

CLASS-XI COMMERCE



CTMX	0.45	▲	+0.45
FTR	-0.23	▼	-2.34%
CSCO	-1.01	▼	-1.89%
CHK	0.02	▲	+0.24
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PRTO	-0.01	▼	-0.01
AMZN	-0.01	▼	-0.01
TSLA	-0.01	▼	-0.01
AVGO	-0.01	▼	-0.01
SIRI	-0.65	▼	-0.65



Work Book Cum Question Bank with Answers BUSINESS MATHEMATICS AND STATISTICS



SCHEDULED CASTES & SCHEDULED TRIBES
RESEARCH & TRAINING INSTITUTE (SCSTRTI)
ST & SC DEVELOPMENT DEPARTMENT
BHUBANESWAR

**WORK BOOK CUM
QUESTION BANK WITH ANSWERS
BUSINESS MATHEMATICS AND STATISTICS
CLASS - XI
(COMMERCE)**

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2020

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SYLLABUS (1ST YEAR)

Unit - I

- **Business Arithmetic**

- (i) **Profit and Loss** : Concept, Calculation of Selling Price, Cost Price, Profit or Loss percentage, Concept and Types of Price, Discount.
- (ii) **Partnership** : Concept, Characteristics, important terms, types of partnership, calculation of Profit Sharing Ratio.
- (iii) **Logarithm** : Concept, Features, Properties, types & methods of Logarithm, Laws of Logarithmic Operation, Determination of Log & Antilog under the common logarithm system, interpolation of logarithms, Methods of Logarithm.
- (iv) **Simple & Compound Interest** : Concept, Types, Calculation of simple interest, Concept & features of Compound Interest and calculation of compound interest. (Simple problems only).

Unit - II

- **Business Arithmetic**

- (i) **Annuity** : Concept, Types, special application of annuity, techniques of calculation of Annuity Problems (Future value & Present value of Annuity), Sinking Fund, Loan, overdraft or borrowings.
- (ii) **Discounting of Bills of Exchange** : Concept, Features, Types of Bills of Exchange, Important terms (Demand Bill, Time Bill, Terms of Bills, Days of Grace, Bill Value, Discounted Period, Banker's Discount, Discounted Value, Present Value, True Discount, Banker's Gain).
- (iii) **Stock & Share** : Concept, Features, Classification of Stock and Shares, Share Vs Stock, calculation of Dividend, Yield, income, cost of investment, Nominal and Market value of Shares, ex-dividend and cum dividend price of a share.

Unit - III

- **Business Statistics**

- (i) Conceptual Framework of Statistics : Meaning, Definition, Origin & Growth
- (ii) Characteristics, Scope & functions of Statistics
- (iii) Relationship of Statistics with other fields
- (iv) Statistical Survey: Meaning and its steps

Unit - IV

- **Business Statistics**

- (i) Data : Types of Data - Primary and Secondary Data.
- (ii) Methods of Collection of Primary & Secondary data
- (iii) Classification of Data and Tabulation of Data

QUESTION PATTERN OF CHSE

Theory	:	80 marks
Project Work	:	<u>20 marks</u>
Total	:	100 marks

Group - A (Objective type - Compulsory)

1. Multiple choice Questions (12 bits questions of 1 mark each) 1 x 12 = 12 marks
2. Do as directed questions
 - a) Express in one word/term
 - b) Correct the underlined portion
 - c) Fill in the blanks
 - d) Answer in one sentence(12 bit questions of 1 mark each) 1 x 12 = 12 marks

Group B (Short type Answer)

3. To be answered within 30 words (10 bit questions to be answered out of 13 given, each carrying 2 marks) 2 x 10 = 20 marks
4. To be answered within 50 words (4 bit questions to be answered out of 6 given, each carrying 3 marks) 3 x 4 = 12 marks

Group C (Long Answer type)

- 5.to (3 questions to be answered out of 5,
9. each carrying 8 marks) 8 x 3 = 24 marks

TOTAL

80 marks

N.B. : Questions have been framed as per the syllabus and pattern of question set in the Annual H.S. Examination conducted of CHSE, Odisha.

UNIT-I

KEY CONCEPTS

PROFIT AND LOSS, PARTNERSHIP, LOGARITHM, CHANGE OF BASE, SIMPLE INTEREST AND COMPOUND INTEREST, COMPOUND INTEREST

PROFIT AND LOSS

- | | |
|---|---|
| <p>(i) Sale Price = Marked Price - Trade Discount</p> <p>(ii) Invoice Price = Sales Price + Invoice Charges</p> <p>(iii) Tender Price = Tender Cost + Profit</p> <p>(iv) Trade Discount = % on marked price</p> <p>(v) Cash Discount = % on sale price</p> <p>(vi) Profit = Sales Price - Cost Price</p> <p>(vii) % of Profit = $\frac{\text{Profit}}{\text{Cost Price}} \times 100$</p> <p>(viii) % of Loss = $\frac{\text{Loss}}{\text{Cost Price}} \times 100$</p> | <p>(ii) $\text{Log} \frac{m}{n} = \text{Log } m - \text{Log } n$</p> <p>$\frac{m}{n} = \text{Antilog} (\text{Log } m - \text{Log } n)$</p> <p>(iii) $\text{Log } m^n = n \text{Log } m$</p> <p>$m^n = \text{Antilog} (n \text{Log } m)$</p> <p>(iv) $\text{Log} \sqrt[n]{m} = \frac{1}{n} \text{Log } m$</p> <p>$\sqrt[n]{m} = \text{Antilog} \left(\frac{1}{n} \text{Log } m \right)$</p> |
|---|---|

PARTNERSHIP

- (i) Sacrificing Ratio = Old Ratio - New Ratio
- (ii) Gaining Ratio = New Ratio - Old Ratio
- (iii) Weighted Capital = $\Sigma (\text{Rs.} \times \text{Time})$

LOGARITHM

Laws of Logarithm

- (i) $\text{Log } mn = \text{Log } m + \text{Log } n$
 $mn = \text{Antilog} (\text{Log } m + \text{Log } n)$

Change of Base

- (i) $\text{Log}_a^m = \text{Log}_b^m \times \text{Log}_a^b$
- (ii) $\text{Log}_b^m = \frac{\text{Log}_a^m}{\text{Log}_a^b}$
- (iii) $\text{Log}_b^m = \text{Log}_b^m \times \text{Log}_c^b \times \text{Log}_a^c$
- (iv) $\text{Log}_b^m = \frac{\text{Log}_a^m}{\text{Log}_c^b \times \text{Log}_a^c}$

**SIMPLE INTEREST AND
COMPOUND INTEREST**

$$(i) \quad \text{S.I.} = \frac{P \times T \times R}{100}$$

$$(ii) \quad P = \frac{\text{S.I.} \times 100}{T \times R}$$

$$(iii) \quad T = \frac{\text{S.I.} \times 100}{P \times R}$$

$$(iv) \quad R = \frac{\text{S.I.} \times 100}{P \times T}$$

$$(v) \quad P = \frac{100 \times A}{100 + TR} \quad (\text{when amount is given})$$

Compound Interest

$$(i) \quad A = P(1 + i)^n \text{ or } A = P \left(1 + \frac{i}{t}\right)^{n \cdot t}$$

$$(ii) \quad \text{C.I.} = A - P = P(1 + i)^n - P$$

$$(iii) \quad P = A(1 + i)^{-n}$$

Where

S.I. = Simple Interest

P = Principal,

R = Rate of Interest

T = Time / Number of Years

A = Amount

$i = R/100$

C.I. = Compound Interest

UNIT - I

GROUP - A : OBJECTIVE TYPE QUESTIONS

1. *From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.*

Profit and Loss

- | | |
|---|--|
| <p>1. Trade discount is a rebate from the :</p> <p>(i) Cost price (ii) Sales price
(iii) Marked price (iv) Net sales</p> <p>2. If a business man cheats 5% of weight in both buying and selling, his gain percentage is :</p> <p>(i) 5% (ii) 10%
(iii) 15% (iv) 10.25%</p> <p>3. When C.P. is ₹123 and S.P. is ₹150, profit percent on S.P. is :</p> <p>(i) 10% (ii) $16\frac{2}{3}\%$
(iii) 20% (iv) 25%</p> <p>4. If cost price is ₹800 and loss is $12\frac{1}{2}\%$, then the sales price is :</p> <p>(i) ₹700 (ii) ₹900
(iii) ₹600 (iv) ₹850</p> <p>5. 25% profit on sale is equal to :</p> <p>(i) 20% on cost (ii) 25% on cost
(iii) 33% on cost (iv) $33\frac{1}{3}\%$ on cost</p> <p>6. Ex-factory price is known as :</p> <p>(i) FOR price (ii) FOB price
(iii) LOCO price (iv) CIF price</p> | <p>7. The invoice price, when the exporter bears all the expenses is known as :</p> <p>(i) COD (ii) LOCO
(iii) FOR (iv) Franco</p> <p>8. If sales price of an article is ₹475 and loss is 5% then its cost price is :</p> <p>(i) ₹480 (ii) ₹500
(iii) ₹525 (iv) ₹498.75</p> <p>9. Successive discounts of 20% and 10% is equivalent to a single discount of :</p> <p>(i) 30% (ii) 25%
(iii) 22% (iv) 28%</p> <p>10. If a seller allows two successive discounts of 25% and 10% the sales price of a product marked ₹1000 is :</p> <p>(i) ₹650 (ii) ₹675
(iii) ₹700 (iv) ₹775</p> <p>11. The excess of cost over revenue is :</p> <p>(i) Profit (ii) Loss
(iii) Cash discount (iv) Trade discount</p> <p>12. An article is sold at 20% loss if the sales price of the article is ₹400, its cost price is :</p> <p>(i) ₹300 (ii) ₹500
(iii) ₹700 (iv) ₹800</p> |
|---|--|

13. A trader giving 800 grams for a kilogram gains by :
- (i) 20% (ii) 25%
- (iii) 30% (iv) 10%
14. When a profit of 20% requires the sales price to be ₹ 1200 a 25% profit require the sales price to be :
- (i) ₹ 1250 (ii) ₹ 1300
- (iii) ₹ 1350 (iv) ₹ 1440
15. Trade discount is allowed by a :
- (i) Creditor to his debtor
- (ii) Trader to a buyer
- (iii) Bankers to a customer
- (iv) Debtor to a creditor
16. The cost price of a scooter is ₹ 16000. To make a profit of $12\frac{1}{2}\%$ it should be sold at :
- (i) ₹ 17000 (ii) ₹ 17500
- (iii) ₹ 18000 (iv) ₹ 18500
17. Equivalent single discount of successive discounts of 5%, 10% and 20% is :
- (i) 35% (ii) 15%
- (iii) 31.6% (iv) 20%
18. If the sales price of an article is ₹ 180 and the seller makes a loss of 20% on sales then its cost price is
- (i) ₹ 180 (ii) ₹ 200
- (iii) ₹ 216 (iv) ₹ 144
19. Cash discount is allowed on :
- (i) Cost price (ii) Selling price
- (iii) Marked price (iv) Net selling price
20. If the successive discounts are 20% and 10% and the selling price is ₹ 216, the marked price is :
- (i) ₹ 400 (ii) ₹ 300
- (iii) ₹ 500 (iv) ₹ 320

Partnership

21. The minimum number of members required to form a partnership is :
- (i) 1 (ii) 2
- (iii) 7 (iv) 50
22. Partnership form of business is governed by the Partnership Act :
- (i) 1912 (b) 1932
- (c) 1961 (d) 2015
23. Maximum number of partners in case of non-banking business is :
- (i) 7 (ii) 10
- (iii) 20 (iv) 50
24. Normally liabilities of partners in a partnership firm are :
- (i) Limited (ii) Unlimited
- (iii) Fixed (iv) Partly fixed
25. Maximum number of partners in case of banking business is :
- (i) 5 (ii) 10
- (iii) 15 (iv) 20
26. If A and B are two partners having capital ratio of 2:3, B's share of profit in a total profit of ₹ 60,000 is :
- (i) ₹ 24,000 (ii) ₹ 12,000
- (iii) ₹ 36,000 (iv) ₹ 48,000

27. In absence of any provision in partnership deed rate of interest on loan payable to partners is :
- (i) 5% (ii) 6%
(iii) 7% (iv) 8%
28. In absence of any provision in partnership deed the profit of the firm is shared among the partners in :
- (i) Capital ratio (ii) Sacrificing ratio
(iii) Gaining ratio (iv) Equal ratio
29. Agreement among the partners laying down the terms and conditions of partnership business is :
- (i) Article of association
(ii) Memorandum
(iii) Partnership deed
(iv) Object clause
30. A partner who contributes capital but do not take active part in business is a :
- (i) Active partner
(ii) Partner by holding out
(iii) Nominal partner
(iv) Sleeping partner
31. The retiring partners share in the goodwill is written off to the other partners account in their :
- (i) Old ratio (ii) New ratio
(iii) Gaining ratio (iv) Sacrificing ratio
32. When a new partner brings cash for goodwill the old partners divide the goodwill in their :
- (i) New ratio (ii) Old ratio
(iii) Capital ratio (iv) Sacrificing ratio
33. A invested ₹ 20,000 for a year, B invested ₹ 25,000 for 8 months then their profit sharing ratio is :
- (i) 6 : 5 (ii) 5 : 6
(iii) 10 : 15 (iv) 12 : 8
34. A and B invest equal amount of capital but A's money is invested for 8 months and B's money for 12 months, then their profit sharing ratio is :
- (i) Equal (ii) 3 : 2
(iii) 2 : 3 (iv) 6 : 5
35. Old ratio - New ratio is
- (i) Capital ratio
(ii) Profit sharing ratio
(iii) Loss sharing ratio
(iv) Sacrificing ratio

Logarithm

36. Common logarithm system was developed by :
- (i) De Morgan (ii) John Venn
(iii) Henry Briggs (iv) Napier
37. When no base of the log is specified it is assumed to be :
- (i) e (ii) 10
(iii) 0 (iv) 100
38. The integral part of the logarithm is called :
- (i) Mantissa (ii) Characterstics
(iii) Standard form (iv) Base
39. The decimal part of the logarithm is known as :
- (i) Base (ii) Characterstic
(iii) Exponent (iv) Mantissa
40. The base of natural logarithm is :
- (i) 0 (ii) e
(iii) 10 (iv) 100
41. The standard form of 0.0006457 is
- (i) 64.57 (ii) 6.457×10^{-3}
(iii) 6.457×10^{-4} (iv) 64.57×10^{-2}

42. Log_2^2 is equal to :
- (i) 0 (ii) 1
(iii) 10 (iv) 2
43. $\text{Log } 1000$ is equal to :
- (i) 1 (ii) 2
(iii) 3 (iv) 4
44. Log_{10}^1 is equal to :
- (i) 0 (ii) 1
(iii) 0.1 (iv) 0.01
45. The characteristic of $\text{Log } 0.0006457$ is :
- (i) 3 (ii) $\bar{3}$
(iii) 4 (iv) $\bar{4}$
46. Mantissa part of the log is always :
- (i) Negative
(ii) Positive
(iii) Negative or positive
(iv) Zero
47. $\text{Log } \sqrt[n]{m}$ is equal to
- (i) $\text{Log } n \cdot \text{Log } m$ (ii) $\text{Log } n + \text{Log } m$
(iii) $\text{Log } \frac{1}{n} \cdot \text{Log } m$ (iv) $\frac{1}{n} \text{Log } m$
48. Log_a^m is equal to :
- (i) $\log_a^m \cdot \text{Log}_m^a$ (ii) $\log_b^m \cdot \text{Log}_m^b$
(iii) $\log_b^m \cdot \text{Log}_a^b$ (iv) $\log_m^b \cdot \text{Log}_b^m$
49. If $\log 81$ to the base a is 3 then the value of a is :
- (i) 3 (ii) 4
(iii) 9 (iv) 27
50. The characteristic of $\log 4.06457$ is :
- (i) 1 (ii) 2
(iii) 3 (iv) 5
- Simple Interest and Compound Interest**
51. A sum will double itself in 10 years at a simple interest rate of :
- (i) 5% p.a. (ii) 10% p.a.
(iii) 20% p.a. (iv) 25% p.a.
52. A sum of ₹ 2400 will earn an interest of ₹ 360 at 5% p.a. simple interest in :
- (i) 1 yr. (ii) 2 yrs.
(iii) 3 yrs. (iv) $\frac{1}{2}$ yr.
53. Simple interest on ₹ 2000 for $5\frac{1}{2}$ yrs. at 5% p.a. is :
- (i) ₹ 500 (ii) ₹ 525
(iii) ₹ 530 (iv) ₹ 550
54. The simple interest on a sum will be equal to $\frac{1}{10}$ th of itself in 4 years at :
- (i) 5% p.a. (ii) 10% p.a.
(iii) 15% p.a. (iv) $2\frac{1}{2}$ % p.a.
55. If S.I. = ₹ 100, Rate = 5% p.a. and Time = 2 yrs. then the principal is :
- (i) ₹ 500 (ii) ₹ 800
(iii) ₹ 1000 (iv) ₹ 1100
56. A sum of ₹ 1250 will amount to ₹ 1400 at 6% S.I. per annum in :
- (i) 1 yr. (ii) $\frac{1}{2}$ yr.
(iii) 2 yrs. (iv) $2\frac{1}{2}$ yrs.
57. Interests are always calculated at :
- (i) Nominal rate (ii) Effective rate
(iii) Compound rate (iv) Simple rate

58. Compound interests are converted into capital at the end of every :
- Month
 - Quarter
 - Year
 - Conversion period
59. Compound interest is equal to :
- $P(1+R)^n - P$
 - $A(1+i)^n + P$
 - $P(1+i)^n - P$
 - $P(1+i-A)$
60. Compound interest on ₹ 1000 @10 p.a. for 3 years is :
- ₹ 300
 - ₹ 330
 - ₹ 333
 - ₹ 331
61. The principal that will yield ₹ 406, at $3\frac{1}{2}\%$ simple interest p.a. in $7\frac{1}{4}$ years is :
- ₹ 1600
 - ₹ 800
 - ₹ 1200
 - ₹ 1000
62. If P = Principal, R = Rate, T = Time, then simple interest is equal to :
- $\frac{PT}{R}$
 - $\frac{RT}{P}$
 - $\frac{100 \times T \times R}{P}$
 - $\frac{PTR}{100}$
63. Number of years in which a sum will be 2.9 times of itself at 5% p.a. simple interest is :
- 29 years
 - 38 years
 - 19 years
 - 30 years
64. If C.I. = ₹ 331, n = 3 yrs., R = 10% then the principal is :
- ₹ 1000
 - ₹ 1100
 - ₹ 1110
 - ₹ 1210
65. If C. I. = ₹ 105, n = 2 years and R = 10%, then principal is :
- ₹ 400
 - ₹ 500
 - ₹ 550
 - ₹ 605

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

Profit and Loss

- What is trade discount ?
- What is cash discount ?
- What is franco price ?
- What is loco price ?
- What is invoice price ?
- What is marked price ?
- What is quotation price ?

Partnership

- What is partnership ?
- What is partnership deed ?
- Who is a sleeping partner ?
- what is sacrifice ratio ?
- How weighted capital is calculated ?

Logarithm

- What is logarithm ?
- What is common logarithm ?

15. Write the multiplication law of logarithm.
16. Write the division law of logarithm.
17. What is characteristic ?
18. What is mantissa ?
19. What is the logarithm of any number to the base itself ?
20. What is antilogarithm ?

2. (b) Fill in the blanks :

Profit and Loss

1. When sales price is ₹ 1000 and cost price is ₹ 750, profit percentage is equal to _____.
2. When sale price of an article is ₹ 475 and loss is 5% the cost of the article is _____.
3. 25% profit on sale is equal to _____ % profit on cost.
4. Successive discount of 20% and 10% is equivalent to a single discount of _____%.
5. Ex-factory price is also known as _____ price.
6. Trade discount is allowed on _____ price of an article.
7. CIF price cover cost, insurance and _____.

Partnership

8. Usually the liability of partners is _____.
9. Minimum number of members needed to form a partnership is _____.
10. Partnership business is governed by the Indian Partnership Act _____.
11. The excess of old profit sharing ratio over the new profit sharing ratio is known as _____ ratio.

Simple Interest and Compound Interest

21. What is interest ?
22. What is nominal rate ?
23. Write the formula for finding simple interest.
24. What is compound interest ?
25. Write the formula used for calculating compound interest.

12. The excess of new profit sharing ratio over the old profit sharing ratio is called _____ ratio.
13. Partnership agreement containing all the terms and conditions in detail is known as partnership _____.

Logarithm

14. $\log_2 64$ is equal to _____.
15. When base of the log is not specified it is assumed to be _____.
16. $\log \frac{1}{10} =$ _____.
17. The decimal part of logarithm is called _____.
18. $\sqrt[m]{m} =$ Antilog of _____ (Log m).
19. The characteristics of log .006507 is _____.
20. Logarithm of 1 to any non-zero base is _____.

Simple Interest and Compound Interest

21. A sum of money will double in 10 years at _____ % p.a. simple interest.
22. ₹ 2400 will produce ₹ 120 as simple interest at 5% p.a. in _____ years.
23. Compound interest is calculated on _____ amount.

24. Simple interest on ₹ 2000 for $5\frac{1}{2}$ years at 5% p.a. is _____ .
25. Nominal rate and effective rates are _____ when interests are calculated per annum.
26. The compound interest on ₹ 1000 @10% for 2 years is equal to ₹ _____.
27. In _____ years ₹ 1000 will amount to ₹ 1350 at 7% simple interest.
28. ₹ _____ will yield a simple interest of ₹ 100 at 5% p.a. in 2 years.
29. A sum of ₹ 1200 will amount to ₹ 1500 in 5 years at _____ % S.I. p.a.
30. C. I. = $P(1+i)^n - \text{_____}$.

2. (c) *Express the following in one word / term each.*

Profit and Loss

1. Price at which an article is quoted or tendered by a seller.
2. Price payable at the locality of supply which excludes all expenses of delivery.
3. Discount allowed for prompt payment.
4. Excess of cost price over sales price.
5. Series of discounts given by seller to a buyer is known as :
6. Discount allowed by a trader to buyer of goods.

Partnership

7. A partner who contributes capital but do not participate in the management of the firm.
8. The document which contains the terms and conditions of partnership business.
9. Excess of old profit sharing ratio over the profit sharing ratio.
10. Excess of new profit showing ratio over the old profit sharing ratio.
11. The accumulated balance of undistributed profit of the firm.
12. Persons who enter into partnership business.

Logarithm

13. The integral part of logarithm.
14. The decimal part of logarithm.
15. The reverse process of logarithm.
16. Logarithm in which the base is taken as 10.
17. Logarithm in which the base is taken as 'e' or 2.7183.

Simple Interest and Compound Interest

18. The interest which is always calculated at a fixed rate in the original amount of the principal borrowed.
19. The agreed rate at which the interest is calculated on certain money either per annum per any other conversion period.
20. The price paid by a borrower for using lenders' money for a certain period.
21. The sum of principal and interest.
22. Interest which is calculated at a given rate percent of the accumulated sum of the principal and the earliest interest left unpaid.

2. (d) Correct the underlined portion of the following sentences.

Profit and Loss

1. Loco price covers all the charges upto buyers godown.
2. Trade discount is deducted from the cost price of an article.
3. If the C.P. \geq S.P. then a seller gains.
4. Trade discount is deducted from the amount of a debt realised.
5. 25% profit on S.P. is equal to 20% on C.P.
6. F.A.S. price covers cost freight and insurance.
7. The excess of cost over revenue is profit.
8. Co-efficient or percentage of profit is called absolute profit.

Partnership

9. Maximum number of partners in a firm would be 50.
10. Active partners do not participate in the firm management.
11. Minimum number of members required to form a partnership is 7.
12. Agreement containing all the terms and conditions of partnership is known as memorandum of association.
13. The liabilities of partners in a firm are usually limited.
14. In absence of an agreement the profit and loss of a firm is divided among the partners in capital ratio.

Logarithm

15. The logarithm of a number to base 10 is called natural logarithm.
16. The logarithm of 1000 to the base 10 is 4.000.
17. The decimal part of logarithm is known as characterstic.
18. The log of 64 to the base 8 is 6.
19. $\text{Log} \frac{a}{b} = \text{Log } a + \text{Log } b$.
20. Logarithm of any number to the base itself is 10.
21. $\text{Log } m^n = \text{Log } n \times \text{Log } m$.
22. The characterstics of $\text{Log } 0.0075$ is 2.

Simple Interest and Compound Interest

23. Simple interest is calculated on accumulated amount.
24. Interests are always calculated at effective rate.
25. C. I. = $P(1+i)^n - \underline{A}$.
26. At 25% simple interest per annum a sum will double itself in 5 years.
27. Effective rate is less than the nominal rate when interest are calculated per annum.
28. Effective rate is lower than the nominal rate when interests are calculated per any term less than a year.

UNIT - I**GROUP - A : ANSWERS**

1. From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.

- | | |
|-----------------------------------|----------------------------------|
| 1. (iii) Marked price | 21. (ii) 2 |
| 2. (iv) 10.25% | 22. (b) 1932 |
| 3. (ii) $16\frac{2}{3}\%$ | 23. (iii) 20 |
| 4. (i) ₹ 700 | 24. (ii) Unlimited |
| 5. (iv) $33\frac{1}{3}\%$ on cost | 25. (ii) 10 |
| 6. (iii) LOCO price | 26. (iii) ₹ 36,000 |
| 7. (iv) Franco | 27. (ii) 6% |
| 8. (ii) ₹ 500 | 28. (iv) Equal ratio |
| 9. (iv) 28% | 29. (iii) Partnership deed |
| 10. (ii) ₹ 675 | 30. (iv) Sleeping partner |
| 11. (ii) Loss | 31. (iii) Gaining ratio |
| 12. (ii) ₹ 500 | 32. (iii) Capital ratio |
| 13. (ii) 25% | 33. (i) 6 : 5 |
| 14. (i) ₹ 1250 | 34. (iii) 2 : 3 |
| 15. (ii) Trader to a buyer | 35. (iv) Sacrificing ratio |
| 16. (iii) ₹ 18000 | 36. (iii) Henry Briggs |
| 17. (iii) 31.6% | 37. (ii) 10 |
| 18. (iii) ₹ 216 | 38. (ii) Charectorstics |
| 19. (iv) Net selling price | 39. (iv) Montissa |
| 20. (ii) ₹ 300 | 40. (ii) e |
| | 41. (iii) 6.457×10^{-4} |

- | | |
|---|-----------------------------------|
| 42. (ii) 1 | 54. (iv) $2\frac{1}{2}\%$ p.a. |
| 43. (iii) 3 | 55. (iii) ₹ 1000 |
| 44. (i) 0 | 56. (iii) 2 yrs. |
| 45. (iv) $\bar{4}$ | 57. (i) Nominal rate |
| 46. (ii) Positive | 58. (iv) Conversion period |
| 47. (iv) $\frac{1}{n} \text{Log } m$ | 59. (iii) $P(1+i)^n - P$ |
| 48. (iii) $\log_b^m \cdot \text{Log}_a^b$ | 60. (iv) ₹ 331 |
| 49. (ii) 4 | 61. (i) ₹ 1600 |
| 50. (ii) 2 | 62. (iv) $\frac{\text{PTR}}{100}$ |
| 51. (ii) 10% p.a. | 63. (ii) 38 years |
| 52. (iii) 3 yrs. | 64. (i) ₹ 1000 |
| 53. (iv) ₹ 550 | 65. (ii) ₹ 500 |

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

- Trade discount is a discount allowed by a trader to the buyer of goods for bulk buying.
- Cash discount is a discount allowed by a creditor to a debtor for prompt payment of a bill.
- It is the invoice price that covers all charges upto buyer's godown.
- LOCO price is ex-factory or ex-godown price which excludes all expenses relating to transport, loading, insurance etc.
- Invoice price is one at which an article is invoiced to a buyer after receipt of a specific order called indent from him.
- Marked price is the price at which an article is quoted or tendered by a seller to invite offers from the prospective buyers.
- It is a sort of marked price of an article that is payable at a particular state of delivery upon orders which is quoted to prospective buyers on request.
- Partnership is the relationship between persons who have agreed to share the profits of a business carried on by all or any of them acting for all.
- Partnership agreement entered into in writing containing all the terms and conditions in detail is called partnership deed.

10. A partner who contributes capital, shares the profit and loss but do not take active part in management of the business is called sleeping partner.
11. The difference between old and new profit sharing ratio of partners is called sacrificing ratio.
12. Weighted capital

$$= \sum (\text{Capital invested} \times \text{Time period})$$
13. If $a^x = N$ (Where $a > 0, a \neq 1$) then the index 'x' is called the logarithm of the number 'N' with respect to the base 'a'.
14. The system of logarithm with 10 as the base is known as common logarithm.
15. Multiplication law of logarithm is :

$$\text{Log} (m \times n) = \text{Log} m + \text{log} n.$$
16. The division law of logarithm is

$$\text{Log} \frac{m}{n} = \text{Log} m - \text{log} n .$$
17. The integral part of logarithm of a number is called as charecteristic.
18. The logarithm of any number to the base itself is 'One.
20. If $10^N = x$, then N is called the antilogarithm of x and is written as antilog x = N.
21. Interest is the price paid by the borrower to the lender for using his money for certain period.
22. Nominal rate is the agreed rate at whcih interest is calculated on certain money either per annum, or any other conversion period.
23. Simple Interest =
$$\frac{\text{Pr incipal} \times \text{Time} \times \text{Rate}}{100} .$$
24. Compound interest is one which is calculated at a given rate per cent on the accumulated sum of the principal and the earlier interest left unpaid.
25. Compound interest (C.I.) = $P(1 + i)^n - P.$

2. (b) Fill in the blanks :

- | | | |
|------------------------------|-------------------|-----------------|
| 1. $33\frac{1}{3}\%$ | 10. 1932 | 20. 0 |
| 2. ₹ 500 | 11. Sacrificing | 21. 10% |
| 3. $33\frac{1}{3}$ | 12. Gaining | 22. 1 (One) |
| 4. 28% | 13. Deed | 23. Accumulated |
| 5. LOCO | 14. 6 | 24. ₹ 550 |
| 6. Marked / List / Catalogue | 15. 6 | 25. Equal |
| 7. Freight | 16. - 1 | 26. ₹ 210 |
| 8. Unlimited | 17. Mantissa | 27. 5 years |
| 9. 2 | 18. $\frac{1}{n}$ | 28. ₹ 1000 |
| | 19. $\bar{3}$ | 29. 5% |
| | | 30. P |

2. (c) Express the following in one word / term each.

- | | |
|--|-----------------------|
| 1. Marked Price / List Price / Catalogue Price | 12. Partners |
| 2. Loco / Ex-factory price | 13. Characterstic |
| 3. Cash discount | 14. Mantissa |
| 4. Lost | 15. Antilogarithm |
| 5. Successive discounts | 16. Common Logarithm |
| 6. Trade discount | 17. Natural logarithm |
| 7. Sleeping Dormant Partner | 18. Simple interest |
| 8. Partnership Deed | 19. Nominal Rate |
| 9. Sacrificing ratio | 20. Interest |
| 10. Grining ratio | 21. Amount |
| 11. Reserves | 22. Compound interest |

2. (d) Correct the underlined portion of the following sentences.

- | | |
|------------------------|---------------|
| 1. Franco | 15. Common |
| 2. Marked / List | 16. 3.000 |
| 3. < | 17. Mantisa |
| 4. Cash | 18. 2 |
| 5. $33\frac{1}{3}\%$ | 19. ab |
| 6. C.I.F. | 20. 1 |
| 7. Loss | 21. n |
| 8. Relative | 22. $\bar{3}$ |
| 9. 20 | 23. Original |
| 10. Dormant / Sleeping | 24. Nominal |
| 11. 2 | 25. P |
| 12. Partnership Deed | 26. 20% |
| 13. Unlimited | 27. Equal to |
| 14. Equal | 28. Higher |

UNIT - I**GROUP - B : SHORT TYPE QUESTIONS****3. Short Questions to be answered within 30 words****Profit and Loss**

1. Write any two differences between trade discount and cash discount.
2. What is successive discounts ?
3. A dealer allows 15% trade discount and 10% cash discount. Find the sales price if the marked price is ₹ 400.
4. Which is profitable for the buyer 20%, 15% or 30% ?
5. Find the single discount equivalent to successive discounts of 20%, 15% and 10%.
6. At what price an article be marked to get a profit of 17% after allowing 10% cash discount if the C.P. of the article is ₹ 100.
7. What is F.A.S. price ?
8. What is C.I.F. price ?
9. What is marked price ?
10. A dishonest trader using a false weight defrauds 10% while buying and 10% while selling, what is his gain percentage ?
11. A trader sold an article for ₹ 2250 and earned a profit of 20% on S.P. what is his C.P. ?
12. A person buys 8 mangoes for ₹ 15 and sells 10 mangoes for ₹ 18. What is the percentage of gain ?
13. Ram sold an article for ₹ 2500 and gained 25% on C.P.. Find the C.P. of the article.

14. By selling 200 lemons a man gains the cost price of 50 lemons what is his percentage of profit ?
15. By selling a book for ₹ 18 shopkeeper loses 10%. At what price he should sell to gain 10% ?
16. If a man purchases 4 apples for ₹ 5 and sales 5 apples for ₹ 4. Find his gain or loss percentage.
17. What is trade discount ?
18. What is cost price ?
19. The list price of a cooler is ₹ 1280. It is sold at a discount of 8%. If further off season discount of 10% given, find the selling price of the cooler.
20. A chair was sold for ₹ 63 making a profit of 5% what was its C.P. ?

Partnership

21. Define partnership under Indian Partnership Act.
22. What is partnership deed ?
23. Three partners A, B & C invest ₹ 1600, ₹ 1800 and ₹ 2200 respectively. Find their share in a profit of ₹ 440.
24. What is compound partnership ?
25. How capital ratio is found out in compound partnership ?
26. A, B, C invested capital in the ratio of 3:4:5. The timing of their investment being in the ratio of 4:5:6. Find their profit showing ratio.
27. A invest ₹ 1000 for 6 months and B invests ₹ 750 for 4 months. What will be their profit sharing ratio.

28. Write any two content of a partnersip deed.
29. What is sacrifice ratio ?
30. Who is a partner ?
31. What is profit sharing ratio ?
32. What is gaining ratio ?
33. What is legal profit sharing ratio ?
34. P and Q share the profit and loss in the ratio of 3:2 C joins with them purchasing 1/3rd share. What is the new profit sharing ratio.
35. What is goodwill ?

Logarithm

36. Define logarithm.
37. What is change of base law of logarithm ?
38. Find the value of $\text{Log}_2 \frac{1}{8}$.
39. Find the value of $\text{Log}_4 2$.
40. Write 0.4339 in standard form.
41. Find the value of $\text{Log}_{\sqrt{2}} x = 6$.
42. Add the following logarithm values
2.9708, $\bar{3}.6551$, $\bar{4}.3263$.
43. Subtract the following logarithm values
 $\bar{3}.1256 - \bar{1}.6341$.
44. Find the value of x
 $\text{Log}_x 2 + \text{Log}_x 4 + \text{Log}_x 8 = 2$.
45. Multiply the following logarithm values
 $\bar{2}.6551 \times 2$.
46. Divide the following logarithm value by the given real number
 $\bar{3}.4215 \div 4$
47. Change the base of $\text{Log}_2 64$ into common logarithm base.
48. Write any two properties of logarithm.
49. What is standard form ?
50. Find the number of digit in 3^{50} .

Simple Interest and Compound Interest

51. What is effective rate of interest ?
52. Write the formula for finding the amount when interest is compounded quarterly.
53. What sum of money will generate ₹429 interest in $3\frac{1}{4}$ years at $2\frac{1}{2}$ SI per annum ?
54. In what time will ₹ 34,000 amount to ₹ 63070 at 4.5% p.a. ?
55. At what rate of interest a sum of money will be trebled itself in 5 years ?
56. What principal will amount to ₹ 3440 in 6 years @ 12% p.a. ?
57. What principal will amount to ₹ 9520 in 4 years @ 9% p.a. ?
58. In how many years ₹ 300 amount to ₹ 405 at 5% p.a. ?
59. At 10% p.a. C.I. ₹ 10,000 will amount to what sum in 3 years ?
60. Find compound interest on ₹ 2000 for 2 years at 10% p.a.
61. What principal will amount to ₹ 1352 in 2 years at 4% p.a. C.I. ?
62. Write the formula for finding principal when interest is compounded annually.
63. Find the C.I. on ₹ 3000 for 3 years @ 12% p.a.
64. Write the formula for calculating simple interest.
65. Explain compound interest.

4. *Answer the following questions within 50 words each.*

Profit and Loss

1. A man sold a land at a profit of $8\frac{1}{2}\%$. Had he sold it for ₹ 700 more he would have gained 12%. Find the cost price.
2. A person buys a table for ₹ 600 and sells it for ₹ 820 at a credit of 5 months. What is his gain percent if rate of interest is 5% p.a.
3. Which is profitable for the buyer. A discount of 15%, 20% or 12% and 25%.
4. The list price of an article is ₹ 65. Two successive discount of 20% and 10% are allowed by the seller find its sales price.
5. Explain 'invoice price'.
6. Explain C & F price.
7. Write any three differences between trade discount and cash discount.
8. Explain 'Loco' price.
9. What is tender price ?

Partnership

10. What do you mean by sacrificing and gaining ratio in case of partnership business?
11. Write any four important content of a partnership deed.
12. The profit sharing ratio of A and B was 3:2. C is admitted to partnership. If the new ratio is 1:1:1 find the sacrificing ratio.
13. X, Y and Z share profit and loss in the ratio of 1:2:5. Y retires from the firm. What is their gaining ratio ?
14. A and B share profit in the ratio of 3:2. They admit C who takes $\frac{1}{10}$ of profit. Calculate the new profit sharing ratio.
15. P, Q and R agree to share their profit in their capital ratio. The total capital of the firm was ₹ 60,000. Out of total profit ₹ 20,000 P gets ₹ 5000 Q gets ₹ 6000. What is R's capital ?

Logarithm

16. Find the log of .125.
17. Find the value of x if $\left(\frac{1}{.4}\right)^x = 6.25$.
18. Prove that $\text{Log}_b^a \times \text{Log}_c^b \times \text{Log}_a^c = 1$.
19. Prove that $\text{Log} mn = \text{Log} m + \text{Log} n$.
20. Prove that $\text{Log}_a \frac{m}{n} = \text{Log}_a m - \text{Log}_a n$.
21. Show that $\text{Log}_4 \text{Log}_{\sqrt{2}} \text{Log}_3 81 = 1$.
22. Prove that $\text{Log}_3 \text{Log}_3 \text{Log}_4 64 = 0$.
23. Prove that $\text{Log}_a \sqrt[n]{m} = \frac{1}{n} \text{Log}_a m$.
24. Find x if $\text{Log}_{49} \sqrt{7} = \frac{1}{4} x$.
25. Evaluate $\text{Log}_{0.1} 0.001$.

Simple Interest and Compound Interest

26. Differentiate between nominal rate and effective rate of interest.
27. Differentiate between simple interest and compound interest.
28. At what rate percent a sum will treble itself in 20 years with simple interest.
29. Find the effective rate of interest corresponding to 10% p.a. Convertible half yearly.
30. What principal will amount to ₹ 3440 in 6 years @ 12% p.a. ?
31. A man deposited ₹ 5830 in a bank. How much he would receive at the end of 5 years if the bank agrees to pay him S.I. of 7% p.a.
32. What sum of money will generate ₹ 429 interest in $3\frac{1}{4}$ years at $2\frac{1}{3}\%$ simple interest?

UNIT - I

GROUP - B : ANSWERS

3. Short Questions to be answered within 30 words

1. Trade discount is deducted from the marked price of an article but cash discount is deducted from the amount of a debt realised.
Trade discount is given by a trader to a buyer of goods where as cash discount is allowed by a creditor to a debtor.
2. If a trader offer series of discounts and each being calculated on the past reduced value then such discounts are called successive discounts.
3.

The M.P.	= ₹ 400
Less Trade Discount	= ₹ 60
15%	-----
	= ₹ 340
Less Cash Discount	= ₹ 34
10%	-----
Sales price	₹ 306
4. Suppose M.P. = ₹ 100
Successive discounts of 20% and 15% will be

$$\left(100 \times \frac{20}{100}\right) + \left(80 \times \frac{15}{100}\right) = 20 + 12 = ₹ 32$$
 Single discount is only 30% or ₹ 30.
Hence successive discounts of 20% and 15% is profitable.
5. If the M.P. is ₹ 100
1st 20% on ₹ 100 = ₹ 20
2nd 15% on (100-20) = ₹ 12
3rd 15% on (80 - 12) = ₹ 10.2
Total discount 42.2
∴ Single equivalent of the successive discounts of 20%, 15%, 10% is 42.2%.
6. When C.P. is ₹ 100
The S.P. will be $₹ 100 + 100 \times \frac{17}{100} = 117$
As 10% discount is allowed
When M.P. = 100 the S.P. = 90
When the SP = 117 the MP = $\frac{100}{90} \times 117 = ₹ 130$.
7. It is the price payable at the side of the ship which is inclusive of all charges along side the ship such as packing carriage to dock, dock dues etc.
8. This quotation price is inclusive of all charges upto the contract of freight and insurance. C.I.F. stands for cost insurance and freight.
9. Marked price is the nominal price at which an article is quoted or tendered by a seller to invite offers from prospective buyers. This is also called as list price or catalogue price.
10. Percentage of gain

$$= \frac{\text{True weight} - \text{False weight}}{\text{False weight}} \times 100$$

$$= \frac{1000 \text{ gms} - 900 \text{ gms}}{900 \text{ gms}} \times 100$$

$$= \frac{1}{9} \times 100 = \frac{100}{9} \%$$

$$= 11 \frac{1}{9} \%$$
11. S. P. = ₹ 2250
Profit is 20% on S.P. = $2250 \times \frac{20}{100} = ₹ 450$
∴ C.P. = S.P. - Profit = ₹ 2250 - ₹ 450 = ₹ 1800.

12. Let the man buys 40 mangoes i.e. L.C.M. of 10 and 8.
Then the
C.P. will be $\frac{40}{8} \times 15 = ₹75$
S.P. will be $\frac{40}{10} \times 18 = ₹72$
Then the loss is $₹75 - ₹72 = ₹3$.
% of Loss is $\frac{3}{75} \times 100 = 4\%$.
13. When C.P. is ₹100 S.P. = 125
When S.P. is 2500 C.P.
 $= \frac{100}{125} \times 2500 = ₹2000$.
14. In 200 he gains 50
 \therefore His profit % is $\frac{50}{200} \times 100 = 25\%$.
15. When S.P. is ₹90 and the C.P. is ₹100, then there is loss of 10%.
Hence when S.P. is ₹18,
the C.P. is $\frac{100}{90} \times 18 = ₹20$.
To make a profit of 10% the S.P. will be
 $₹20 + \frac{20 \times 10}{100} = ₹20 + ₹2 = ₹22$.
16. Let the man buys 20 apples
The C.P. of the apples will be $\frac{20}{4} \times 5 = ₹25$
The S.P. of the apples will be $\frac{20}{5} \times 4 = ₹16$
Then loss is $₹25 - ₹16 = ₹9$
% of loss is $\frac{9}{25} \times 100 = 36\%$.
17. Sometimes the wholesaler allows certain percentage of discount on marked price to retailer to enable him to sale the article at marked price and earn some profit. This discount is called trade discount.
18. Price paid by the buyer to buy an article from the seller is called cost price. It includes all the expenses incurred in connection with the purchase.
19. M.P. of the cooler is ₹1280
Less 1st Discount 8% 102.04

1177.96
Less off season discount 10% 117.80

1060.16
20. When S.P. is ₹105 C.P. = 100
When S.B. is 63 C.P. = $\frac{100}{105} \times 63 = ₹60$
21. Indian Partnership Act defines partnership as the relation between persons who have agreed to share profits of a business carried on by all or any of them acting for all.
22. If partnership agreement is in writing and registered in the form of a document that is called partnership deed.
23. A, B & C's capital ratio is 15 : 18 : 22, Total Profit = ₹440.
A's share
 $= \frac{440}{15+18+22} \times 15 = \frac{440}{55} \times 15 = ₹120$
B's share = $\frac{440}{55} \times 18 = ₹144$
C' share = $\frac{440}{55} \times 22 = ₹176$.
24. The partnership in which the capital of partners are not invested for equal period of time is called compound partnership.

25. In compound partnership capital ratio is determined on the basis of capital invested per month. Monthly equivalent capital investment of each partner is found out for the purpose.
26. The investment ratio is 3:4:5
Time of investment ratio is 4:5:5
Then their profit sharing ratio will be
 $(3 \times 4) : (4 \times 5) : (5 \times 6)$
i.e. 12 : 20 : 30 or 6 : 10 : 15.
27. A invest ₹ 1000 for 6 months then
 $1000 \times 6 = 6000$ for 1 month
B invest ₹ 750 for 4 months then
 $750 \times 4 = 3000$ for 1 month
Then their profit sharing ratio will be
6000 : 3000 or 2:1.
28. Content of partnership deed :
- Amount of capital contributed by each partner
 - Profit sharing ratio
 - Rate of interest (if any) on capital etc.
29. Here sacrifice means the profit the old partners has to forgo in case of new admission. Thus sacrifice ratio is the difference between old profit sharing ratio and new profit sharing ratio.
30. A partner is a person whether artificial or natural who agrees to take part in the profit and losses of a business. He may or may not bring any capital or may or may not take active part in management.
31. A profit sharing ratio is a quantitative ratio like 1:2, 2:3, 3:4 etc. in which both profits and losses made by a firm are divided among its partners.
32. Here gain means the increase in share of profit of the old partners due to new admission or retirement. Thus gaining ratio is new profit sharing ratio minus old profit sharing ratio.
33. A legal profit sharing ratio is one which is laid down in the partnership laws and is applied when there is no agreement as to the manner of distribution of profit and losses. It is always equal i.e. 1:1.
34. A's share was $\frac{3}{5}$ and B's $\frac{2}{5}$
Now C's have $= \frac{1}{3}$
B's c's share is $1 - \frac{1}{3} = \frac{2}{3}$
Out of $\frac{2}{3}$
A's share will be $\frac{2}{3} \times \frac{3}{5} = \frac{2}{5}$
B's share will be $\frac{2}{3} \times \frac{2}{5} = \frac{4}{15}$.
The new ratio A : B : C
 $\frac{2}{5} : \frac{4}{15} : \frac{1}{3}$ or 6:4:5.
35. Goodwill is an intangible asset which arises because of good reputation of a business. This may be due to good location, good dealings, good quality, good price good behaviour etc.
36. If $a^x = N$ (Where $a > 0$, $a \neq 1$, then the index 'x' is called the logarithm of number N with respect to base 'a'. It is written as, $\text{Log}_a N = x$.
37. According to change of base law
 $\text{Log}_a m = \text{Log}_b m \times \text{Log}_a b$ similarly
 $\text{Log}_a m = \text{Log}_b m \times \text{Log}_c b \times \text{Log}_a c$
38. Let $\text{Log}_2 \frac{1}{8} = x$
 $\therefore 2^x = \frac{1}{8} \therefore 2^x = 2^{-3}$
 $\therefore x = -3$.

39. Let $\text{Log}_4^2 = x$
 $\therefore 4^x = 2$
 $\therefore 2^{2x} = 2^1$
 $\therefore 2x = 1$
 $\therefore x = \frac{1}{2}$
40. 0.4339
 $= 0.4339 \times \frac{10}{10}$
 $= (04.339 \times 10) \times \frac{1}{10} = 4.339 \times \frac{1}{10}$
 $= 4.339 \times 10^{-1}$
41. $\text{Log}_{\sqrt{2}} x = 6$
 $(\sqrt{2})^6 = x$
 $(2^{\frac{1}{2}})^6 = x$
 $2^{\frac{1}{2} \times 6} = x$ or $2^3 = x$
 $\therefore x = 8$.
42. $2.9708 + (-3) + 0.6551 + (-4) + 0.3263$
 $= 2.9708 - 3 + 0.6551 - 4 + 0.3263$
 $= 3.9522 - 7 = -3.0478$
 $= \bar{4} + 1 - 0.0478$
 $= \bar{4}.5922$
43. $\bar{3}.1256 - \bar{1}.6341$
 $= -3 + 0.1256 - \{(-1) + 0.6341\}$
 $= -3 + 0.1256 + 1 - 0.6341$
 $= 1.1256 - 3.6341 = -2.5085$
 $= -3 + 1 - 0.5085 = \bar{3}.4915$
44. $\text{Log}_x^2 + \text{Log}_x^4 + \text{Log}_x^8 = 2$
 $= \text{Log}_x^{(2 \times 4 \times 8)} = 2$
 $= \text{Log}_x^{64} = 2$
 $\therefore x^2 = 64$
 $\therefore x^2 = 8^2$
 $\therefore x = 8$
45. $\bar{2}.6551 \times 2$
 $= (\bar{2} \times 2) + (.6551 \times 2)$
 $= -4 + 1.3102 = \bar{3}.3102$
46. $\bar{3}.4215 \div 4$
 $= (-3 - 1 + 1.4215) \div 4$
 $= (-4 + 1.4215) \div 4$
 $= (-4 \div 4) + (1.4215 \div 4)$
 $= \bar{1} + 0.3554 = \bar{1}.3554$.
47. $\text{Log}_a^m = \text{Log}_b^m \times \text{Log}_a^b$
 $\text{Log}_b^m = \frac{\text{Log}_a^m}{\text{Log}_a^b} \therefore \text{Log}_2^{64} = \frac{\text{Log}_{10}^{64}}{\text{Log}_{10}^2}$
 $\therefore \text{Log}_{10}^{64} = \text{Log}_2^{64} \times \text{Log}_{10}^2$
 $= 6 \times \text{Log}_{10}^2$.
48. (i) The logarithm of the number 1 to any base is Zero.
(ii) The logarithm of any quantity to the same base is 1.
(iii) The base of a logarithm is always positive other than '0' and '1'.
49. Standard form in a method of determining the characteristic. Under this method a given number is converted into standard form and the power value of 10, thus obtained, is the required characteristic.

50. Let $\text{Log } x = 3^{50}$

$$x = 50 \text{ Log } 3$$

$$= 50 \times .4771 = 23.8550$$

The characteristic of $x = 23$

Hence the digit in $3^{50} = 23 + 1 = 24$

51. Effective rate is the rate percent per annum which ultimately results in by calculating the interest on the money at the nominal rate for any term called conversion period.

52.
$$A = \left(P + \frac{i}{4} \right)^{4n}$$

Where A = Amount P = Principal

$$i = \frac{R}{100} \text{ \& } n = \text{No. of years.}$$

53.
$$P = \frac{100 \times I}{T \times R}$$

$$= \frac{100 \times 429}{\frac{13}{4} \times \frac{5}{2}} = \frac{100 \times 429 \times 8}{65}$$

$$= 5 \times 33 \times 8 = 5280.$$

54.
$$T = \frac{I \times 100}{P \times R} = \frac{(63070 - 34,000) \times 100}{34,000 \times \frac{9}{2}}$$

$$= \frac{29,070 \times 100}{17000 \times 9} = 19 \text{ years.}$$

55. Let $P=100$, then $A=300$ $I = 300 - 100 = 200$

$$R = \frac{100 \times I}{P \times T} \therefore \frac{100 \times 200}{100 \times 5} = 40 \text{ yrs.}$$

56. Let principal is 100

Int on ₹ 100 for 6 yrs @ 12 p.a. will be $12 \times 6 = 72$

Amount at the end will be

$$\text{₹ } 100 + \text{₹ } 72 = \text{₹ } 172.$$

When amount is ₹ 172 principal 100

$$\text{₹ } 3440 \text{ Principal } \frac{100}{172} \times 3440 = \text{₹ } 2000$$

57. When Principal is ₹ 100, Interest for 4 yrs. at 9% p.a. will be $9 \times 4 = \text{₹ } 36$.

Amount will be $100 + 36 = \text{₹ } 136$

When amount ₹ 136, Principal ₹ 100

When amount ₹ 9520 Principal

$$\frac{100}{136} \times 9520 = \text{₹ } 7000.$$

58. Given, $P = \text{₹ } 300$ $I = 415 - 300 = 105$, $R = 5$

$$T = \frac{I \times 100}{P \times R} = \frac{105 \times 100}{300 \times 5} = 7 \text{ yrs.}$$

59. Given $P = 10,000$ $n = 3$ yrs $i = \frac{10}{100} = .1$.

$$A = P(1 + i)^n$$

$$= 10,000 (1 + .1)^3$$

$$= 10,000 (1.1)^3 = 1000 \times 1.331 = \text{₹ } 13310.$$

60. Given $P = \text{₹ } 2000$, $n = 2$ yrs. $i = \frac{10}{100} = .1$

$$\text{C.I.P } (1 + i)^n - P$$

$$= 2000 (1 + .1)^2 - 2000$$

$$= 2000 \times (1.1)^2 - 2000$$

$$= 2000 (1.21 - 1) = 2000 \times .21 = \text{₹ } 420.$$

61. Given $A = 1352$ $n = 2$ $i = \frac{4}{100} = .04$.

$$P = \frac{A}{(1 + i)^n} = \frac{1352}{(1.04)^2} = \frac{1352}{1.0816} = \text{₹ } 1250$$

62.
$$P = \frac{A}{(1 + i)^n}$$

Where, P = Principal $i = \frac{\text{Rate}}{100}$

$n = \text{No of years. A = Amount.}$

63. C.I = $P(1+i)^n - P$. Given $P = 3000$.

$$i = \frac{10}{100} = .1n = 3$$

$$\begin{aligned} \text{C.I.} &= 3000 \{(1.1)^3 - 1\} \\ &= 3000 \{1.331 - 1\} \\ &= 3000 \times .331 = ₹ 993. \end{aligned}$$

64. Simple interest = $\frac{P \times T \times R}{100}$ where
P = Principal, T = Time and R = Rate of Interest

65. Compound interest is one which is calculated at a given rate percent of the accumulated sum of the principal and the earlier interest left unpaid. Thus, this interest at the end of each period is converted into principal for the next period.

4. Answer the following questions within 50 words each.

1. The change in percentage of profit is

$$12\% - 8\frac{1}{2}\% = 3\frac{1}{2}\%$$

Change in price is ₹ 700

$$\text{Hence } 3\frac{1}{2}\% \text{ of C.P.} = ₹ 700$$

$$\therefore 1\% \text{ is } 700 \times \frac{2}{7} = 200$$

$$100\% = 200 \times 100 = ₹ 20,000$$

Hence C.P. of the article is ₹ 20,000.

2. As credit for 5 months are given the C.P. will include int. for 5 months @ 6%.

$$\text{The interest on ₹ 600 will be } \frac{6 \times 6 \times 5}{12} = ₹ 15.$$

The C.P. of the table is ₹ 600 + ₹ 15 = ₹ 615.

The S.P. = ₹ 820

Profit ₹ 820 - ₹ 615 = ₹ 205

$$\% \text{ of profit is } \frac{205}{615} \times 100 = 33\frac{1}{3}\%$$

3. The equivalent discount of 15% and 20% is

$$15\% + (100 - 15) \times \frac{20}{100} = 15\% + 17\% = 32\%$$

Similarly equivalent of 12% and 25%

$$12\% + (100 - 12) \times \frac{25}{100}$$

$$= 12\% + 22\% = 34\%$$

Hence the 2nd option is better.

4. List price is ₹ 65

Less First discount 20%

$$65 \times \frac{20}{100} = \frac{13}{52}$$

Less 2nd Discount 10% ₹ 5.20

=====

S.P. = ₹ 46.80.

5. Invoice price is one at which an article is invoiced to the door step of a buyer upon receipt of a specific order called indent from him. This price is shown on the body of the invoices sent along with the goods and is obtained by deducting trade discount and adding chargeable taxes and delivery expenses on the goods.

6. C & F stands for cost and freight. It is the price payable after the contract of affreightment is made by the seller. This price is inclusive of all charges up to the contract of affreightment with the shipping company. Thus it is the sum of F.O.B. price plus freight.

7. Write any three differences between trade discount and cash discount are

Trade Discount	Cash Discount
1. The purpose of trade discount is to encourage buyer to buy more goods.	1. The purpose of cash discount is to encourage the buyer to make immediate payment.
2. Trade discount is allowed on marked price/list price.	2. Cash discount is calculated on selling price.
3. Trade discount has no accounting treatment.	3. Cash discount has accounting treatment.
4. Trade discount is given at the time of sale.	4. Cash discount is allowed at the time of receiving cash for sale of goods.

8. LOCO price is the price payable at the locality of the supply, which excludes all expenses relating to delivery and transport. This price is also called ex-factory price. It is calculated by deducting trade discount from the marked price of the article.

9. This is a sort of marked price of an article to be produced upon receipt of a specific order which is tendered to a prospective buyer on his request. This price is fixed by adding a margin to the estimated cost which would give the desired profit after allowing rebate.

10. In case of admission of new partner the profit sharing ratio of the old partners change. They may have to sacrifice some part of their profit as such. The difference between the old profit sharing ratio and the new profit sharing ratio is called sacrificing ratio. But in case of retirement of partner as the old partners stand to gain the difference between the new ratio and old ratio is called gaining ratio.

11. The important contents of a partnership deed are :

- (i) The nature and duration of the business.
- (ii) The amount of capital to be brought by each partner.
- (iii) The profit sharing ratio of the partners.

(iv) The rate of interest allowable on capital and loans from partners and chargeable on drawings.

(v) The amount of salary or rent if any payable to any partner.

(vi) The commission or bonus if payable to any partner.

12. The old profit sharing ratio was 3 : 2

Then A's share $\frac{3}{5}$ and B's share was $\frac{2}{5}$.

The new ratio is 1:1:1

Hence A's share = $\frac{1}{3}$ and B's share is $\frac{1}{3}$.

The sacrificing ratio is

$$A = \frac{3}{5} - \frac{1}{3} = \frac{9-5}{15} = \frac{4}{15}$$

$$B = \frac{2}{5} - \frac{1}{3} = \frac{6-5}{15} = \frac{1}{15}$$

The ratio is $\frac{4}{5} : \frac{1}{15}$ or 4:1.

13. The old ratio of X . Y . and Z are 1 : 2 : 5

Thus the share of

$$X = \frac{1}{8} . Y = \frac{2}{8} \ \& \ Z = \frac{5}{8}$$

The new ratio of Y & Z is 1 : 5

$$X\text{'s share} = \frac{1}{6} \quad Y\text{'s share} = \frac{5}{6}.$$

The gain for

$$X = \frac{1}{6} - \frac{1}{8} = \frac{4-3}{24} = \frac{1}{24}$$

$$Z = \frac{5}{6} - \frac{5}{8} = \frac{20-15}{24} = \frac{5}{24}$$

∴ Their gaining ratio is $\frac{1}{24} : \frac{5}{24}$ or 1:5.

14. C's share in profit is $\frac{1}{10}$

Then A & B's share is $1 - \frac{1}{10} = \frac{9}{10}$.

The profit sharing ratio of A and B was 3:2

Then A's share was $\frac{3}{5}$ and B's share $\frac{2}{5}$.

Now A's share will be $\frac{9}{10} \times \frac{3}{5} = \frac{27}{50}$

B's share will be $\frac{9}{10} \times \frac{2}{5} = \frac{18}{50}$

Now profit sharing ratio of A, B and C will be

$$\frac{27}{50} : \frac{18}{50} : \frac{1}{10} \text{ or } 27 : 18 : 5.$$

15. The profit of P & Q are

$$₹ 5000 + ₹ 6000 = ₹ 11000$$

The profit of R is

$$₹ 20000 - ₹ 11000 = ₹ 9000$$

The profit sharing ratio is equal to capital ratio

i.e. 5000 : 6000 : 9000. or 5 : 6 : 9.

Then R's capital out of ₹ 60000 is

$$= 60,000 \times \frac{9}{20} = ₹ 27,000.$$

16. $\text{Log } 125 = \text{Log } \frac{125}{1000}$
 $= \text{Log } 125 - \text{Log } 1000$
 $= \text{Log } 5^3 - \text{Log } 1000$
 $= 3 \text{Log } 5 - \text{Log } 1000$
 $= 3 \text{Log } \frac{10}{2} - \text{Log } 1000$
 $= 3 (\text{Log } 10 - \text{Log } 2) - \text{Log } 1000$
 $= 3 (\text{Log } 10 - \text{Log } 2) - 3$
 $= 3(1 - .30103) - 3 = 3 \times .69879 - 3$
 $= 2.09691 - 3 = \bar{1}.09691.$

17. $\left(\frac{1}{.4}\right)^x = 6.25$

$$\text{Log} \left(\frac{1}{.4}\right)^x = \text{Log } 6.25$$

$$x \text{Log} \left(\frac{1}{.4}\right) = \text{Log } 6.25$$

$$x \text{Log } 2.5 = \text{Log } 6.25$$

$$x = \frac{\text{Log } 6.25}{\text{Log } 2.5} = \frac{0.7959}{0.3979} = 2$$

18. Let $\text{Log}_b^a = x$, $\text{Log}_c^b = y$, $\text{Log}_a^c = z$

Then $b^x = a$, $c^y = b$ and $a^z = c$

$$a = b^x = (c^y)^x = (a^z)^{yx} = a^{xyz}$$

$$a^1 = a^{xyz}$$

$$\therefore xyz = 1.$$

19. $\text{Log } mn = \text{Log } m + \text{Log } n$

Let $\text{Log}_a^{mn} = x$, $\text{Log}_a^m = y$, $\text{Log}_a^n = z$

$$\therefore a^x = mn \quad a^y = m \quad a^z = n$$

$$\therefore a^x = a^y \times a^z$$

$$\therefore a^x = a^{y+z}$$

$$\therefore x = y+z$$

$$\therefore \text{Log}_a^{mn} = \text{Log}_a^m + \text{Log}_a^n.$$

20. Let $\text{Log}_a \frac{m}{n} = x$
 $\text{Log}_a m = y$ $\text{Log}_a n = z$
 $\therefore a^x = \frac{m}{n}$. $a^y = m$ and $a^z = n$
 $\therefore a^x = \frac{a^y}{a^z} = a^{y-z}$
 $\therefore x = y - z$
 $\therefore \text{Log}_a \frac{m}{n} = \text{Log}_a m - \text{Log}_a n$ proved.

21. $\text{Log}_4 \text{Log}_{\sqrt{2}} \text{Log}_3 81$
 $= \text{Log}_4 \text{Log}_{\sqrt{2}} \text{Log}_3 3^4$
 $= \text{Log}_4 \text{Log}_{\sqrt{2}} 4 \text{Log}_3 3$
 $= \text{Log}_4 \text{Log}_{\sqrt{2}} (\sqrt{2})^4 \cdot 1$
 $= \text{Log}_4 4 \text{Log}_{\sqrt{2}} (\sqrt{2})$
 $= \text{Log}_4 4$
 $= 1$

22. $\text{Log}_2 \text{Log}_3 \text{Log}_4 64$
 $= \text{Log}_2 \text{Log}_3 \text{Log}_4 4^3$
 $= \text{Log}_2 \text{Log}_3 \text{Log}_4 4$
 $= \text{Log}_2 \text{Log}_3 3 \cdot 1$
 $= \text{Log}_2 3 \cdot 1$
 $= \text{Log}_2 3$

23. $\text{Log}_a \sqrt[n]{m} = x$, $\text{Log}_a m = y$
 $\text{Log}_a m^{\frac{1}{n}} = x$
 By definition
 $a^x = m^{\frac{1}{n}}$
 $a^x = (a^y)^{\frac{1}{n}}$ $m = a^y$
 $a^x = a^{\frac{y}{n}}$
 $x = \frac{y}{n}$

Substituting the value of x and y

$$\text{Log}_a \sqrt[n]{m} = \frac{\text{Log}_a m}{n} = \frac{1}{n} \text{Log}_a m.$$

24. $\text{Log}_{49} \sqrt{7} = \frac{1}{4} x$

By definition $49^{\frac{x}{4}} = \sqrt{7}$

$$\{(\sqrt{-7})^4\}^{\frac{x}{4}} = \sqrt{7}$$

$$= (\sqrt{7})^x = \sqrt{7} \text{ or } (\sqrt{7})^x = (\sqrt{7})^1$$

$$\therefore x = 1.$$

25. Let $\text{Log}_{0.1} 0.001 = x$

$$(0.1)^x = 0.001$$

$$\left(\frac{1}{10}\right)^x = \frac{1}{1000}$$

$$(10^{-1})^x = \frac{1}{(10)^3}$$

$$(10^{-1})^x = 10^{-3}$$

$$(10)^{-x} = 10^{-3}$$

$$-x = -3$$

$$\text{or } x = 3.$$

26. Nominal rate is the rate at which interest is calculated on certain money either per annum or per any other conversion period. Effective rate is the rate percent per annum which ultimately results by calculating interest on the money at the nominal rate per any term called conversion period. It is equal to nominal rate when interests are calculated per annum. It is higher than the nominal rate when interest are calculated per any term less than a year.

27. Simple interest is one which is calculated always at a fixed rate on the original amount of the principal borrowed. But compound interest is one which is calculated at a given rate percent of the accumulated sum of the principal and the earlier interests left unpaid. Thus this interest at the end of every period is converted into the principal for the next period.
28. Let the sum $P = 100$
 The propose amount $A = P \times 3 = 100 \times 3 = ₹300$
 Thus the S.I. on ₹100 in 20 yrs is
 $= ₹ 300 - ₹ 100 = ₹ 200$
 The rate of interest is given by $R = \frac{S.I. \times 100}{P \times T}$
 Here S. I. = ₹ 200, $T = 20$ yrs.
 $\therefore R = \frac{200 \times 100}{100 \times 20} = 10$
 \therefore Rate percent is 10%.
29. Let the principal is 100.
 The interest for 6 months @10% is ₹ 5.
 The interest for other 6 months is 10% of ₹ 105 i.e. ₹ 5.25.
 The total interest thus comes out (₹ 5 + ₹ 5.25) is 10.25.
 The effective rate of interest is 10.25%
 Whereas the nominal rate of interest is 10%.
30. Given $A = P + I = 3440$, $T = 6$ yrs, Rate = 12% p.a.
 $I = 3440 - P$
 $\therefore 3440 - P = \frac{P \times 6 \times 12}{100}$
 $344000 - 100 P = 72P$
 $\therefore 172 P = 344000$
 $P = \frac{344000}{172} = 2000$.
31. The principal (P) is = ₹5830 $R = 7\%$ Time = 5 Yrs.
 Then interest
 $I = \frac{P \times T \times R}{100} = \frac{5830 \times 5 \times 7}{100} = ₹ 2040.5$
 Then Amount
 $= P + I = ₹5830 + ₹2040 = ₹7870$.
32. Given:
 Interest (I) = 429
 Rate (R) = $2\frac{1}{2}\%$ or $\frac{5}{2}\%$
 Time (T) = $3\frac{1}{4}$ yrs. = $\frac{13}{4}$ year
 $P = \frac{I \times 100}{T \times R} = \frac{429 \times 100}{\frac{13}{4} \times \frac{5}{2}} = \frac{42900}{\frac{65}{8}}$
 $= \frac{42900 \times 8}{65} = ₹ 5280$

UNIT - I**GROUP - C : LONG TYPE QUESTIONS****Profit and Loss**

1. A man buys two articles for ₹1350. He sells one at 10% loss and the other at 2% gain. On the whole he neither gains nor loses. Find the cost price of each.
2. A 10% hike in price of rice forces a person to purchase 2 kg less for ₹110. Find the new and original prices of the rice.
3. The list price of an article is 20% above S.P. and C.P. is 40% below the list price. Find the rate of discount and rate of profit.
4. A shop-keeper sold chair at ₹166 each after giving 17% discount on market price. Had he not given the discount he would have earned a profit of 25% on the cost price. What was the C.P. of a chair ?
5. A radio was sold at a profit of 12%. If the cost price had been 10% less and the selling price is ₹1 more he would have made a profit of 25%. Find the C.P. and S.P. to gain 20%.
6. An article was sold at a profit of 20% on cost after allowing a discount of 20% on the market price. Find the market price of the article on which a profit of ₹ 100 is made.
8. Three partners A, B, and C subscribe ₹7700 for a business. A subscribe ₹700 more than B and B ₹ 500 more than C. How much will each receive out of a profit of ₹ 1540 ?
9. The partners invest ₹26,000 and ₹16,250 respectively in a business with an understanding that 40% of profit should be divided equally between them and the remaining profit is to be treated as interest on capital. If one partner gets ₹450 more than the other find the total profit.
10. X, Y and Z are in partnership sharing profit and losses in the ratio of their capitals. The ratio of the capital between X and Y is 8:7 and between Z and Y is 9:8. If X received ₹5200 more than Y in a particular year, find the profit of each partner and total profit of the year.
11. A, B and C enter into a partnership. Their capitals are ₹20,000, ₹18,000 and ₹12,000 respectively. A and B get 12% and 8% of profits respectively for managing the business and the rest is divided on proportion to their capitals. At the end of the year A receres together ₹648 more than B. Find their respective shows.

Logarithm

7. X and Y are two partners contributing their capital in the ratio of 2:3. At the end of 9 months X withdraws his capital. If they divide the profit in their capital ratio and accordingly they get their profit in the ratio of 3:4, new long is the capital of Y was invested.
12. The population of a town is 2,00,000. If it increases 5% annually what will be the population in 4 years.
13. Find the value of x :
$$\begin{aligned} \text{Log}(x + 13) + \text{Log}(x - 13) \\ = 4 \text{Log} 2 + \text{Log} 5 + \text{Log} 7. \end{aligned}$$

14. Prove that
- $$7\text{Log}\frac{10}{9} - 2\text{Log}\frac{25}{24} + 3\text{Log}\frac{81}{80} = \text{Log}2$$
15. Prove that $2\text{Log}\frac{4}{3} + \text{Log}\frac{9}{25} + 2\text{Log}\frac{5}{4} = 0$
16. If $\text{Log}_a^{bc} = x$, $\text{Log}_b^{ca} = y$, $\text{Log}_c^{ab} = z$ prove that
- $$\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1} = 1.$$
17. Prove that
- $$\frac{\text{Log}8 + \text{Log}27 + \text{Log}125}{1 + \text{Log}3} = 3.$$
18. Evaluate $a = b^x$, $b = c^y$, $c = a^z$ prove that $xyz = 1$.
19. Evaluate $\frac{2\text{Log}6 + 6\text{Log}2}{4\text{Log}2 + \text{Log}27 - \text{Log}9}$.
20. If $\frac{\text{Log}^x}{y-z} = \frac{\text{Log}^y}{z-x} = \frac{\text{Log}^z}{x-y}$,
Prove that $x^x \cdot y^y \cdot z^z = 1$.
21. If a sum of money amounts to ₹5,508 in 4 years and ₹6720 in 10 years at simple interest find the sum and rate percent.
22. Divide ₹ 76,700 among 3 persons in such a way that the amount of 1st, 2nd and 3rd person after 5, 7 & 9 years respectively be the same at 4% p.a.
23. A part of ₹20,000 is invested at 12% p.a. and the remainder in 15% p.a. If the total interest earned in the year is ₹2600, find the amount invested in each.
24. A sum amounts to ₹6050 in 2 years and ₹6655 in 3 years at a rate of interest compounded annually. find the rate of interest and the sum.
25. On a certain sum at a certain rate the C.I. and S.I. for 2 years is ₹1050 and ₹1000 respectively. Find the sum and rate of interest.
26. A sum of money double itself at certain rate of compound interest in 4 years. In how many years will it amount to 8 times of itself.
27. A sum of ₹26,000 is to be discharged in 3 annual instalment together with interest 5% p.a. on the outstanding balances. Find the value of each of the instalments.
28. A man receives ₹ 2444 as compound interest by depositing a certain sum in a 10% fixed deposit account for 5 years. Determine the sum deposited by him. Also find the S.I. on the same sum at the same rate for the same period and the amount of interest he would have received annually.
29. What principal would amount to ₹1000 at 6% p.a. in 8 years compounded monthly.
30. A man borrowed ₹25,000 at C.I. at the rate of 3% for the 1st year. 4% for the 2nd year and 5% for the 3rd year. Find the interest and amount to be paid after 3 years.

UNIT - I

GROUP - C : ANSWER

1. Let the price of one article is x

Then the price of other is $1350 - x$

He sells one at 10% Loss.

\therefore If the C.P. is x then loss is

$$\frac{x \times 10}{100} = \frac{x}{10}$$

He sells the 2nd article at 2% gain

\therefore The gain is $(1350 - x) \times \frac{2}{100} = \frac{1350 - x}{50}$

As he neither gains nor lose on the sells of both his loss is equal to his gain

$$\frac{x}{10} = \frac{1350 - x}{50}$$

or $50x = 1350 - 10x$

or $60x = 13500$

$$x = \frac{13500}{60} = 225$$

The cost of one article is ₹ 225.

The cost of other article $1350 - 225 = ₹1125$.

2. Let the original price per kg is ₹ x

Quantity of rice that can be purchased in

$$₹ 110 = \frac{110}{x}$$

The price is hiked by 10%

Now the new price will be $x \times \frac{110}{100} = \frac{11x}{10}$

The quantity (new) purchased is

$$110 \div \frac{11x}{10} = 110 \times \frac{10}{11x} = \frac{100}{x}$$

Now $\frac{110}{x} - \frac{100}{x} = 2$

$$\frac{110 - 100}{x} = 2$$

$$\frac{10}{x} = 2$$

$\therefore 2x = 10$

$x = 5$.

Original price per kg of rice = ₹ 5.

The new price = ₹5 + 10% of 5 = ₹5.50.

3. Let S.P. is ₹100

Then the list price will be 20% above S.P. = ₹120

Then the C.P. is 40% below the list price

Hence the C.P. is

$$= ₹120 - 40\% \text{ of } ₹120$$

$$= ₹120 - ₹48 = ₹72$$

The discount = L.P. - S.P. = $120 - 100 = ₹20$.

Thus the rate of Discount is

$$= \frac{20}{120} \times 100 = \frac{1}{6} \times 100 = 15\frac{2}{3}\%$$

The rate of profit = S.P. - C.P.

$$= ₹ 100 - ₹ 72 = ₹ 28$$

The rate of profit = $\frac{28}{72} \times 100 = 38\frac{8}{9}\%$.

4. Let the M.P. of a chair is ₹ 100.

Then the S.P. will be ₹100 - ₹17 = ₹83

Thus when S.P. is ₹83, the M.P. is 100.

When S.P. is ₹166, the M.P. is

$$\frac{100}{83} \times 166 = ₹200.$$

If he would not have given the discount then the S.P. would have been ₹ 200.

For making a profit of 25%.

When S.P. will be ₹125 the C.P. be ₹100

S.P. will be ₹ 200 the C.P. be

$$\frac{100}{125} \times 200 = ₹ 160.$$

5. Let the C.P. of the radio be x

$$\therefore \text{the S.P. will be } x + \frac{12}{100}x = \frac{112x}{100}$$

If the C.P. had been 10% less, then

$$x - \frac{x}{10} = \frac{9x}{10}$$

and s.P. had been ₹1 more.

$$\text{Then } = \frac{112x}{100} + 1 = \frac{112x + 100}{100}$$

Then the profit would have been

$$\left(\frac{112x + 100}{100} - \frac{9x}{10} \right)$$

Which is 25% of $\frac{9x}{10}$ or $\frac{9x}{40}$

$$\therefore \frac{112x + 100}{100} - \frac{9x}{10} = \frac{9x}{40}$$

$$\frac{112x + 100 - 90x}{10} = \frac{9x}{4}$$

$$4(22x + 100) = 90x$$

$$88x + 400 = 90x$$

$$2x = 400$$

$$\therefore x = 200.$$

$$\therefore \text{The C.P.} = ₹ 200$$

Thus the S.P. to gain 20%

$$= 200 + 20\% \text{ of } ₹200$$

$$= ₹200 + ₹40 = ₹240.$$

6. Let the C.P. is ₹100

Then the S.P. is ₹100 + 20% of 100 = ₹120.

A discount of 20% is allowed on M.P.

Thus if M.P. is 100 the S.P. = 80

\therefore When S.P. is 120 the M.P.

$$= \frac{100}{80} \times 120 = ₹150.$$

The profit on the article is ₹100.

When profit is ₹20 the M.P. = ₹150

$$\text{Profit is ₹100 the M.P.} = \frac{150}{20} \times 100 = ₹750.$$

7. Let the capital of y is invested for x months.

The profit sharing ratio is equal to capital ratio

They share the profit in the ratio of 3:4.

The weighted capital of x is $2 \times 9 = 18$

The weighted capital of y is $3 \times x = 3x$

$$\therefore \frac{18}{3x} = \frac{3}{4}$$

$$\text{or } 9x = 18 \times 4$$

$$\text{or } x = \frac{18 \times 4}{29} = 8$$

\therefore y invested his capital for 8 months.

8. Let C's contribution to capital is x

B's capital is ₹500 more than C

thus i.e. $x + ₹500$.

A's capital is ₹700 more than B

i.e. $\{(x + 500) + 700\}$.

The total capital is 7,700.

Thus capital $(x + 1200) + (x + 500) + x = 7,700$

$$3x + 1700 = 7,700$$

$$\therefore 3x = 7,700 - 1700 = 6000$$

$$\therefore x = \frac{6000}{3} = ₹ 2000$$

C's Capital is ₹ 2,000

B's Capital is $(2000 + 500) = ₹2500$

A's Capital is $(2500 + 700) = ₹3,200$.

∴ Capital ratio is 32:25:20

Their profit sharing ratio is 32:25:20

A's share in profit = $1540 \times \frac{32}{77} = ₹640$

B's share in profit = $1340 \times \frac{25}{77} = ₹500$

C's share in profit = $1540 \times \frac{20}{77} = ₹400$.

9. Let the profit earned be x

Then 40% of $x = \frac{40x}{100} = \frac{2x}{5}$

This is divided equally by the partners i.e.

$\frac{2x}{5} \times \frac{1}{2} = \frac{x}{5}$ will be the share of each.

The rest 60% i.e. $\frac{3x}{5}$ of the profit will be shared as interest on capital which means in the ratio of their capital.

The capital ratio is 26000 : 16250
i.e. 104:65 or 8:5.

In a profit of $\frac{3x}{5}$ their share will be

$\frac{3x}{5} \times \frac{8}{13} = \frac{24x}{65}$ and $\frac{3x}{5} \times \frac{5}{13} = \frac{3x}{13}$

This difference is ₹ 450.

(As 40% is should equally)

$\frac{24x}{63} - \frac{3x}{13} = \frac{24x - 15x}{65} = 450$

$x = \frac{450 \times 65}{9} = ₹3250$.

10. The capital ratio of $X : Y = 8 : 7$

The Capital Ratio of $Z : Y = 8 : 9$

Let the capital of X is $8x$ then Y's capital $7x$.

When Y's capital is $9x$ Z's capital is $8x$.

When Y's capital is $7x$, Z's capital is

$$\frac{8}{9} \times 7 = \frac{56}{9}x$$

The capital of X, Y, Z are in the ratio of

$$8x : 7x : \frac{56}{9}x$$

$$72 : 63 : 56.$$

The difference between share of profit between X and Y is ₹ 5200

∴ $(72-63) 9$ part of profit = 5200

∴ Total profit is

$$\frac{5200}{9} \times 100 = 578 \times 100 = 57800$$

X's share is = $\frac{57800}{191} \times 72 = 21,788$

Y's = $\frac{57800}{191} \times 63 = 19065$

and Z's = $\frac{57800}{191} \times 56 = 16947$.

11. Let the profit of the firm is ₹100.

For managing A will receive 12% i.e. ₹12

For managing B will receive 8% i.e. ₹8.

The balance of profit to be distributed among A, B and C is ₹100 - (₹12 + ₹8) = ₹ 80.

Their profit sharing ratio is 20:18:12 or 10:9:6

Then A's share in profit is $80 \times \frac{10}{25} = ₹32$

A's total receipt is ₹12 + ₹32 = ₹ 44

B's share in profit is $80 \times \frac{9}{25} = \frac{144}{5} = 28.8$

B's total receipt is ₹ 28.8 + ₹8 = ₹36.8

The difference between A and B is

$$₹ 44 - ₹36.8 = ₹7.2$$

When the difference is 5.2,

the profit of the firm = ₹100

When the difference is 648,

$$\text{the profit of the firm} = \frac{100}{5.2} \times 648 = ₹9000$$

Out of total profit of ₹9000

A will receive 12% management fees

$$9000 \times \frac{12}{100} = ₹1080$$

B will receive 8% management fee

$$9000 \times \frac{8}{100} = ₹720$$

The balance $9000 - (1080 + 720) = 7200$

A's share in balance is $7200 \times \frac{10}{25} = 2880$

B's share in balance is $7200 \times \frac{9}{25} = 2592$

C's share in balance is $7200 \times \frac{6}{25} = 1728$

Thus A's total receipt is ₹2880 + 1080 = 3960

B's total receipt is 2592 + 720 = 3312

C's total receipt is = 1728

12. Let the population be $P_1 = 2,00,000$

Rate of increase be $i = \frac{R}{100} = \frac{5}{100} = 0.05$

'n' be the number of years.

' P_1 ' be the population after 4 years.

$$P_1 = P (1+i)^n$$

$$= 2,00,000 (1+0.05)^4$$

$$= 2,00,000 (1.05)^4$$

$$\text{Log } P_1 = \text{Log } 2,00,000 (1.05)^4$$

$$= \text{Log } 2,00,000 + 4 \text{Log } 1.05$$

$$= 5.3010 + 4 \times 0.0212$$

$$= 5.3010 + 0.0848 = 5.3858$$

$$P_1 = \text{Antilog } 5.3858$$

$$= 242700.$$

13. $\text{Log}(x+13) + \text{Log}(x-13) = 4\text{Log}2 + \text{Log}5 + \text{Log}7$

$$= \text{Log}(x+13)(x-13) = \text{Log}2^4 + \text{Log}5 + \text{Log}7$$

$$\text{Log}(x^2 - 169) = \text{Log}(2^4 \times 5 \times 7)$$

$$\text{Log}(x^2 - 169) = \text{Log}(16 \times 5 \times 7)$$

$$\text{Log}(x^2 - 169) = \text{Log}560$$

$$x^2 - 169 = 560$$

$$x^2 = 560 + 169 = 729$$

$$x = \sqrt{729} = 27.$$

14. $7\text{Log}\frac{10}{9} - 2\text{Log}\frac{25}{24} + 3\text{Log}\frac{81}{80}$

$$= 7(\text{Log}10 - \text{Log}9) - 2(\text{Log}25 - \text{Log}24)$$

$$+ 3(\text{Log}81 - \text{Log}80)$$

$$= 7(1 - \text{Log}3^2) - 2\{\text{Log}5^2 - \text{Log}(3 \times 2^3)\}$$

$$+ 3\{\text{Log}3^4 - \text{Log}(5 \times 2^4)\}$$

$$= 7 - 14 \text{Log}3 - 4 \text{Log}5 + 2 \text{Log}3$$

$$+ 6 \text{Log}2 + 12 \text{Log}3 - 3 \text{Log}5 - 12 \text{Log}2$$

$$= 7 - 14 \text{Log}3 + 2 \text{Log}3 + 12 \text{Log}3$$

$$- 4 \text{Log}5 - 3 \text{Log}5 - 12 \text{Log}2 + 6 \text{Log}2$$

$$= 7 - 7 \text{Log}5 - 6 \text{Log}2$$

$$\begin{aligned}
 &= 7 - 7 \text{Log}5 - 7 \text{Log} 2 + \text{Log} 2 \\
 &= 7 - 7 (\text{Log} 5 + \text{Log} 2) + \text{Log} 2 \\
 &= 7 - 7 (\text{Log} 5 \times 2) + \text{Log} 2 \\
 &= 7 - 7 \text{Log} 10 + \text{Log} 2 \\
 &= 7 - 7 \times 1 + \text{Log} 2 \\
 &= 7 - 7 + \text{Log} 2 - \text{Log} 2
 \end{aligned}$$

LHS = RHS

15. LHS $2\text{Log}\frac{4}{3} + \text{Log}\frac{9}{25} + 2\text{Log}\frac{5}{4}$

$$\begin{aligned}
 &= 2(\text{Log} 4 - \text{Log} 3) + (\text{Log} 9 - \text{Log} 25) \\
 &\quad + 2(\text{Log} 5 - \text{Log} 4) \\
 &= 2(\text{Log}2^2 - \text{Log}3) + (\text{Log}3^2 - \text{Log}5^2) \\
 &\quad + 2(\text{Log}5 - \text{Log}2^2) \\
 &= 2\{(2\text{Log}2 - \text{Log} 3) + (2\text{Log}3 - 2\text{Log}5) \\
 &\quad + 2(\text{Log}5 - 2 \text{Log}2)\} \\
 &= 4 \text{Log} 2 - 2 \text{Log} 3 + 2 \text{Log} 3 \\
 &\quad - 2 \text{Log} 5 + 2 \text{Log} 5 - 4 \text{Log} 2 = 0
 \end{aligned}$$

LHS = RHS

16. $x = \text{Log}_a^{bc} \therefore x + 1 = \text{Log}_a^{bc} + \text{Log}_a^a = \text{Log}_a^{abc}$
 (in place of 1 we can write Log_a^a)

$$y + 1 = \text{Log}_b^{ca} + \text{Log}_b^b = \text{Log}_b^{abc}$$

$$z + 1 = \text{Log}_c^{ab} + \text{Log}_c^c = \text{Log}_c^{abc}$$

Now $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1}$

$$= \frac{1}{\text{Log}_a^{abc}} + \frac{1}{\text{Log}_b^{abc}} + \frac{1}{\text{Log}_c^{abc}}$$

$$= \text{Log}_{abc}^a + \text{Log}_{abc}^b + \text{Log}_{abc}^c$$

$$= \text{Log}_{abc}^{abc} = 1$$

LHS = RHS.

17. $\frac{\text{Log}8 + \text{Log}7 + \text{Log}125}{1 + \text{Log}3}$

$$\begin{aligned}
 &= \frac{\text{Log}2^3 + \text{Log}3^3 + \text{Log}5^3}{1 + \text{Log}3} \\
 &= \frac{3\text{Log}2 + 3\text{Log}3 + 3\text{Log}5}{1 + \text{Log}3} \\
 &= \frac{3\text{Log}2 + 3\text{Log}5 + 3\text{Log}3}{1 + \text{Log}3} \\
 &= \frac{3(\text{Log}2 + \text{Log}5) + 3\text{Log}3}{1 + \text{Log}3} \\
 &= \frac{3\text{Log}10 + 3\text{Log}3}{1 + \text{Log}3} \\
 &= \frac{3.1 + 3\text{Log}3}{1 + \text{Log}3} \\
 &= \frac{3(1 + \text{Log}3)}{(1 + \text{Log}3)} \\
 &= 3.
 \end{aligned}$$

L.H.S. = R. H. S.

18. $b^x = a \therefore x = \text{Log}_b^a$

$$c^y = b \therefore y = \text{Log}_c^b$$

$$a^z = c \therefore z = \text{Log}_a^c$$

Now $x y z$

$$= \text{Log}_b^a \times \text{Log}_c^b \times \text{Log}_a^c$$

$$= \text{Log}_c^a \times \text{Log}_b^c \times \text{Log}_c^b \times \text{Log}_a^c$$

$$(\therefore \text{Log}_b^a = \text{Log}_c^a \times \text{Log}_b^c)$$

$$= (\text{Log}_c^a \times \text{Log}_a^c) \times (\text{Log}_b^c \times \text{Log}_c^b)$$

$$= \text{Log}_a^a \times \text{Log}_c^c$$

$$= 1 \times 1 = 1$$

LHS = RHS

$$\begin{aligned}
 19. \quad & \frac{2 \log 6 + 6 \log 2}{4 \log 2 + \log 27 - \log 9} = x \\
 & = \frac{2 \log (2 \times 3) + 6 \log 2}{4 \log 2 + 3 \log 3 - 2 \log 3} \\
 & = \frac{2(\log 2 + \log 3) + 6 \log 2}{4 \log 2 + \log 3} \\
 & = \frac{8 \log 2 + 2 \log 3}{4 \log 2 + \log 3} \\
 & = \frac{2(4 \log 2 + \log 3)}{(4 \log 2 + \log 3)} \\
 & = 2 \\
 \therefore x & = 2
 \end{aligned}$$

$$\begin{aligned}
 20. \quad & \frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y} = k \\
 & \frac{\log x}{y-z} = k \\
 \therefore \log x & = k(y-z) \\
 x \log x & = Kx(y-z) \\
 & \frac{\log y}{z-x} = k \\
 \therefore \log y & = K(z-x) \\
 y \log y & = Ky(z-x)
 \end{aligned}$$

$$\begin{aligned}
 & \frac{\log z}{x-y} = k \\
 \therefore \log z & = K(x-y) \text{ or } Z \log z = Kz(x-y)
 \end{aligned}$$

By adding

$$\begin{aligned}
 x \log x + y \log y + z \log z \\
 & = Kx(y-z) + ky(x-z) + kz(x-y) \\
 & = K \{x(y-z) + y(x-z) + z(x-y)\} \\
 & = K \{xy - zx + yx - yz + xz - zy\} \\
 & = K \{0\} = 0
 \end{aligned}$$

$$\therefore \log x^x + \log y^y + \log z^z = 0$$

$$\log x^x \cdot y^y \cdot z^z = 0$$

$$\therefore x^x \cdot y^y \cdot z^z = 1.$$

21. Amount in 10 yrs is ₹ 6720

Amount in 4 yrs is ₹ 5,508

S. I. for 6 yrs (10 - 4) is

$$₹ 6720 - ₹ 5508 = ₹ 1,212$$

\therefore Simple interest for 4 yrs is

$$\frac{1212}{6} \times 4 = ₹ 808$$

\therefore Principal is ₹ 5,508 - ₹ 808 = ₹ 4700.

Rate of Interest is

$$= \frac{100 \times I}{P \times T} = \frac{100 \times 808}{4700 \times 4} = 4.3\%$$

22. Let the shares of each be P_1 , P_2 and P_3 .

$$\therefore P_1 + P_2 + P_3 = 76,700$$

Amount of P_1 @ 4% for 5 yrs i.e.

$$\begin{aligned}
 A_1 & = P_1 + \frac{P_1 TR}{100} \\
 & = P_1 + \frac{P_1 5.4}{100} = P_1 \left(1 + \frac{20}{100}\right) \\
 & = P_1 \left(1 + \frac{1}{5}\right) = \frac{6P_1}{5}
 \end{aligned}$$

Amount of P_2 @ 4%, in 7 yrs.

$$\begin{aligned}
 & = P_2 \left(1 + \frac{TR}{100}\right) = P_2 \left(1 + \frac{7 \times 4}{100}\right) \\
 & = P_2 \left(1 + \frac{28}{100}\right) = P_2 \left(\frac{128}{100}\right) = P_2 \frac{32}{25}
 \end{aligned}$$

Amount of P_3 @ 4% for 9 yrs.

$$\begin{aligned}
 & = P_3 \left(1 + \frac{TR}{100}\right) = P_3 \left(1 + \frac{9 \times 4}{100}\right) \\
 & = P_3 \left(1 + \frac{9}{25}\right) = P_3 \left(\frac{34}{25}\right)
 \end{aligned}$$

$$\therefore P_1 \frac{6}{5} = P_2 \frac{32}{25} = P_3 \frac{34}{25}$$

$$P_1 \frac{6}{5} = P_2 \frac{32}{25}$$

$$\frac{P_1}{P_2} = \frac{32}{25} \times \frac{5}{6} = \frac{32}{30} \quad P_1 : P_2 = 32 : 30$$

$$P_2 \frac{32}{25} = P_3 \frac{34}{25}$$

$$\frac{P_2}{P_3} = \frac{34}{25} \times \frac{25}{32} = \frac{34}{32} \quad P_2 : P_3 = 34 : 32$$

$$\text{When } P_2 = 34 \quad P_3 = 32$$

$$\text{When } P_2 = 30 \quad P_3 = \frac{32}{34} \times 30 = \frac{480}{17}$$

$$\therefore \text{The ratio of } P_1 : P_2 : P_3 \text{ is } 32 : 30 : \frac{480}{17}$$

$$544 : 510 : 480$$

\therefore The total amount will be distributed in the ratio of 544 : 510 : 480.

$$\therefore P_1 = \frac{76700}{1534} \times 544 = ₹27200$$

$$P_2 = \frac{76700}{1534} \times 510 = ₹25500$$

$$P_3 = \frac{76700}{1534} \times 480 = ₹24000$$

23. Let ₹ x be invested in 12% p.a.

Then (₹ 20000 - x) is invested in 15% p.a.

$$\text{Interest on } x \text{ for the year is } x \times \frac{12}{100} = \frac{12x}{100}$$

Interest on 20,000 - x for the year is

$$(20,000 - x) \times \frac{15}{100} = \frac{15(20,000 - x)}{100}$$

$$= \frac{300000 - 15x}{100}$$

Total interest is

$$\frac{12x}{100} + \frac{3,00,000 - 15x}{100} = 2600$$

$$\frac{12x + 3,00,000 - 15x}{100} = 2600$$

$$3,00,000 - 3x = 260000$$

$$-3x = 40,000$$

$$x = \frac{40,000}{3} = 13,333$$

The remainder is 20,000 - 13,333 = ₹ 6667

\therefore ₹ 13,333 is invested at 12% p.a.

₹ 6,667 is invested at 15% p.a.

24. Given:

The amount in 3 years be $A_2 = ₹6655$

The amount in 2 years be $A_1 = ₹6050$

The difference between $A_2 - A_1$ is

$$= ₹ 6655 - ₹ 6050 = ₹ 605.$$

Thus ₹ 605 is interest for 6050 for one year

\therefore The rate of interest is

$$\frac{605}{6050} \times 100 = 10\%.$$

Now, we get

$R = 10\%$, Time = 2 years, Amount = ₹ 6050

Thus $A = P(1+i)^n$

$$P = \frac{A}{(1+i)^n} = \frac{6050}{\left(1 + \frac{10}{100}\right)^2}$$

$$= \frac{6050}{(1.10)^2}$$

$$= \frac{6050}{1.21} = ₹5000$$

25. $CI = ₹ 1050, S.I = ₹ 1000$

Interest on interest for one year is

$$1050 - 1000 = ₹ 50$$

Simple interest for 2 years is ₹ 1000

$$\text{Simple interest for 1 year is } \frac{1000}{2} = ₹ 500.$$

∴ Then interest on 500 for one year is ₹ 50

$$\therefore \text{The rate of interest is } \frac{50}{500} \times 100 = 10\%.$$

When rate is 10% interest is ₹ 500 and time is One year then the principal is

$$\frac{500}{10} \times 100 = ₹ 5000.$$

∴ The rate is 10% and the sum is ₹ 5000.

26. Let the sum be P.

$$\text{Amount (A)} = 2 \times P = 2P$$

$$A = P(1+i)^n$$

$$2P = P(1+i)^4$$

$$2 = (1+i)^4 \quad (\text{Dividing both the side by P})$$

Now cubing both the side we will get

$$(2)^3 = \{(1+i)^4\}^3$$

$$= 8 = (1+i)^{12} \quad (\text{By multiplying P on both sides})$$

$$= 8P = P(1+i)^{12}$$

∴ The sum will be 8 times in 12 years.

27. The annual instalment towards principal is

$$\frac{₹ 24,000}{3} = ₹ 8000$$

Thus the outstanding balances at the beginning of each year are

$$\text{1st year } ₹ 24,000$$

$$\text{2nd year } ₹ 24,000 - ₹ 8000 = ₹ 16,000$$

$$\text{3rd year } ₹ 16,000 - ₹ 8,000 = ₹ 8,000$$

Now interest for the instalments are

$$\text{1st instalment } 5\% \text{ of } ₹ 24,000 = ₹ 1200$$

$$\text{2nd instalment } 5\% \text{ of } ₹ 16,000 = ₹ 800$$

$$\text{3rd instalment } 5\% \text{ of } ₹ 8,000 = ₹ 400$$

Thus the value of the instalments are

$$\text{1st instalment } = ₹ 8000 + ₹ 1200 = ₹ 9200$$

$$\text{2nd instalment } = ₹ 8000 + ₹ 800 = ₹ 8800$$

$$\text{3rd instalment } = ₹ 8000 + ₹ 400 = ₹ 8400$$

28. Given

$$\text{C.I.} = 2444, \quad r = \frac{10}{100} = 1, \quad n = 5.$$

Let the sum invested be ₹ 100

$$\text{Then C.I.} = P(1+i)^n - P$$

$$= 100(1+.1)^5 - 100$$

$$\text{Let } x = 100(1.1)^5$$

$$\text{Log } x = \text{Log } 100 + 5 \text{ Log } 1.1$$

$$= 2 + 5 \times .414$$

$$= 2 + .2070$$

$$= 2.2070$$

$$x = \text{Antilog of } 2.2070$$

$$= 161.10$$

$$\therefore \text{C.I.} = ₹ 161.10 - ₹ 100 = ₹ 61.10$$

When C.I. is 61.10 Amount invested is ₹ 100

When C.I. is 2444 Amount invested

$$\frac{100}{61.1} \times 2444 = ₹ 4000$$

Hence the amount deposited is ₹ 4000

$$\text{Simple interest} = \frac{4000 \times 5 \times 10}{100} = ₹ 2000$$

Thus the annual interest he would have received

$$\text{is } \frac{₹ 2000}{5} = ₹ 400.$$

29. When interest is compounded monthly amount

$$A = P \left(1 + \frac{i}{12} \right)^{n \times 12}$$

$$\begin{aligned} \text{Given } i &= \frac{6}{100} = 0.06 \\ n &= 8, A = 1000 \end{aligned}$$

$$\therefore 1000 = P \left(1 + \frac{0.06}{12} \right)^{8 \times 12}$$

$$\begin{aligned} 1000 &= P(1 + .005)^{96} \\ &= P(1.005)^{96} \end{aligned}$$

$$\text{Let } x = (1.005)^{96}$$

$$\begin{aligned} \text{Log } x &= \text{Log } (1.005)^{96} \\ &= 96 \text{ Log } 1.005 \\ &= 96 \times .0021 \\ &= .2016 \end{aligned}$$

$$\begin{aligned} x &= \text{Antilog } 0.2016 \\ &= 1.591 \end{aligned}$$

$$\therefore 1000 = P \times 1.591$$

$$\therefore P = \frac{1000}{1.591} = 628.5$$

Hence the required principal is ₹ 628.5.

30. The rate of interest for the 3 yrs are 3%, 4% and 5%.

The amount of the end of 3 yrs.

$$A = P(1 + i_1) \cdot (1 + i_2) \cdot (1 + i_3)$$

$$\text{Given } i_1 = \frac{3}{100} = .03$$

$$i_2 = \frac{4}{100} = .04$$

$$i_3 = \frac{5}{100} = .05$$

$$P = ₹ 25,000$$

Putting the values

$$\begin{aligned} A &= 25,000 (1 + .03)(1 + .04)(1 + .05) \\ &= 25,000 \times 1.03 \times 1.04 \times 1.05 \\ &= 25,000 \times 1.12476 \\ &= 28119. \end{aligned}$$

\therefore Thus the amount to be paid is 28119

$$\begin{aligned} \text{Interest} &= \text{Amount} - \text{Principal} \\ &= ₹ 28119 - ₹ 25,000 \\ &= ₹ 3119. \end{aligned}$$

UNIT-II

KEY CONCEPTS

ANNUITY, DISCOUNTING OF BILLS OF EXCHANGE, STOCK AND SHARES

ANNUITY

Amount of Annuity (M)

- (i) Immediate Annuity

$$M = \frac{A}{i} \{(1-i)^n - 1\}$$

- (ii) Annuity Due

$$M = \frac{A}{i} (1-i) \{(1-i)^n - 1\}$$

- (iii) Deferred Annuity (Immediate)

$$M = \frac{A}{i} \{(1-i)^n - 1\}$$

- (iv) Deferred Annuity (Due)

$$M = \frac{A}{i} (1-i) \{(1-i)^n - 1\}$$

Present Value of Annuity (V)

- (i) Immediate annuity / Ordinary annuity

$$V = \frac{A}{i} \{1 - (1-i)^{-n}\}$$

- (ii) Annuity Due

$$V = \frac{A}{i} (1-i) \{1 - (1-i)^{-n}\}$$

- (iii) Deferred Annuity (Immediate)

$$V = \frac{A}{i} (1-i)^m \{1 - (1-i)^{-n}\}$$

- (iv) Deferred Annuity (Due)

$$V = \frac{A}{i} (1-i)^{m-1} \{1 - (1-i)^{-n}\}$$

- (v) Perpetuity (Immediate)

$$V = \frac{A}{i}$$

- (vi) Perpetuity (Due)

$$V = \frac{A}{i} (1+i)$$

- (vii) Deferred Perpetuity (Immediate)

$$V = \frac{A}{i} (1+i)^m$$

- (viii) Deferred Perpetuity (Due)

$$V = \frac{A}{i} (1+i)^{-(m-1)}$$

A = Annuity

i = Rate of interest (R/100),

n = Number of years

M = Amount,

V = Present Value

m = Deferred period

DISCOUNTING OF BILLS OF EXCHANGE

$$(i) \quad P.V. = B.V. - I \quad \text{or} \quad \frac{B.V. \times 100}{100 + R \times T}$$

$$(ii) \quad B.V. = P.V. + I \quad \text{or} \quad D.V. + B.D.$$

or

$$\frac{B.D. \times T.D.}{B.G.}$$

$$(iii) \quad R.V. = B.V. - T.D.$$

$$(iv) \quad D.V. = B.V. - B.D.$$

$$(v) \quad T.D. = P.V. \times T \times \frac{R}{100}$$

or

$$\frac{B.V. \times R \times T}{100 + R \times T}$$

or

$$\sqrt{P.V. \times B.G.}$$

or

$$R.V. - P.V.$$

$$(vi) \quad B.D. = B.V. \times T \times \frac{R}{100}$$

or

$$\frac{B.V. \times T.D.}{P.V.}$$

or

$$B.V. - D.V.$$

or

$$T.D. + B.G.$$

$$(vii) \quad B.G. = T.D. \times T \times \frac{R}{100}$$

or

$$B.D. - T.D.$$

or

$$R.V. - D.V.$$

(viii) Due Date = Legal due date

Legal Due date =

Nominal due date + 3 days of grace.

Nominal Due date =

Date of drawal + Term of the bill.

P.V. = Present Value

B.V. = Bill Value

R.V. = Retired Value

D.V. = Discounted Value

T.D. = True Discount

B.D. = Bankers' Discount

B.G. = Bankers' Gain

T = Term of the bill

R = Rate

I = Interest

STOCK AND SHARES

(i) Stock Value = Paid up Value (usually ₹100)

(ii) Market Value =

Stock Value + Premium

Stock Value - Discount

(iii) Cash Value or Sale Value =

M.V. - Brokerage - Contango

(iv) Cash Value on Purchase =

M.V. + Brokerage + Backwardition
+ Stamp duty

(v) Dividend Rate = $\frac{\text{Dividend}}{\text{Stock Value}} \times 100$

(vi) Yield Rate =

$\frac{\text{Dividend}}{\text{Cash Value on Purchase}} \times 100$

(vii) Gross Income =

Dividend Rate x Stock Value

or

Yield Rate x Cash Value

(viii) Net Income = Gross Income - Income Tax

(ix) Brokerage = % of Stock Value

(x) Contango = % of Stock Value

(xi) Backwardition = % of Market Value

UNIT - II

GROUP - A : OBJECTIVE TYPE QUESTIONS

1. *From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.*

Annuity

66. An annuity the enforcement of which is delayed for a certain period is :
- (i) Immediate annuity
(ii) Deffered annuity
(iii) Annuity due
(iv) Annuity prepaid
67. The person entitled to receive the annuity payment is :
- (i) Annuitator (ii) Annuitant
(iii) Drawer (iv) Annuity
68. An annuity which is payable at the beginning of each period :
- (i) Annuity due
(ii) Dffered annuity
(iii) Perpetual annuity
(iv) Immediate annuity
69. Annuity which becomes due for payment at the endof each period :
- (i) Deffered annuity
(ii) Perpetual annuity
(iii) Annuity due
(iv) Annuity prepaid
70. Annuity that is payable for ever without stop:
- (i) Immediate annuity
(ii) Perpetual annuity
(iii) Annuity due
(iv) Annuity certain
71. Periodical payment of a fixed amount payable at regular interval.
- (i) Interest (ii) Instalment
(iii) Annuity (iv) Premium
72. The present value of a perpetuity is equal to:
- (i) $\frac{A}{i}(1+i)$ (ii) $\frac{A}{i}$
(iii) $P(1+i)^n$ (iv) $P(1+i)^n - P$
73. An annuity which is payable till the happening of a certain contingent event is :
- (i) Deffered annuity
(ii) Contigent annuity
(iii) Immediate annuity
(iv) Perpetuity
74. Annuity payable for a certain number of time is :
- (i) Perpetual annuity
(ii) Defered annuity
(iii) Caontigent annuity
(iv) Annuity certain
75. The interval between two consecutive annuity payments are :
- (i) Fixed
(ii) Variable
(iii) Partly Fixed
(iv) Partly Variable

Discounting of Bills

76. The present value of ₹ 1020 due 3 months hence at 8% per annum is :
- (i) ₹ 900 (ii) ₹ 996
(iii) ₹ 1000 (iv) ₹ 1010
77. B. D. is :
- (i) > T. D. (ii) < T. D.
(iii) = T. D. (iv) = B.G.
78. The person to whom the payment of the bill is to be made is called.
- (i) Drawer (ii) Drawee
(iii) Holder (iv) Payee
79. The bankers discount on ₹ 2600 due 6 months hence at 8% p.a. is :
- (i) ₹ 208 (ii) ₹ 104
(iii) ₹ 260 (iv) ₹ 130
80. The difference between B.D. and T.D. is :
- (i) B.V. (ii) B.G.
(iii) P.V. (iv) D.V.
81. True discount is interest on :
- (i) B.V. (ii) P.V.
(iii) D.V. (iv) B.G.
82. Banker's gain is interest on :
- (i) B.V. (ii) T.D.
(iii) P.V. (iv) B.V.
83. Banker's discount is interest on :
- (i) B.V. (ii) P.V.
(iii) D.V. (iv) T.D.
84. The nominal due date of a bill drawn on 14th August 2016 payable after 4 months is :
- (i) 14th November 2016
(ii) 17th November 2016
(iii) 15th November 2016
(iv) 16th November 2016
85. A bill of exchange is a/an :
- (i) Unconditional order
(ii) Unconditional promise
(iii) Conditional Order
(iv) Qualified promise
86. The true discount on a bill of ₹ 5100 for 3 months at 8% p.a. is :
- (i) ₹ 100 (ii) ₹ 105
(iii) ₹ 110 (iv) ₹ 120
87. The banker's discount on a bill of ₹ 5100 for 3 months at 8% p.a. is :
- (i) ₹ 100 (ii) ₹ 102
(iii) ₹ 108 (iv) ₹ 408
88. The party who accepts a bill is :
- (i) Drawer
(ii) Drawee
(iii) Payee
(iv) Holder in due course
89. If B.D. is ₹ 525 and T.D. is ₹ 500, then the B.V. is :
- (i) ₹ 10,000 (ii) ₹ 10,200
(iii) ₹ 10,500 (iv) ₹ 11,000
90. The legal due date of a bill drawn on 24th March 2020 for 6 months after date is
- (i) 24.09.20 (ii) 21.09.20
(iii) 26.09.20 (iv) 27.09.20
91. The unexpired period of a bill due on 31.03.20 but retired on 17.01.20 is :
- (i) 70 days (ii) 72 days
(iii) 73 days (iv) 75 days

92. The B.V. of ₹ 1000 payable after 3 months at 6% p.a. is
 (i) ₹ 1018 (ii) ₹ 1015
 (iii) ₹ 1020 (iv) ₹ 1005
93. The bankers' discount on a bill of ₹ 5400 due 8 months hence at 12% p.a. is :
 (i) ₹ 540 (ii) ₹ 548
 (iii) ₹ 435 (iv) ₹ 432
94. If T.D. on a bill due 4 months hence @3% p.a. is ₹ 100 the B.D. is
 (i) ₹ 300 (ii) ₹ 112
 (iii) ₹ 99 (iv) ₹ 101
95. A bill drwn on 5th July payable 3 months after date was discounted on 8th August. The discounting period is :
 (i) 95 days (ii) 61 days
 (iii) 38 days (iv) 43 days
- Stock and Share**
96. By investing ₹ 1920 in 8% stock. Mr. X earns ₹ 160. The stock is then quoted at :
 (i) ₹ 106 (ii) ₹ 96
 (iii) ₹ 80 (iv) ₹ 108
97. 6% stock at par cum dividend will be quoted at
 (i) ₹ 106 (ii) ₹ 100
 (iii) ₹ 94 (iv) ₹ 112
98. 8% stock at 10% discount cum dividend will be quoted at :
 (i) ₹ 100 (ii) ₹ 90
 (iii) ₹ 98 (iv) ₹ 118
99. The amount of stock which can be brought by investing ₹ 4900 in 5% stock at 98 is :
 (i) ₹ 4900 (ii) ₹ 5000
 (iii) ₹ 5500 (iv) ₹ 4800
100. The yield on 10% stock at 10% discount is:
 (i) 12% (ii) 11%
 (iii) $11\frac{1}{9}\%$ (iv) $10\frac{1}{9}$
101. A stock is said to be at pur when :
 (i) M.V. > S. V. (ii) M.V. < S. V.
 (iii) M. V. = S. V. (iv) M.V. = C.V
102. The amount required to buy 7% ₹ 1000 stock at 8% discount :
 (i) ₹ 800 (ii) ₹ 820
 (iii) ₹ 900 (iv) ₹ 920
103. Annual income from ₹ 9500 5% stock is :
 (i) ₹ 425 (ii) ₹ 450
 (iii) ₹ 475 (iv) ₹ 525
104. Commission payable by a speculative seller to the broker is known as :
 (i) Backwardition (ii) Forwardition
 (iii) Brokerage (iv) Contago
105. Commission payable by speculative buyer to the broker is :
 (i) Backwardition (ii) Forwardition
 (iii) Stepwardition (iv) Contago
106. The amount to be realised by selling ₹3000 5% stock at ₹ 95 is :
 (i) ₹ 2650 (ii) ₹ 2750
 (iii) ₹ 2850 (iv) ₹ 2950
107. In ex-dividend quotation the next dividend is received by :
 (i) Buyer
 (ii) Seller
 (iii) Broker
 (iv) Both buyer & seller

108. In security trading stamp duty is paid by :
- (i) Buyer
(ii) Seller
(iii) Boker
(iv) Both by buyer and seller
109. A man buys 5% ₹ 3000 stock at 90 and sells them at $92\frac{1}{4}$. His gain is :
- (i) ₹ 60 (ii) ₹ 67
(iii) ₹ 67.50 (iv) 45
110. If annual income on 6% stock is ₹ 9000 then the value of stock is :
- (i) ₹ 15,000 (ii) ₹ 16,000
(iii) ₹ 18,000 (iv) ₹ 20,000
111. Yeild from 3.75% stock at 10% discount is :
- (i) 4% (ii) 4.17%
(iii) 5% (iv) 5.17%
112. The dividend on 5%, ₹ 5000 stock at 10% premium is :
- (i) ₹ 200 (ii) ₹ 250
(iii) ₹ 255 (iv) ₹ 500
113. The income of a broker from ₹ 80,000 4% stock at 90 contago 3% is :
- (i) ₹ 2400 (ii) ₹ 2700
(iii) ₹ 3200 (iv) ₹ 3600
114. The cash value realised from sale of 9% ₹ 1480 stock at $95\frac{1}{8}$, brokerage $\frac{1}{8}\%$:
- (i) ₹ 409 (ii) ₹ 406
(iii) ₹ 1406 (iv) ₹ 706
115. Money required to buy 6% ₹ 7400 stock at $110\frac{7}{8}$ brokerage $\frac{1}{8}\%$:
- (i) ₹ 8000 (ii) ₹ 8014
(iii) ₹ 8214 (iv) ₹ 8200

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

Annuity

26. What is an annuity ?
27. What is an immediate annuity ?
28. What is an annuity due ?
29. What is a perpetuity ?
30. What is present value ?
31. What is contingent annuity ?

Discounting of Bills of Exchange

32. What is true discount ?
33. What is bill value ?
34. What is banker's discount ?

35. What is legal due date ?
36. What is nominal due date ?

Stock and Shares

37. What is stock ?
38. What is dividend ?
39. What is yeild ?
40. What is contago ?
41. What is backwardition ?
42. What is an ex-dividend quotation ?
43. What is a debenture ?
44. Write one difference between stock and share.
45. What is a preference share ?

2. (b) Fill in the blanks :

Annuity

31. When annuity is payable for ever it is called _____ annuity.
32. The person receiving the annuities is called _____.
33. When annuity is payable at the end of each period it is called annuity _____.
34. The present value of a perpetuity of ₹ 1000 a year at the rate of 10% p.a. is _____.
35. Annuity in which payments are made at the beginning of each period is _____ annuity.
36. Annuities are determined reckoning _____ interest.
37. An annuity the payment of which is delayed for certain period is called _____ annuity.

Discounting of Bills

38. Legal due date exceeds the nominal due date by _____ days.
39. The difference between B.D. and T.D. is _____.
40. $B. V. = P. V. + \underline{\hspace{2cm}}$.
41. Bankers' gain is the interest on true discount for the _____ period.
42. A bill is drawn on 5th July payable 3 months after date was discounted on 8th August. The discounting period is _____ days.
43. If T.D. is ₹ 10, and P.V. = ₹ 200 then the B.V. is equal to _____.
44. Bankers' discount on a bill for ₹ 500 due 6 months hence @4% p.a. is ₹ _____.

Stock and Share

45. The yield on 6% stock at ₹ 120 _____ is .
46. ₹ _____ stock can be bought by investing ₹ 4900 in 5% at 98.
47. A stock is at premium when market value is _____ than the stock value.
48. Commission which is paid by the seller as well as buyer of a stock to the broker is called _____.
49. A bull anticipates a _____ in price.
50. If ₹ 100 stock is quoted at 20 discount then the price of the stock is _____.
51. The income of an investor from ₹ 80,000, 5% stock at 90 is ₹ _____.

2. (c) Express the following in one word / term each.

Annuity

23. An annuity which is payable for ever without stop.
24. An annuity the enforcement of which is delayed for certain period.
25. An annuity which becomes due for payment at the end of each period.
26. An annuity which is payable at the beginning at each period.
27. The person entitled to receive the benefits of annuity payment.
28. The person obliged to make annuity payments.
29. The lump sum consideration against which annuity payments are made.
30. An annuity which is payable for a certain number of times.
31. An annuity the payment of which is enforced immediately.
32. Periodical payment of a fixed amount payable at regular interval.

Discounting of Bills

33. Days added to nominal due date to find out the legal due date of a bill.
34. Excess of banker's discount over true discount.
35. Rebate from a bill values which is allowed by the holder of the bill to his debtor who retires the bill before due date.
36. The date which is arrived at by adding 3 days of grace to the nominal due date.
37. The person who receives the final payment from a bill.
38. The date on which actual period of the bill expires.
39. Interest charged by a bank for discounting a bill.
40. The amount of money, invested today will be equal to the maturity value of the bill on due date.

Stock and Share

41. Commission payable by the buyer and seller of stocks to their booker.
42. Unit of capital which is formed by consolidation or conversion of fully paid up shares of similar class.
43. The rate of return on investment.
44. The nominal value of stock.
45. The value at which a particular instrument is quoted in a stock exchange market.
46. A stock the market price of which excludes the dividend accrued to the stock to date.
47. Shares having preference over payment of dividend and return of capital at the time of liquidation.

2. (d) Correct the underlined portion of the following sentences.**Annuity**

29. An annuity which is payable for ever without stop is known as annuity certain.
30. In case of annuity due the payment is made at the end of each period.
31. The annuitator is entitled to receive the benefits of annuity payments.
32. The term annuity is derived from the latin world annual.
33. The present value of a perpetuity = $\frac{A}{1-i}$.
34. In case of immediate annuity the payments are made at the beginning of each period.

Discounting of Bills

35. Bill of exchange is an unconditional promise to pay.
36. True discount is interest on Bill value.

37. Banker's discount is interest on Present value.
38. Bankers gain is interest on banker's discount.
39. B.D. on ₹ 500 due 6 months hence @4% p.a. is ₹ 20.
40. The days of grace allowed on a bill is 5 days.

Stock and Share

41. The yeild on a 10% stock at a premium is more than 10%.
42. Brokerage decreases purchase value.
43. Equity shareholders get a fixed amount of dividend p.a.
44. A 8% stock at par cum dividend will be quoted at ₹100.
45. When market value is less than stock value the stock is at premium.
46. 8% stock at 110 means ₹ 8 is earned an investment of ₹ 110.

UNIT - II

GROUP - A : ANSWERS

1. From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.

- | | |
|------------------------------|------------------------------------|
| 66. (ii) Deffered annuity | 91. (iii) 73 days |
| 67. (ii) Annuitant | 92. (ii) ₹ 1015 |
| 68. (iv) Immediate annuity | 93. (iv) ₹ 432 |
| 69. (iii) Annuity due | 94. (iv) ₹ 101 |
| 70. (ii) Perpetual annuity | 95. (ii) 61 days |
| 71. (iii) Annuity | 96. (ii) ₹ 96 |
| 72. (ii) $\frac{A}{i}$ | 97. (i) ₹ 106 |
| 73. (ii) Contigent annuity | 98. (iii) ₹ 98 |
| 74. (iv) Annuity certain | 99. (ii) ₹ 5000 |
| 75. (i) Fixed | 100. (iii) $11\frac{1}{9}\%$ |
| 76. (iii) ₹ 1000 | 101. (iii) M. V. = S. V. |
| 77. (ii) < T. D. | 102. (iv) ₹ 920 |
| 78. (iv) Payee | 103. (iii) ₹ 475 |
| 79. (ii) ₹ 104 | 104. (iv) Contage |
| 80. (ii) B.G. | 105. (i) Backwardition |
| 81. (ii) P.V. | 106. (iii) ₹ 2850 |
| 82. (ii) T.D. | 107. (ii) Seller |
| 83. (i) B.V. | 108. (iv) Both by buyer and seller |
| 84. (i) 14th November 2016 | 109. (iii) ₹ 67.50 |
| 85. (i) Unconditional orders | 110. (i) ₹ 15,000 |
| 86. (i) ₹ 100 | 111. (ii) 4.17% |
| 87. (ii) ₹ 102 | 112. (ii) ₹ 250 |
| 88. (ii) Drawee | 113. (i) ₹ 2400 |
| 89. (iii) ₹ 10,500 | 114. (iii) ₹ 1406 |
| 90. (iv) 27.09.20 | 115. (iii) ₹ 8214 |

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

26. Annuity means a series of payments of a fixed amount at regular intervals.
27. When periodic payment of annuity starts at the end of each period it is called immediate or ordinary annuity.
28. When payment of annuity starts at the beginning of each period it is called annuity due.
29. Annuity payable for ever without any stop is called a perpetuity.
30. Present value is the lump sum consideration against which annuity payments are made or present worth of the future payments.
31. An annuity which is payable till the happening of a certain contingent event is called contingent annuity.
32. Interest on present value of the bill for the bill period.
33. The value written on the face of the bill is known as bill value or maturity value.
34. The excess of bankers' discount over true discount is known as banker's gain.
35. Nominal due date plus 3 days of grace is the legal due date or it is the date which comes after 3 days of nominal due date.
36. Nominal due date is the date on which actual term of the bill expires.
37. Total value of fully paid up shares is called stock.
38. Dividend is the part of profit distributed by a company among its shareholders.
39. Yield is the rate of return on the amount of investment.
40. Contango is a commission which is payable by a speculating seller to a broker who arranges the instruments for him to sell to the investing buyer.
41. It is a commission which is payable by a speculating buyer to a broker who arranges money for him to buy the instruments from a real seller.
42. Ex-dividend is a quotation of stock price under which the next dividend is to be received by the seller of the stock.
43. A debeture is an acknowledgement of debt given by a company under its common seal.
44. Shares may be fully paid or partly paid but stocks are always fully paid.
45. Preference share refers to those shares which have a preference over payment of dividend and return of capitla at the time of liquidation of the company.

2. (b) Fill in the blanks :

- | | | |
|---------------|-----------------|---------------|
| 31. Perpetual | 38. 3 | 45. 5% |
| 32. Annuitant | 39. B.G. | 46. ₹ 5000 |
| 33. Due | 40. T.D. | 47. More |
| 34. ₹ 10,000 | 41. Discounting | 48. Brokerage |
| 35. Immediate | 42. 61 | 49. Rise |
| 36. Compound | 43. ₹ 210 | 50. ₹ 80 |
| 37. Deferred | 44. 10 | 51. ₹ 4000 |

2. (c) Express the following in one word / term each.

- | | | |
|----------------------------------|-----------------------|---------------------------------|
| 23. Perpetuity/Perpetual annuity | 31. Immediate annuity | 39. Banker's discount |
| 24. Deferred annuity | 32. Annuity | 40. Present Value/Present Worth |
| 25. Immearate | 33. Days of grace | 41. Brokerage |
| 26. Annuity due | 34. Banker's Gain | 42. Stock |
| 27. Annuitant / Annuity Holder | 35. True discount | 43. Yeild |
| 28. Annuitator | 36. Legal due date | 44. Stock value |
| 29. Present value | 37. Payee | 45. Market value |
| 30. Annuity Certain | 38. Nominal due date | 46. Ex-dividend |
| | | 47. Preferential shares |

2. (d) Correct the underlined portion of the following sentences.

- | | | |
|--------------------------------|-------------|----------------|
| 29. Perpetual annuity | 35. Order | 41. < |
| 30. Beginning | 36. Present | 42. Increases |
| 31. Annuitant / Annuity Holder | 37. Bill | 43. Preference |
| 32. Annum | 38. True | 44. ₹ 108 |
| 33. $\frac{A}{i}$ | 39. 10 | 45. Discount |
| 34. End | 40. 3 | 46. ₹ 100 |

UNIT - II

GROUP - B : SHORT TYPE QUESTIONS

3. *Short Questions to be answered within 30 words*

Annuity

66. What is annuity ?
67. What is a sinking fund ?
68. What do you mean by amount of an annuity?
69. What is present value of an annuity ?
70. What is a contingent annuity ?
71. What is an immediate annuity ?
72. What is a deferred annuity ?
73. Write the formula for finding the present value of an immediate annuity.
74. Write the formula for finding the present value of a perpetuity.
75. Write the formula for finding amount of an immediate annuity.

Discounting of Bills of Exchange

76. What is a bill of exchange ?
77. What is an after date bill ?
78. What is an after sight bill ?
79. What is a promisory note ?
80. What do you mean by days of grace ?
81. What do you mean by dishonouring of a bill?
82. What do you mean by discounting of a bill?
83. What do you mean by bill value ?
84. What is the bankers' discount on a bill of ₹ 3200 payable 3 months after date, rate of interest being 10% p.a. ?
85. What is true discount on a bill of ₹ 3200 payable 3 month after date, rate of interest being 10% ?

86. What is the present value of a bill of ₹ 5000 payable 6 months after date, rate of interest being 10% ?
87. When B.D. = ₹ 25 and T.D. = ₹ 20. What is B.V. ?
88. When P.V. = 5000 B.G. = ₹ 5, what is T.D.?
89. What do you mean by bankers' discount ?
90. What is discounted value ?

Stock and Share

91. What do you mean by a security ?
92. What is a preference share ?
93. What is an equity share ?
94. What is a debenture ?
95. What is authorised share capital ?
96. What do you mean by yeild ?
97. Which is better investment ? 4% stock at 96 or 5% stock at 90.
98. Find the gain or loss when a man buys ₹ 3000 stock at 90 and sells than at $92\frac{1}{4}$.
99. What is cash value on purchase ?
100. What is cash value on sale ?
101. What is a cum-dividend stock ?
102. What is ex-dividend stock ?
103. What is stock value ?
104. What is the market value of a stock ?
105. What is the market value of a stock of ₹5000 5% stock, sold for ₹ 5495 brokerage being $\frac{1}{10}$ %.

4. Answer the following questions within 50 words each.

Annuity

33. What is present value of an annuity ?
34. Write any three objectives of annuity.
35. What is a sinking fund ?
36. What is an endowment fund ?
37. What is commutation of pension ?
38. Explain perpetual annuity.
39. Explain annuity certain.
40. A man desires to create an endowment fund to award a prize of ₹ 1000 p.a. Reckoning interest at 10% p.a. compound find the amount of the fund to be set aside, if the award is given at the end of each period.

Discounting of Bills of Exchange

41. Give a specimen of a bill of exchange.
42. Explain the parties to a bill of exchange.
43. Explain the features of a bill of exchange.
44. Explain legal due date with an example.
45. Write any three difference between a bills of exchange and promisory note.
46. A bill for ₹ 1000 is discounted 73 days before due date at 10% p.a., find the banker's discount.
47. Find the P.V. and T.D. on a bill of ₹ 5000 due 6 months hence @ 10 p.a.
48. If the T.D. and B.D. on a bill due in 3 months are ₹ 1600 and ₹ 1625. Find the B.V.

49. If the T.D. on ₹ 10,500 due five years hence is ₹ 500, find the rate of interest.
50. Differentiate between true discount and banker's discount.

Stock and Share

51. Find the annual income of ₹ 5000 7% stock at 90 (Bro $\frac{1}{4}\%$) and income tax @0.10 per rupee.
52. Find the sales price of ₹ 20,000, 5% stock at a premium of 10% (Brokerage $\frac{1}{4}$ and stamp duty 3%).
53. Which is better investment, 5% at 110 or 4% stock at ₹ 90.
54. Find the gain or loss when a man invests ₹ 834 in 6% stock at $104\frac{1}{8}$ and sells the lot when it has risen to $111\frac{5}{8}$ (Brokerage $\frac{1}{8}$ both the way).
55. An investment of ₹ 2860 at $4\frac{1}{2}\%$ gives an annual income of ₹ 123.75. Find cost of stock.
56. A man invested some money in 5% stock at 94 and when the price rises to 111 sold his holdings and earned ₹ 680. Find the investment.
57. ₹ 5000, 5% stock are sold for ₹ 5495 brokerage being $\frac{1}{10}\%$ find the market value of the stock.
58. A 4% stock yeilds $4\frac{1}{2}\%$ after deduction of income tax @10%. Find the market value of the stock.
59. Which is better investment 5% stock at 80 subject to an income tax of 10% or 4% stock at 75 free of income tax.
60. Write the differences between stock and share.

UNIT - II

GROUP - B : ANSWERS

3. *Short Questions to be answered within 30 words*

66. An annuity is a sequence of payments, usually equal in size, made at equal intervals of time. Though the word annuity means annual payments, the payments may be yearly, half yearly, quarterly or monthly.
67. A fund that is created in order to meet certain liability or to purchase some property in future by depositing a fixed amount periodically at compound rate of interest is known as sinking fund.
68. The amount of future value of an annuity is the value of all payments at the end of its term. This is the sum of the compound amount of all payments.
69. The sum of present values of different payments or instalments of an annuity is called the present value of that annuity.
70. A contingent annuity is one whose payments continue for a period of time which depends upon an event whose date of occurrence can not be accurately foretold.
71. An annuity is called immediate or ordinary annuity if the payments of the annuity are made at the end of each payment period.
72. An annuity is called deferred annuity if the first payment is made after a certain period from the beginning of the annuity.
73. Present value of Immediate annuity
- $$V = \frac{A}{i} \{1 - (1 - i)^n\}$$
- Where V = Present value A = Annuity
- $$i = \frac{R}{100} \quad n = \text{No. of years.}$$
74. P.V. of perpetuity $V = \frac{A}{i}$
- Where A = Annuity $i = \frac{R}{100}$
75. $M = \frac{A}{i} \{(1 - i)^n - 1\}$
- Where M = Amount, A = Annuity
- $$i = \frac{R}{100} \quad \& \quad n = \text{No. of yrs.}$$
76. A bill of exchange is an instrument in writing continuing an unconditional order, signed by the maker, directing certain person to pay a certain sum of money only to, or to order of certain person or to the bearer of the instrument.
77. An after date bill is a time bill where due date is calculated from the date of drawing.
78. An after sight bill is a time bill where nominal due date is calculated from the date of acceptance.
79. A promisory note is an instrument in writing containing an unconditional undertaking signed by the maker to pay a certain sum of money only to the order of a certain person or to the bearer of the instrument.
80. Days of grace is a period of 3 days that is being added to nominal due date of a bill to find out the legal due date. It is a legal concession given to a borrower.
81. When a drawee fails to meet his obligations under a bill or fails to make payment on the legal due date of the bill, the bill is said to be dishonoured.

82. Discounting of a bill means pledging the bill with a banker before its maturity and taking in advance money due on the bill in the process allowing the banker deduct some discount for its service.
83. Bill value refers to the amount recorded on the face of the bill to be payable on maturity. It is also called as face value of the bill.
84. Given BV = 3200
Time = 3 months $\frac{1}{2}$ yrs
Rate = 10%
Bankers discount B.D. = $\frac{BV \times T \times R}{100}$
$$= \frac{3200 \times \frac{1}{2} \times 10}{100} = ₹ 80.$$
85. Let P.V. = ₹ 100.
Then B.V. = 100 + Int @ 10% for 3 months
B.V. will be $100 + 2.50 = 102.50$ or ₹ $\frac{205}{2}$
When B.V. is $\frac{205}{2}$ T.D. is $\frac{5}{2}$
When B.V. is 1 T.D. = $\frac{5}{2} \times \frac{2}{205} = \frac{1}{41}$
When B.V. is 3200 TD is $= \frac{1}{41} \times 3200 = ₹ 78$
86. When P.V. is 100,
B.V. = 100 + Int. for 6 months.
= ₹ 100 + ₹ 5 = ₹ 105
∴ Thus for ₹ 105 B.V.P.V. = ₹ 100
₹ 5000 B.V. P.V. = $\frac{100}{105} \times 5000 = ₹ 4762$
87. $B.V. = \frac{B.D. \times T.D.}{B.D. - T.D.}$
Given B.D. = ₹ 25, T.D. = ₹ 20
$$B.V. = \frac{25 \times 20}{25 - 20} = \frac{500}{5} = ₹ 100.$$
88. $T.D. = \sqrt{P.V. \times B.G.}$
Given P.V. = 5000, B.G. = ₹ 5
Hence T.D. = $\sqrt{5000 \times 5}$
$$= \sqrt{25000} = ₹ 500.$$
89. Bankers' discount is a rebate from a bill value which is allowed by an holder of an instrument to his banker who advances him on the instrument before its due date.
90. Discounted value is the value which is realised from an instrument by discounting the same with a banker before its due date. Thus it is simply the difference between B.V. and B.D.
91. A security means any debenture, bond, loan paper, promisory note or any other instrument which is issued by a company, corporation, co-operative, local authority or government to raise loan from the public for a certain period at a certain rate of interest.
92. It is a share which carry a preferential right in respect of a fixed dividend and a preferential right as to the return of capital in the event of company's winding up over other classes of shares.
93. It is a share which has no preferential rights over other classes of shares as regards to payment of dividend or capital in case of winding up.

94. A debenture is a formal document issued by a company under its seal acknowledging a debt due by it to its holder.
95. It is the maximum amount of share capital which a company can raise for the time being. It is mentioned in the company memorandum and is also known as nominal or registered capital.
96. Yield means return on investment. Its rate is calculated by dividing income from stock by its cash value or purchase value and multiplying it by 100.
97. Yield from 4% stock is $\frac{4}{96} \times 100 = 6\frac{1}{4}\%$.
 Yield from 5% stock is $\frac{5}{90} \times 100 = 5\frac{5}{9}\%$
 As yield rate of 4% stock is higher it is a better investment.
98. Purchase price is ₹ 90 per stock
 Sales price is ₹ $92\frac{1}{4}$ per stock
 Profit per stock is $92\frac{1}{4} - 90 = 2\frac{1}{4}$.
 Profit per stock in 30 stock $\left(\frac{300}{100}\right)$ is
 $= 2\frac{1}{4} \times 30 = \frac{9}{4} \times 30$
 $= \frac{270}{4} = ₹67.50$.
99. Cash value on purchase is the investment value or the cost of an investment to a buyer. It is arrived at by adding the brokerage if any, backwardition if any, and stamp duty if any to the market value of the instrument.
100. Cash value on sales is the net sale proceeds or realisable value by a seller on the sell of an instrument. It is arrived at by subtracting the brokerage if any and contango if any from the market value of the instrument.
101. A stock the market price of which includes the dividend or interest accrued on the stock to date is called a cum-dividend or cum-interest stock.
102. A stock the market price of which excludes the dividend or interest accrued on the stock to date is called an ex-dividend or ex-interest stock.
103. Stock value is the paid-up value of an instrument issued. Unless otherwise specified it is taken at ₹ 100 in terms of indian stock exchange market.
104. The market value is the value at which a particular stock is quoted in a stock exchange market for sale and purchase during a certain period. It varies from time to time.
105. Cash price of 5000 stock = ₹ 5495
 Add Brokerage $\frac{1 \times 5000}{10 \times 100} = 5$
 Total M.V. ₹ 5,500
 Market value of ₹ 100 stock is
 $\frac{5500}{5000} \times 100 = ₹ 110$.

4. Answer the following questions within 50 words each.

33. Present value of an annuity refers to the aggregate of all future payments, discounted at a certain rate of interest. Thus it is the sum total of all the cash flows or cash receipts by the annuity holder discounted at a specific compound rate of interest.
34. The objectives of annuity are :
- To discharge an existing debt in certain number of instalments inclusive of compound interest at a specified rate.
 - To create a fund to redeem a liability or to replace an asset in future without disturbing the financial position of a person/institution.
 - To secure a regular income to meet the needs at old age.
 - To create wealth by investing in small amounts regularly.
35. A sinking fund is a fund which is created through periodical contribution of equal amount for a certain period to be invested outside in certain gilt-edged securities with a view to realize an accumulated sum inclusive of compound interest at a certain rate percent to meet an expensive project like redemption of an existing debt or replacement of an existing asset.
36. An endowment fund is a fund which is created by setting aside a lump sum of money to grow with compound interest for certain periods upto a desired amount that would suffice to pay for an award of prize, scholarship, donation or grant or the like, either for certain times or forever.
37. Usually an employee on retirement from service receives a monthly pension till death. The pension amount is constant and regular. Sometimes the employee wants a lump sum amount in lieu of a part of his pension amount. This arrangement is known as commutation of pension.
38. Annuity payable for ever is known as perpetual annuity or perpetuity when annuity is payable at the end of each period it is called immediate perpetuity. If annuity is payable at the beginning of each period it is called perpetuity due. Again if payment starts after a certain period of time and goes for ever it is called deferred perpetuity. Deferred perpetuity may be immediate deferred perpetuity or deferred perpetuity due taking into account whether payment is made at the beginning or end of the year.
39. An annuity payable for a fixed number of year is known as annuity certain. There are three types of annuity certain : immediate annuity, annuity due and deferred annuity. When payment of annuity is made at the end of the year it is called immediate annuity. When the payment is made at the beginning of the year / period it is called annuity due. Again when the payment is postponed or deferred for certain period it is called a deferred annuity.
40. This is a problem of immediate perpetual annuity
- Given $A = ₹1000$ $i = \frac{10}{100} = 0.10$
- The amount of the fund to be set aside means the present value of the said annuity, which is given by the model
- $$V = \frac{A}{i}$$
- Substituting the respective values.
- $$V = \frac{1000}{0.10} = 10,000.$$
- Hence the required amount to be set aside is ₹ 10,000.

41. Specimen of a Bill of Exchange

Stamp Ticket

₹ 20,000

Bhubaneswar

23rd April 2020

Three months after date pay to or order a sum of ₹ 20,000 (Twenty thousand only for value of goods received.

Signature

(Drawer)

To Drawee

42. There are three parties to a bill of exchange : Drawer, drawee and the payee.

The maker of the bill is known as the drawer. The bill is being prepared by him and sent to the drawee for acceptance.

The party thus accepting the bill is called the drawee. He is originally liable for the payment of the bill.

The person to whom the final payment is made is known as payee. The drawer and the payee may be the same person.

43. Features of a bill of exchange are :

- (i) A bill of exchange must be in writing.
- (ii) It must contain an unconditional order to pay.
- (iii) The period and amount of the bill must be certain.
- (iv) There are 3 parties to a bill : the drawer, drawee and payee.
- (v) It must be accepted by the drawee.
- (vi) It must be properly stamped, dated and signed by the maker.
- (vii) It is a valid legal document empowering the parties to enforce their duties and rights under the Negotiable Instrument Act.

44. Legal due date is the date on which the bill is legally payable. It is also called the maturity date. This date is found out by adding 3 days

of grace to the nominal due date of the bill. For example if a bill is drawn on 1st April 2020 payable 3 months after date the nominal due date of the bill is 1st July 2020. The legal due date is nominal due date i.e. 1st July plus 3 days i.e. 4th July 2020.

45. The differences between a bill of exchange and a promissory note are :

- (i) Bill of exchange is an unconditional order to pay whereas promissory note is an unconditional promise to pay.
- (ii) A bill of exchange has three parties; the drawer drawee and payee. But a promissory note has two parties : the promisor and the promisee.
- (iii) A bill of exchange must be accepted by the drawee but no acceptance is required in case of promissory note.
- (iv) Liability of the drawer is secondary in case of bill of exchange but in case of promissory note the liability of the promisee is primary.

46. B. V. = ₹ 1000

Unexpired period of the bill 73 days

$$\text{i.e. } \frac{73}{363} = \frac{1}{5} \text{ yr.}$$

Rate of interest 10% p.a.

Bankers discount is equal to the interest on B.V. for the unexpired period of the bill.

Hence B.D. is int. on ₹ 1000 @ 10% p.a.

for $\frac{1}{5}$ yrs.

$$\therefore \text{Interest / B.D.} = \frac{1000 \times \frac{1}{5} \times 10}{100} = ₹ 20.$$

47. Given B. V. = ₹ 5000

Time = 6 months

Rate = 10% p.a.

Let P. V. is = ₹ 100

Interest at the rate of 10% for 6 months is = ₹ 5.

Then B. V. is = ₹100 + ₹ 5 = 105

When B. V. is ₹105 P.V. is ₹ 100

When B. V. is ₹5000, P.V. is

$$\frac{100}{105} \times 5000 = ₹4762$$

The T. D. = B. V. - P. V.

$$= ₹ 5,000 - ₹ 4762 = ₹ 268.$$

∴ Present value of the bill is ₹4762 and

T.D. on the bill is ₹ 268.

48. Given

T. D. = ₹ 1600 B.D.= ₹ 1625 Time = 3 months

B.D. - T.D. = ₹ 1625 - ₹ 1600 = ₹ 25

∴ The interest on ₹1600 for 3 months is ₹25.

∴ The rate of interest is

$$\frac{25 \times 4}{1600} \times 100 = \frac{25}{4} = 6.25$$

50. The difference between B.D. and T.D. are :

Bankers' Discount	True Discount
<ul style="list-style-type: none"> Bankers' Discount is interest on B.V. for the unexpired period of the bill. Bankers' Discount is always more than T.D. Bankers' Discount give rise to bankers' gain. 	<ul style="list-style-type: none"> True Discount is interest on P.V. for the unexpired period of the bill. True Discount is always less than B.D. There is no scope for bankers' gain.

51. ₹ 5000, 7% stock

Brokerage and quotation price has no role in determining the income from stock as income/ dividend is always calculated on face value.

$$\therefore \text{Income is } \frac{7}{100} \times 5000 = ₹350$$

Less Income Tax @0.10 pr rupee = ₹35

Net income after tax ₹ 315

52. A ₹ 100 stock will be sold at ₹ 110

Less Brokerage

$$1/4 = 0.25 = ₹110 - 0.25 = ₹ 109.75$$

Stamp duty is not usually paid by the seller.

Bankers discount is the interest on B.V.

When B.V. is ₹ 100 interest is $\frac{6.25}{4}$

When Interest is ₹ 1625 B.V. is

$$= 100 \times \frac{4}{6.25} \times 1625 = 10400 .$$

∴ The B.V. is ₹ 1,04,000.

49. Given

B.V. = ₹10,500, Time = 5 yrs. T.D.= ₹510

P.V.= B.V. - T.D.

$$= ₹ 10,500 - ₹ 500 = ₹ 10,000.$$

∴ Int on ₹ 10,000 for 5 yrs is ₹ 500.

$$\text{Int on 100 for 1 yr is } \frac{500 \times 100}{10,000 \times 5} = 1$$

∴ The rate of interest is 1%.

Hence by selling ₹ 2000 stock the seller will realise

$$\frac{109.75 \times 20,000}{100} = 109.75 \times 200 = ₹21,950 .$$

53. Yield Rate

$$= \frac{\text{Income from Stock}}{\text{Investment Value of Stock}} \times 100$$

$$\text{Case I } YR = \frac{5}{110} \times 100 = 4.55\%$$

$$\text{Case II } YR = \frac{4}{90} \times 100 = 4.45\%$$

Thus return on investment is higher in first stock hence it is better investment.

54. Investment = Market Value + Brokerage

Thus for ₹ 100 stock investment

$$= ₹104 \frac{1}{8} + \frac{1}{8} = 104 \frac{1}{4}$$

Realised value = Market Value - Brokerage

Thus realised value is $111 \frac{5}{8} - \frac{1}{8} = 111 \frac{1}{2}$

The gain is = $111.50 - 104.25 = 7.25$

In an investment of 104.25 gain is 27.25

In an investment of

$$₹ 834 \text{ gain } \frac{27.25}{104.25} \times 834 = ₹58.$$

55. Income is 123.75, investmnet = ₹2860

When income is 4.50 investment

$$= \frac{2860}{123.75} \times 4.50 = 104$$

Hence the cost of stock is ₹ 104.

56. Cost price of ₹ 100 stock = ₹94

Sale price of ₹ 100 stock = ₹ 111

Gain on ₹ 100 stock is = ₹ 111 - ₹ 94 = ₹17

When the gain is ₹17 investment is ₹ 94

When the gain is ₹ 680 investment is

$$\frac{94}{17} \times 680 = 3760.$$

57. The cash value of ₹ 5000 stock is = ₹ 5495

Add Brokerage 1/10%

$$\frac{1}{10} \times 5000 \times \frac{1}{100} = 5 \quad = ₹ \quad 5$$

$$\text{Total market value} \quad = ₹ 5,500$$

60. The difference between stock and share are :

Stock	Share
<ul style="list-style-type: none"> ● A stock may consist any type of share, bond, debenture etc. ● A stock can be bought and sold in fraction. ● Stock is not issued at the time of starting of a company ● Stock is never serially numbered. ● Stocks are always fully paid-up. 	<ul style="list-style-type: none"> ● A share consists of one type of share only i.e. equity share or preference shares. ● Shares can not be brought and sold in fraction. ● Shares are issued at the starting of company. ● Shares are serially numbered. ● It may be fully or partly paid up.

∴ M.V. of ₹ 5000 stock is ₹ 5500

$$\text{M.V. of ₹ 100 stock is } \frac{5500}{5000} \times 100 = ₹110.$$

58. The net yeild from the stock is ₹ 4.5

When income is 100 the income tax is 10%

∴ Net income is $100 - 10 = ₹ 90.$

∴ When Net income is ₹ 90. Gross is ₹ 100.

When Net income is ₹ 4.5.

$$\text{Gross is } \frac{100}{90} \times 4.5 = ₹ 5.00.$$

When gross income is ₹ 5.00 the M.V. is ₹100

When gross income is 4.00 the M.V.

$$\frac{100}{5} \times 4 = 80$$

∴ The market value of 4% stock is ₹ 80.

59. The Yeild Rate (YR) is = $\frac{\text{Income}}{\text{Cash Value}}$

Net Income from ₹ 100, 5% stock is

= ₹ 5 - 0.50 (Income Tax 10%) = ₹ 4.50

Yeild Rate

$$= \frac{4.50}{80} \times 100 = \frac{450}{80} = \frac{45}{8} = 5.625\%.$$

Yeild from 4% stock at 75 is

$$= \frac{4}{75} \times 100 = \frac{16}{3} = 5.333\%.$$

∴ YR of 5% stock is higher thats that of the 4% stock hence is a better investment.

UNIT - II

GROUP - C : LONG TYPE QUESTIONS

Annuity

31. Find the present value of an annuity of ₹1000 payable at the beginning of each period for 6 years reckoning interest at 5% p.a. compound.
32. A person borrows ₹ 10,000 upon a contract that he shall pay it back in 10 equal half yearly instalments. If money is worth 4% p.a. compound find the value of an instalment. (Given $(1.02)^{-10} = 8204$)
33. In how many years will an annuity of ₹400 amount to ₹4064 at 8% p.a. Compound interest ?
34. A man deposits ₹ 1200 at a bank at the end of each year at 5% compound interest. What will be the total amount in his account at the end of 15 years.
35. A sinking fund is created for the redemption of debentures of ₹1,00,000 at the end of 25 years. How much money should be kept aside from the profit each year for the sinking fund if the investment can earn interest at @4% p.a. compound.
36. A man purchased a television paying ₹ 5000 down and promising to pay ₹200 every 3 months for the next 4 years. If the seller charge 8% p.a. C.I., what is the cash price of the television ?
37. Find the present value of an annuity of ₹ 2000 for 10 years at 5% C.I. p.a. The payment being made at the beginning of each year.

Bills Discounting of Bills of Exchange

38. True discount on a bill of ₹2730 due 6 months hence is ₹130. find the rate of interest, B.D., B.G. and P.V. of the bill.
39. If the true discount on a bill of ₹4800 due after a date is ₹240, find the bankers gain on the bill at the same rate of interest.
40. Determine the rate percent, at which the bankers discount exceeds the true discount by $\frac{1}{24}$ th of the latter, in 6 months.
41. If B.G. on a bill due 6 months at 4% p.a. is ₹20 find (i) B.V., (ii) T.D. and (iii) B.D.
42. A bill was drawn on 14.04.18 at 8 month and was discounted on 24.07.18 at 5% p.a. If the B.G. is ₹2. Find the value of the bill.
43. If the true discount and bankers' discount on a certain sum due in certain period at $8\frac{1}{3}\%$ be ₹24 and ₹25 respectively find the sum and the period in which it is due.
44. A bill is drawn for ₹5050 on June 10, 2019 at 5 months. It is discounted on 1st September 2019 at 5% p.a. How much does the holder of the bill receive and what is the bankers' gain ?
45. A bill for ₹1800 is drawn on 24th September 2019 due 6 months hence was discounted in a bank at 5% for ₹1782. Find the date of discounting.

Stock and Share

46. A invests equal amount in two stocks. First stock is 5% at 120 and 2nd is 6% at 125 with 10% income tax. If difference between the income is ₹34.50, find the total amount invested.
47. Soumesh invests ₹35,000 partly in 5% stock at 90 (income tax 10%) and partly in 10% stock (No IT) at 150. His income in each case is equal. Find his investment in each stock.
48. A man invested ₹10,200 partly in 3% stock at $79\frac{3}{4}$ and partly in 4% stock at $109\frac{3}{4}$ (brokerage $\frac{1}{4}$ to in each case). If he earned ₹380 in total, find the investment in each stock.
49. Dutta transferred his stock from $4\frac{1}{2}\%$ at $73\frac{1}{2}$ to $5\frac{1}{2}\%$ at $85\frac{1}{2}$ thereby increasing his annual income by ₹29. What amount was held of original stock by him. (Brokerages being $\frac{1}{2}$ in both the ways).
50. A man invested ₹12,000 in 8% stock at 80. He sold the stock when price increased to ₹90. The same amount is invested in 12% stock. By such act his income is increased by ₹135. What is the purchase price of the 2nd stock.
51. An investor bought 6% debenture at 126 instead of 9% preference shares at 210 and thereby made an income larger by ₹225 a year. What is the amount of his investment.
52. Mr. 'X' invests equal sums in 5% debenture and 6% preference share of a company and obtain equal income from the two. If 5% debentures are at a discount of $2\frac{1}{2}\%$, find the issue price of the preference share.
53. A person sells ₹6000 7% stock at $2018\frac{1}{6}$ and with the money realised purchase 6% stock at $95\frac{5}{6}$. Find the change in his income. Brokerage being $\frac{1}{6}\%$ on each transactions.
54. A person invests ₹7440 partly in 2.5% stock at ₹108 and balance in 3% stock at ₹168 resulting in equal income. What did he invests in each stock and find out his total income.
55. A holder of 1,00,000, 5% stock at $91\frac{6}{10}$ (Bro $\frac{1}{10}$) increases his income by ₹ 1000 a year by changing the same into an 8% stock. What is the value of his newly held stock and the market price of the same ? Brokerage being $\frac{1}{2}\%$.

UNIT - II

GROUP - C : ANSWER

31. It is a case of immediate annuity due.

$$\text{Given : } A = ₹ 1000, n = 6, i = \frac{5}{100} = 0.05$$

Here the present value is :

$$V = \frac{A}{i}(1+i)\{1-(1+i)^{-n}\}$$

Now substituting the value

$$\begin{aligned} V &= \frac{1000}{0.05}(1+0.05)\{1-(1+0.05)^{-6}\} \\ &= \frac{100000}{5}(1.05)\{1-(1.05)^{-6}\} \\ &= 20,000 \times 1.05(1-.7461) \\ &= 21000 \times .2539 \\ &= 5332. \end{aligned}$$

$$\begin{aligned} (1.05)^{-6} &= 6 \text{ Log } 1.05 \\ &= \text{Antilog} - 6 \times 0.0212 \\ &= \text{Antilog} - 1272 \\ &= \text{Antilog } \bar{1}.8728 \\ &= .7461 \end{aligned}$$

∴ The P.V. of the annuity is ₹ 5332.

32. It is a case of immediate annuity but payable half yearly.

$$\begin{aligned} \text{Given: } V &= 10,000 & n &= 5 \text{ yrs.} \\ t &= 2 \text{ times a year} & i &= 0.04 \end{aligned}$$

$$V = \frac{A}{i/t} \left\{ 1 - \left(1 + \frac{i}{t} \right)^{-nt} \right\}$$

Substituting the values

$$10,000 = \frac{A}{\frac{0.04}{2}} \left\{ 1 - \left(1 + \frac{.04}{2} \right)^{-5 \times 2} \right\}$$

$$10,000 \times .02 = A \{1 - (1.02)^{-10}\}$$

$$200 = A \{1 - .8204\}$$

$$200 = A \times .1796$$

$$A = 200 \div .1796$$

$$= 1114 \text{ (approximately)}$$

Hence the amount of each half yearly instalment = ₹ 1114.

33. It is a case of an immediate annuity.

$$\text{Here } M = \frac{A}{i} \{(1+i)^n - 1\}$$

$$\text{Given } A = ₹ 400 \quad M = ₹ 4064 \quad i = \frac{3}{100} = .03$$

Now substituting the values

$$4064 = \frac{400}{.03} \{(1+.03)^n - 1\}$$

$$= \frac{400}{.03} \{(1.03)^n - 1\}$$

$$(1.03)^n - 1 = \frac{4064 \times .03}{400} = \frac{121.92}{400}$$

$$(1.03)^n = \frac{121.92}{400} + 1 = \frac{521.92}{400} = 1.3048$$

$$\text{Log } (1.03)^n = \text{Log } 1.3048$$

$$n \text{ Log } 1.03 = \text{Log } 1.3048$$

$$n = \frac{\text{Log } 1.3048}{\text{Log } 1.03}$$

$$= \frac{0.1155}{0.0128}$$

$$= 9 \text{ years (approx.)}$$

34. It is a case of immediate annuity.

$$\text{Given } A = 1200, i = \frac{5}{100} = 0.05, n = 15 \text{ yrs.}$$

$$M = \frac{A}{i} \{(1+i)^n - 1\}$$

Substituting the values

$$\begin{aligned} M &= \frac{1200}{0.05} \{(1+0.05)^{15} - 1\} \\ &= \frac{120000}{5} \{(1.05)^{15} - 1\} \\ &= 24000 \{2.079 - 1\} \\ &= 2400 \times 1.079 \\ &= 25896 \end{aligned}$$

Let $(1.05)^{15}$ be x

$$\begin{aligned} \text{Log } x &= \text{Log } (1.05)^{15} \\ &= 15 \text{ Log } 1.05 \\ &= 15 \times 0.02779 \\ &= 0.31785 \\ x &= \text{Antilog } 0.31785 \\ &= 2.079 \end{aligned}$$

Hence after 15 years the account balance will be ₹ 25896.

35. This is a case of immediate annuity

$$\text{Given } M = ₹1,00,000, i = \frac{4}{100} = 0.04, n = 25$$

$$M = \frac{A}{i} \{(1+i)^n - 1\}$$

Substituting the values

$$1,00,000 = \frac{A}{0.04} \{(1+0.04)^{25} - 1\}$$

$$\begin{aligned} 1,00,000 &= \frac{A}{0.04} \{2.661 - 1\} \\ &= \frac{A}{0.04} \times 1.661 \\ A &= \frac{1,00,000 \times 0.04}{1.661} \\ &= 2401.19. \end{aligned}$$

Let x	$= (1 + 0.04)^{25}$
Log x	$= \text{Log } (1.04)^{25}$
	$= 25 \text{ Log } 1.04$
	$= 25 \times 0.0170$
	$= 0.4250$
x	$= \text{Antilog } 0.4250$
	$= 2.661$

Hence ₹ 2401.19 be set aside from profit each year to redeem the debentures at the end of 25 years.

36. The cash price of the T.V. is

Down payment + P.V. of the annuity payments
i.e. 16 quarterly payments.

$$\text{P.V.} = A \left\{ \frac{1 - (1+i)^{-n}}{i} \right\}$$

$$\text{Given } A = 200, n = 4 \times 4 = 16, i = \frac{0.08}{4} = 0.02$$

Now substituting the values

$$\begin{aligned} \text{P.V.} &= 200 \left\{ \frac{1 - (1+0.02)^{-16}}{0.02} \right\} \\ &= 200 \left\{ \frac{1 - (1.02)^{-16}}{0.02} \right\} \\ &= 200 \frac{1 - .7285}{0.02} \\ &= 200 \times \frac{.2715}{0.02} \\ &= 2715. \end{aligned}$$

Let x	$= 1.02^{-16}$
Log x	$= \text{Log } 1.02^{-16}$
	$= -16 \text{ Log } 1.02$
	$= -16 \times .0086$
	$= -0.1376$
	$= \bar{1}.8624$
x	$= \text{Antilog } \bar{1}.8624$
	$= .7285$

\therefore The cash price of the T.V. is
 $\text{₹ } 5000 + \text{₹ } 2715 = \text{₹ } 7715.$

37. This is a case of annuity due as it is paid in the beginning.

$$\text{Here } V = \frac{A(1+i)}{i} \{1 - (1+i)^{-n}\}$$

$$\text{Given, } A = 2000, i = \frac{5}{100} = 0.05, n = 10$$

Now Substituting the values

$$V = \frac{2000(1+.05)}{.05} \{1 - (1+.05)^{-10}\}$$

$$= \frac{2000 \times 1.05}{.05} \{1 - (1.05)^{-10}\}$$

$$V = \frac{2000 \times 1.05}{.05} \{1 - .6138\}$$

$$= \frac{2000 \times 1.05 \times .3862}{.05}$$

$$= 16220.40$$

Let x	$= (1.05)^{-10}$
Log x	$= \text{Log } (1.05)^{-10}$
	$= -10 \text{ Log } 1.05$
	$= -10 \times 0.0210$
	$= -.212$
x	$= \text{Antilog } -0.212$
	$= \text{Antilog of } \bar{1}.788$
	$= 0.6138$

\therefore The present value of the annuity is
 16220.40

38. Give B.V. = ₹2730, Time = 6 months, T.D. = ₹130
 P.V. = B. V. - T. D. = ₹ 2730 - ₹130 = ₹2600

\therefore Interest on ₹ 2600 for 6 months is ₹130.
 Interest ₹100 for 1 year is

$$\frac{130 \times 2}{2600} \times 100 = 10 \text{ Yrs.}$$

\therefore Rate of interest is 10%.

B.D. is interest on B.V. for the unexpired period of the bill.

\therefore B.D. i.e. Interest on ₹2730, @10% p.a. for 6 months is

$$2730 \times \frac{10}{100} \times \frac{1}{2} = ₹135$$

$$\text{B.G.} = \text{B.D.} - \text{T.D.} = ₹135 - ₹130 = ₹5.$$

39. Given B.V. ₹4800, T.D. = ₹ 240

$$\text{P.V.} = ₹4800 - ₹240 = ₹ 4560$$

Ratio of interest is same i.e. $\frac{\text{T.D.}}{\text{P.V.}} = \frac{\text{B.D.}}{\text{B.V.}}$

$$\therefore \text{B.D.} = \frac{\text{T.D.} \times \text{B.V.}}{\text{P.V.}}$$

Substituting the values

$$\frac{240 \times 4800}{4560} = 252.63$$

\therefore Banker's gain

$$= \text{B.D.} - \text{T.D.}$$

$$= ₹252.63 - ₹240 = ₹12.63$$

40. Given B.D. - T.D. = $\frac{1}{24}$ T.D.

Let T.D. be ₹ 24

$$\therefore \text{B.D.} - \text{T.D.} = \frac{1}{24} \times 24 = 1$$

\therefore B.G. is ₹1.

B.G. is interest on T.D.

\therefore ₹1 is the interest on ₹24 for 6 months

or on ₹ 24, for 6 months interest is ₹1.

on ₹100 for 1 year interest

$$\frac{1 \times 2 \times 100}{24} = \frac{200}{24} = 8\frac{1}{3}$$

\therefore The rate of interest is $8\frac{1}{3}\%$.

41. B.G. is interest on T.D.
Rate of interest is 4% p.a.
Time is 6 months
When T.D. is ₹ 100 interest for 6 months @ 4% is ₹2.
Thus, when interest is ₹2 T.D. is ₹100
when interest is ₹ 20 T.D. is ₹1000.
Again T.D. is interest on P.V.

$$\therefore \text{T.D.} = \frac{\text{P.V.} \times \text{Time} \times \text{R}}{100}$$

$$\text{P.V.} = \frac{\text{T.D.} \times 100}{\text{T} \times \text{R}}$$

Substituting the values

$$\text{P.V.} = \frac{1000 \times 100}{\frac{1}{2} \times 4} = 50000$$

$$\text{B.V.} = \text{P.V.} + \text{T.D.} = 50000 + 1000 = ₹51000$$

$$\text{B.D.} = \text{T.D.} + \text{B.G.} = 1000 + 20 = ₹ 1020.$$

42. The bill is drawn on 14.04.18 for 8 months.

The date of Discounted on 24.07.18

Drawal Date 14.04.18

Add 3 days & 8 months 03.08.00

Due Date 17.12.18

Unexpired period is from 24.07.18 to 17.12.18.

$$\frac{7}{\text{July}} + \frac{31}{\text{Aug.}} + \frac{30}{\text{Sept.}} + \frac{31}{\text{Oct.}} + \frac{30}{\text{Nov.}} + \frac{17}{\text{Dec.}} = 146 \text{ days}$$

Let P.V. be ₹ 100

Interest at 5% for this period i.e. 146 days.

$$100 \times \frac{5}{100} \times \frac{146}{365} = 2$$

$$\therefore \text{P.V.} + \text{Interest} = ₹100 + ₹ 2 = ₹ 102.$$

B.D. for the period is

$$102 \times \frac{5}{100} \times \frac{146}{365} = \frac{204}{100} = 2.04$$

$$\therefore \text{B.G.} = 2.04 - 2.00 = .04$$

When B.G. is 0.04 B.V. = ₹ 102

$$\text{B.G. is ₹ 2 B.V.} = \frac{102}{.04} \times 2 = ₹5100.$$

43. Given T.D. = ₹24 B.D. = ₹25 Rate = $8\frac{1}{3}$

$$\text{B.V.} = \frac{\text{B.D.} \times \text{T.D.}}{\text{B.D.} - \text{T.D.}}$$

$$= \frac{24 \times 25}{25 - 24} = \frac{600}{1} = 600$$

\therefore The bill value is ₹ 600.

B.D. is the interest on B.V. for the bill period.

Hence ₹ 25 is the interest on ₹ 600 @ $8\frac{1}{3}\%$.

$$\therefore \text{Time} = \frac{\text{Interest} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{25 \times 100}{600 \times \frac{25}{3}}$$

$$= \frac{25 \times 100}{200 \times 25} = \frac{1}{2}$$

\therefore The period in which the bill is due is $\frac{1}{2}$ year or 6 months.

44. Date of drawing 10.06.2019

Add 3 days and 5 months 03.05. -

Legal due date 13.11.2019

Date of Discounting 01.09.19

Unexpired period of the bill.

$$\frac{29}{\text{Sept.}} + \frac{31}{\text{Oct.}} + \frac{13}{\text{Nov.}} = 73 \text{ days}$$

$$\text{or } \frac{73}{365} = \frac{1}{5} \text{ year}$$

B.D. is interest on B.V. for the un-expired period of the bill

$$\therefore \text{B.D.} = \frac{5050 \times \frac{1}{5} \times 5}{100} = ₹50.50$$

T.D. is interest on P.V.

If P.V. is 100 int. is $5 \times \frac{1}{5} = ₹1$

and B.V. is ₹100 + ₹1 = ₹101.

∴ When B.V. is 101 the T.D. is ₹1.

When B.V. is 5050 the T.D. is

$$\frac{1}{101} \times 5050 = 50$$

$$\begin{aligned} \therefore \text{The B.G.} &= \text{B.D.} - \text{T.D.} \\ &= ₹ 50.50 - ₹50 \\ &= 0.50 \end{aligned}$$

45. Given

Amount of the bill ₹1800

Discounted Value ₹ 1782

∴ B.D. = ₹ 1800 - ₹ 1782 = ₹18.

∴ Interest on ₹ 1800 @ 5% p.a. is 18.

$$\begin{aligned} \therefore \text{Time is} &= \frac{1 \times 100}{P \times R} \\ &= \frac{18 \times 100}{1800 \times 5} \\ &= \frac{1}{5} \text{ year i.e. 73 days} \end{aligned}$$

Date of drawing 24.09.2019

Add 3 days & 6 month 3.06. -

Legal Due date 27.03.2020

To find the date of discounting we have to count

73 days back ward from the due date.

March 27

Feb 29

Jan 17

73 days

Date of discounting in Jan (31-17) 14.2020.

46. Let the amount invested on each stock be ₹100

Then income from 1st stock is $\frac{5}{120} \times 100 = \frac{25}{6}$

Income from 2nd stock is $\frac{6}{125} \times 100 = \frac{24}{5}$

Income Tax 10% i.e. $\frac{24}{5} \times \frac{1}{10} = \frac{24}{50}$

Net income $\frac{24}{5} - \frac{24}{50} = \frac{240 - 24}{50} = \frac{216}{50}$

Difference in income is

$$\frac{216}{50} - \frac{25}{6} = \frac{648 - 625}{150} = \frac{23}{150}$$

When Difference in income is $\frac{23}{150}$

Total investment ₹ 200

When Difference in income is 34.50

$$\begin{aligned} \text{Total investment} &= 200 \times \frac{150}{23} \times 34.50 \\ &= ₹ 33000. \end{aligned}$$

47. Let ₹ x be invested in 5% stock at 90

The income will be $\frac{5}{90} \times x = \frac{5x}{90}$

Income tax 10% $\frac{5x}{90} \times \frac{1}{10} = \frac{x}{180}$

Net income $= \frac{5x}{90} - \frac{x}{180} = \frac{10x - x}{180}$

$$= \frac{9x}{180} = \frac{x}{20}$$

The total investment is ₹ 35,000

Then the investment is 10% stock is 35,000 - x

The income from the stock is

$$\frac{10}{150} (35000 - x) = \frac{35000 - x}{15}$$

Income from both stocks are equal

$$\text{Hence } \frac{x}{20} = \frac{35000 - x}{15}$$

$$\text{or } 15x = 7,00,000 - 20x$$

$$\text{or } 15x + 20x = 7,00,000$$

$$\text{or } 35x = 7,00,000$$

$$\text{or } = \frac{7,00,000}{35} = 20,000$$

∴ The investment in 5% stock at 90 is ₹ 20,000 and

The investment in 10% stock at 150 is ₹ 15,000.

48. Let the man invests x rupees in 3% stock.

His investment for buying a 3% stock is

$$79\frac{3}{4} + \frac{1}{4} \text{ book} = ₹ 80$$

His income from the stock will be

$$\frac{x}{80} \times 3 = \frac{3x}{80}$$

His investment in 4% stock is (10200 - x)

To buy a stock he will pay $109\frac{3}{4} + \frac{1}{4} = ₹ 110$

His income will be

$$\frac{10200 - x}{110} \times 4 = \frac{4(10200 - x)}{110}$$

His total income from the two types of stock is

$$\frac{3x}{80} + \frac{4(10200 - x)}{110}$$

Thus
$$\frac{3x}{80} + \frac{4(10200 - x)}{110} = 380$$

$$\frac{110(3x) + 80 \times 4(10200 - x)}{8800} = 380$$

or
$$\frac{330x + 320 \times 10200 - 320x}{8800} = 380$$

or
$$10x + (320 \times 10200) = 380 \times 8800$$

or
$$10x = (380 \times 8800) - (320 \times 10200)$$

$$= 3344000 - 3264000$$

$$= 84,000$$

$$x = \frac{84,000}{10} = 8400$$

Hence investment in 3% stock is ₹ 8400 and

Investment in 4% stock is (10200 - 8400)

i.e. ₹ 1800.

49. The price of $4\frac{1}{2}\%$ stock $73\frac{1}{2} + \frac{1}{2} = ₹ 74$

The price of $5\frac{1}{2}\%$ stock $85\frac{1}{2} + \frac{1}{2} = ₹ 86$.

The investment in $5\frac{1}{2}\%$ and $4\frac{1}{2}\%$ stock

is same.

Let us take the LCM of 74 and 86 to find an amount of investment to make our calculations easier.

The L.C.M. of 74 & 86 is 3182.

By investing ₹ 3182 the income from $4\frac{1}{2}\%$

$$\text{stock will be} = \frac{9}{2} \times 3182 = \frac{9}{2} \times 43 = \frac{387}{2}$$

Income from $5\frac{1}{2}\%$ will be

$$\frac{11}{2} \times 3182 = \frac{11}{2} \times 37 = \frac{407}{2}$$

The change in income is

$$\frac{407}{2} - \frac{387}{2} = \frac{407 - 387}{2} = 10$$

When change in income is 10 investment is 3182.

When change in income is 29

$$\frac{3182}{10} \times 29 = 9227.8$$

The amount of original stock is

$$\frac{9227.8}{74} \times 100 = ₹ 12470$$

50. The investment is ₹ 12,000 in 8% stock at 80.

The amount of stock purchased is

$$\frac{12,000}{80} \times 100 = ₹ 15000$$

The income from the stock is

$$\frac{8 \times 15,000}{100} = ₹ 1200$$

The stocks are sold at ₹ 90

The amount thus realised will be

$$\frac{90 \times 15,000}{100} = ₹13500$$

Thus ₹13,500 is invested in 12% stock

The income increased by ₹135

Hence income from 12% stock is

$$₹ 1200 + ₹ 135 = ₹1335$$

Income from ₹ 100 stock is ₹ 12

To have an income of ₹1335 the stock value

$$\text{shall be } \frac{1335}{12} \times 100 = 11125.$$

The amount of investment is 13500

∴ The M.P. of a stock is

$$\frac{13,500}{11125} \times 100 = ₹121.35.$$

51. The LCM of 126 and 210 is 630.

Let the man invested ₹ 630

The debentures he can buy

$$\frac{630}{126} \times 100 = 500$$

Then income is $\frac{6}{100} \times 500 = ₹30$

Instead of debenture if he will buy preference

share the amount is $\frac{630}{210} \times 100 = ₹300$

The income from preference share is

$$\frac{9}{100} \times 300 = ₹27$$

The difference in income is ₹30 - ₹ 27 = ₹3

For ₹3 difference investment is ₹ 630

For ₹ 225 difference investment is

$$\frac{630}{3} \times 225 = ₹47250.$$

52. Let Mr. X invest ₹ 100 in each

Then from debenture his income will be

$$\frac{100}{97.5} \times \frac{5}{100} = ₹ \frac{5}{97.5}$$

Suppose the price of preference share is x

The income from preference share is

$$\frac{100}{x} \times \frac{6}{100} = ₹ \frac{6}{x}$$

Both the incomes are same

$$\therefore \frac{5}{97.5} = \frac{6}{x}$$

$$5x = 6 \times 97.5$$

$$x = \frac{6 \times 97.5}{5} = ₹117$$

∴ The issue price of the preference share is ₹ 117.

53. The sales price of a stock is ₹108 $\frac{1}{6}$

Brokerage $\frac{1}{6}$

∴ Net money realised from ₹ 100 stock is

$$₹108 \frac{1}{6} - \frac{1}{6} = ₹108$$

Net money realised from 26000 stock is

$$\frac{6000}{100} \times 108 = ₹6480$$

The market price of ₹100 stock (new) is $95 \frac{5}{6}$.

Brokerage $\frac{1}{6}$

∴ Purchase price of ₹100 stock

$$= 95 \frac{5}{6} + \frac{1}{6} = 96.$$

The amount of stock that can be brought

$$\text{by ₹ 6480 is } \frac{6480}{96} \times 100 = ₹6750$$

The income from 6% stock at $95\frac{5}{6}$ will be

$$\frac{6}{100} \times 6750 = ₹405$$

The income from 7% stock was

$$\frac{7}{100} \times 6000 = ₹420$$

The loss in income is ₹ 420 - ₹ 405 = ₹15

54. Let investment in 1st stock be ₹x

Investment in 2nd stock is ₹(7440 - x)

when investment is ₹108

income is ₹2.5.

When investment is x

$$\text{income is } \frac{x}{108} \times 2.5 = \frac{2.5x}{108}$$

2nd stock when investment is ₹ 168

income is ₹ 3

2nd stock when investment (7440 - x)

$$\text{income is } \frac{7440 - x}{168} \times 3 = \frac{3(7440 - x)}{168}$$

Income from both the stocks are same

$$\text{Hence } \frac{2.5x}{168} = \frac{3(7440 - x)}{168}$$

$$\text{or } 2.5x \times 168 = 3 \times 108 (7440 - x)$$

$$\text{or } 420x = 24,10,560 - 324x$$

$$\text{or } 420x + 324x = 24,10,560$$

$$\text{or } 744x = 24,10,560$$

$$\text{or } x = \frac{24,10,560}{744}$$

$$= 3240$$

∴ Investment in 1st stock is ₹ 3240.

Investment in 2nd stock is

$$₹ 7440 - ₹ 3240 = ₹ 4200$$

His income is $\frac{2.5x}{108} \times 2$

$$\therefore \frac{2.5 \times 3240}{108} \times 2 = 75 \times 2 = ₹ 150.$$

55. The income from 5%, ₹ 1,00,000 stock is

$$\frac{5}{100} \times 1,00,000 = ₹5,000$$

Add in increased income = ₹1,000

Income from new 8% stock is = ₹ 6,000

When income is ₹ 8 stock value is ₹ 100

When income is ₹ 6000 stock value is

$$= \frac{8000}{8} \times 100 = ₹75,000$$

A ₹ 100 stock is sold at

$$\left(91\frac{6}{10} - \frac{1}{10} \right) = 91\frac{5}{10} = 91.5$$

∴ Money realised by selling

₹ 1,00,000 stock is

$$\frac{91.5}{100} \times 1,00,000 = ₹91,500$$

Then the purchase price of 8% stock is

₹ 91,500

The cost of ₹100, 8% stock is

$$\frac{91500}{75000} \times 100 = ₹122$$

∴ The market price of the stock is

= Cost Price - Brokerage

= ₹ 122 - 0.5

= ₹ 121.5

UNIT-III

KEY CONCEPTS

DEFINITION OF STATISTICS

DEFINITION OF STATISTICS

Statistics as Statistical Methods (Singular sense)

"Statistics is the science which deals with methods of collecting, classifying, presenting and interpreting numerical data collected to throw some light to any sphere of enquiry".

- *Seligman.*

Statistics as statistical data
(plural sense)

"By statistics we mean aggregate of facts, affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to a reasonable standard of accuracy, collected in a systematic manner, for a predetermined purpose and placed in relation to each other."

- *Prof. Horace Secrist.*

Function of statistics

- It present facts in definite manner
- It simplifies complex data
- It facilitate comparison
- It studies relationship between two or more variable
- It helps in forecasting
- It helps in testing of hypothesis
- It helps in formulation of policies

Scope of statistics

Broad field of its use

- Government policy and planning
- Business and industry
- Economics
- Physical sciences
- Natural sciences
- Research and Development

Limitations of statistics

- It studies only quantitative phenomenon
- It does not study individuals
- Statistical results are true only on an average
- The result can be biased
- Statistics can be misused

Organisation of statistical survey

Statistical survey means statistical enquiry or investigation. It involves the following two stages :

- Planning a survey
- Executing a survey

Preliminary consideration for planning a survey :

- Objectives and scope of enquiry
- Statistical unit
- Source of information
- Technique of data collection
- Degree of accuracy desired
- Type of enquiry

Step involved in executing the survey :

- Setting up an administrative organisation
- Selection and training of field staff
- Design of the forms
- Supervision of field work
- Processing and analysis of data
- Preparation of report

UNIT - III**GROUP - A : OBJECTIVE TYPE QUESTIONS**

1. *From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.*

116. The word statistics is derived from the latin word :
(i) State (ii) Status
(iii) Statista (iv) Statistiks
117. Statistics can be best considered as :
(i) An art
(ii) Science
(iii) Both art and science
(iv) Neither arts nor science
118. Statistics deal with :
(i) Numerical data
(ii) Qualitative data
(iii) Both numerical and qualitative
(iv) Neither numerical nor qualitative
119. Statistics in singular sense refers to :
(i) Data (ii) Methods
(iii) Statistical units (iv) Tabulation
120. Statistics in plural sense refers to :
(i) Data
(ii) Methods
(iii) Body of knowledge
(iv) Classification
121. The real giant in the development of the theory of statistics is :
(i) Fisher (ii) Gauss
(iii) Bowley (iv) Karl Pearson
122. Study of a part of a population is known as:
(i) Census study
(ii) Sample study
(iii) Experimental study
(iv) Group study
123. Complete enumeration survey is known as:
(i) Census survey
(ii) Sample survey
(iii) Individual survey
(iv) Case survey
124. One of the following which is not a function of statistics.
(i) Present facts in definite form
(ii) Simplifies mass of figures
(iii) Facilitate comparison
(iv) Deals with individual measurements.
125. One of the following which is not a limitation of statistics.
(i) Results are true only on an average
(ii) Studies only quantitative phenomenon
(iii) Helps in comparison
(iv) It deals with only individual measurements

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

- | | |
|--|--|
| 46. What do you mean by statistics in singular sense ? | 51. What is a sample survey ? |
| 47. What do you mean by statistics in plural sense? | 52. What do you mean by population ? |
| 48. What is quantitative data ? | 53. What is a statistical unit ? |
| 49. What is a statistical survey? | 54. What is a sample ? |
| 50. What is census survey ? | 55. What is a general purpose survey ? |

2. (b) Fill in the blanks :

- | | |
|--|--|
| 52. The word statistics is derived from the German word _____. | 56. All statistics are _____ statement of facts. |
| 53. Statistics refers to _____ of facts. | 57. Statistics deal with only _____ characteristics. |
| 54. The word statistics is used in _____ senses. | 58. A characteristic that takes different values at different times, places or situations is called a _____. |
| 55. Figures do not lie, liars _____. | |

2. (c) Express the following in one word / term each.

- | | |
|---|---|
| 48. A characteristic that may take on different values at different times, places or situation. | 51. An enquiry for the search of facts and figures about a particular subject of study. |
| 49. Complete enumeration survey method is known as : | 52. The technique in which only a representative part of the group is covered. |
| 50. The aggregate from which the sample is taken. | 53. Listing of all population units. |

2. (d) Correct the underlined portion of the following sentences.

- | | |
|---|---|
| 47. The word statistics is derived from the latin word <u>state</u> . | 51. A statistical unit should be <u>variable</u> . |
| 48. Statistics are <u>qualitative</u> statement of fact. | 52. Listing of <u>selected</u> units from the population is called frame. |
| 49. Statistics in singular sense refers to statistical <u>data</u> . | 53. Study of the part of a population is known as <u>census</u> survey. |
| 50. Statistics deals with <u>individual fact</u> . | |

UNIT - III**GROUP - A : ANSWERS**

1. From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.

- | | |
|---------------------------------|---|
| 116. (ii) Status | 121. (i) Fisher |
| 117. (iii) Both art and science | 122. (ii) Sample study |
| 118. (i) Numerical data | 123. (i) Census survey |
| 119. (ii) Methods | 124. (iv) Deals with individual measurements. |
| 120. (i) Data | 125. (iii) Helps in comparison |

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

- | | |
|--|--|
| 46. In singular sense statistics refers to the methods of collection, presentation, analysis and interpretation of data. | 51. Sample survey is a technique where only a sample or representative part of the population is selected and studied. |
| 47. In plural sense statistics refers to numerical statement of facts or simply data. | 52. Population otherwise known as universe is the totality of items / individuals / things under consideration. |
| 48. Data that possess numerical properties are known as quantitative data. | 53. A statistical unit is the unit in terms of which the investigator counts or measures the variables or attributes selected for enumeration. |
| 49. Statistical survey means search for information and data about a study using statistical methods. | 54. A sample is any group of measurements selected from a population for analysis. |
| 50. It is a survey technique where each and every individual / item of the population is covered or studied. | 55. A general purpose survey is a type of survey under which data obtained are useful for several purposes, like population census. |

2. (b) Fill in the blanks :

- | | |
|---------------|------------------|
| 52. Stastik | 56. Numerical |
| 53. Aggregate | 57. Quantitative |
| 54. 2 | 58. Variable |
| 55. Figure | |

2. (c) Express the following in one word / term each.

- | | |
|--------------------------|---------------------------|
| 48. Variable | 51. Survey/ Investigation |
| 49. Census Survey | 52. Sampling |
| 50. Universe/ Population | 53. Frame |

2. (d) Correct the underlined portion of the following sentences.

- | | |
|-----------------------------|------------|
| 47. Status | 51. Stable |
| 48. Numerical/ Quantitative | 52. All |
| 49. Methods | 53. Sample |
| 50. Aggregate of facts | |

UNIT - III**GROUP - B : SHORT TYPE QUESTIONS****3. Short Questions to be answered within 30 words**

106. Define statistics in plural sense.
107. Define statistics in singular sense.
108. Why statistics may be considered as a science ?
109. Write any two functions of statistics.
110. State two important characteristics of statistics.
111. Write any two limitations of statistics.
112. How statistics is useful in business ?
113. What is distrust of statistics ?
114. Write any two important factors which need consideration for planning a statistical survey.
115. Name the two methods or technique of statistical survey.
116. Name the two types statistical survey.
117. What do you mean by census survey ?
118. What is a statistical unit ?
119. Write any two requisites of a statistical unit.
120. What do you mean by units of analysis and interpretation ?
121. What is units of collection ?
122. What do you mean by population frame ?
123. Name the two sources of data collection.
124. What is a composite unit ?
125. What is a simple unit ?

4. Answer the following questions within 50 words each.

61. Define statistics as given by Horace Secrist.
62. What do you mean by aggregate of facts ?
63. Write the characteristics of statistics.
64. Why we will regard statistics as a science?
65. How statistics help in business ?
66. What are the limitation of statistics ?
67. What are the functions of statistics ?
68. State the factors to be considered before planning a statistical survey.
69. While fixing the statistical unit. What factors are to be kept in mind ?
70. Explain units of measurement.
71. What is unit of analysis and interpretation? Explain with example.
72. Explain the techniques of data collection.
73. What do you mean by choice of a frame?
74. Explain different sources of data.
75. What do you mean by 'degree of accuracy desired' ?

UNIT - III**GROUP - B : ANSWERS****3. Short Questions to be answered within 30 words**

106. In plural sense “statistics is aggregate of facts affected to a marked extent by multiplicity of casues enumerated or estimated according to a reasonable standard of accuracy. Collected in a systematic manner for a predetermined purpose and placed in relationship to each other.
107. In singular sure statistics may be defined as the science of collection, organisation, presentation analysis, interpretation and reporting of numerical data.
108. Science is a systematised body of knowledge based on cause and effect relationship. In the same manner statistics studies a problem in a systematic manner using scientific methods and principle, hence is considered as a science.
109. Functions of statistics are (write any two)
- (i) It presents facts in definite numerical form.
 - (ii) It simplies complex data
 - (iii) It facilitates comparison
 - (iv) It studies relationships between two or more variables.
 - (v) It helps in forecasting.
 - (vi) Helps on testing hypothesis.
110. The characterstics of statistics
- (i) It is aggregate of facts.
 - (ii) It is affected by multiplicity of causes.
111. (i) Statistics do not study individual.
(ii) Statistics do not study qualitative characteristics.
(iii) Statistical findings are only true to an average.
(iv) Statistics can be easily misused etc.
112. Business activities mainly consists of buying, selling production finance, marketing research etc. By using statistical methods business managers enable themselves to make suitbale decisions in different fields.
113. Lack of trust in statistical statements and conclusion is known as distrust of statistics. It arises because of its misuse by unscrupulous persons and ignorance on the part of the user.
114. The important factors which need careful considration before planning a survey are :
- (i) Purpose of the survey
 - (ii) Scope of the survey
 - (iii) Unit of data collection
 - (iv) Source of data etc.
115. The two methods or techniques of statistical survey are :
- (i) Census survey technique.
 - (ii) Sample survey technique.
116. The two types of statistical survey are :
- (i) General purpose survey.
 - (ii) Special purpose survey.

117. A census survey technique involves collection and analysis of data of each item of the population or universe under study.
118. Statistical unit is the unit in which the investigator counts or measures the variables or attributes selected for enumeration, analysis and interpretation.
119. Important requisites of statistical units are
- (i) It must suit the purpose of enquiry.
 - (ii) It should be simple to understand.
 - (iii) It must be specific etc.
120. Units of analysis and interpretation are those which facilitate comparison. They include rates, ratios percentages and co-efficients.
121. Units of collection are the units in terms of which data are collected. They are simply the units of measurement and counting.
122. Population frame refers to listing of all the units or items of data in a population.
123. The two sources of data collection are :
- (i) Primary source.
 - (ii) Secondary source.
124. A simple unit with some qualifying feature is called a composite unit. For example Ton-Kilometre, man-hour, machine-hour, skilled-worker etc.
125. A simple unit is one which represents a single condition without qualification. For example a kilogram, a ton, a mile, a man etc.

4. Answer the following questions within 50 words each.

61. Horace Secrist defined statistics "as aggregate of facts, affected to a marked extent by multiplicity of causes, numerically expressed, enumerated, or estimated according to a reasonable standard of accuracy, collected in a systematic manner for a pre determined purpose and placed in relation to each other".
62. A single figure is not statistics. To become statistics it must be collection or aggregate of facts. The age of a boy in +2 Commerce is not statistics but the age of all boys in +2 Commerce of a College, or of the state under study is statistics. This is one of the most important feature or characteristics of statistics.
63. The characteristics of statistics are :
- (i) It is aggregate of facts.
 - (ii) It is affected by multiplicity of causes.
 - (iii) It should be numerically expressed.
 - (iv) It should be enumerated or estimated according to a reasonable standard of accuracy.
 - (v) It should be collected in a systematic manner.
 - (vi) It should be collected for a predetermined purpose.
 - (vii) It should be placed in relation to each other.
64. Science is considered as a body of systematised knowledge. It studies cause and effect relationship and tries to find out generalisations which are called laws of science. In this sense statistics is a body of knowledge systematised and there are statistical laws or generalisation. But statistics is not an exact science like physics, chemistry and biology. It is called a science of scientific methods. It helps other sciences to derive their laws. That is why it is said that. "Science without statistics bear no fruit and statistics without science has no root."

65. Success in business depends on the precision in forecasting. A businessman must make proper and scientific analysis of the past records in order to arrive at future business conditions. For example to know how much to produce, how many workers and how much raw materials is needed to produce the estimated quantity, what type, size, colour of the product to be produced etc. the business man must analyse the past records and prepare a plan by using statistical methods. Every business, big or small need to use statistical data analysis techniques for success.
66. The limitations of statistics are :
- (i) Statistics do not study individual.
 - (ii) It does not study qualitative phenomenon.
 - (iii) It is true only on average.
 - (iv) It does not reveal the entire story.
 - (v) It is very prone to misuse.
 - (vi) It is only one of the methods of studying a phenomenon.
 - (vii) Statistical methods are always not beyond doubts.
 - (viii) Statistical laws are not exact.
67. The important functions of statistics are :
- (i) It presents facts and figures in a definite form
 - (ii) It simplifies complex data.
 - (iii) It provides for comparison.
 - (iv) It studies relationship between different facts.
 - (v) It helps in forecasting.
 - (vi) It helps in formulating and testing hypotheses.
68. The important factors to be considered before planning a statistical survey are :
- (i) Purpose of the survey
 - (ii) Scope of the survey
 - (iii) Unit of data collection and interpretation
 - (iv) Sources of data
 - (v) Choice of frame
 - (vi) Degree of accuracy required
69. The following factors shall be kept in mind while deciding the statistical unit.
- (i) It must suit the purpose of enquiry
 - (ii) It should be simple to understand
 - (iii) It should be specific and well defined
 - (iv) It should be stable
 - (v) It should be uniform throughout the study.
70. The units of measurement are the units in term of which the data are measured or quantified. For example kilogram, kilometre, miles, ton-kilometre or kg-kilometre etc. are units of measurement. These units may be simple or composite. A simple unit of measurement represents a single condition without any qualification. For example a quintal, a kilogram, mile, an hour etc. A simple unit when qualified becomes a composite unit like kg-kilometre, man-hour, machine-hour, skilled worker etc.
71. The units which are used to analyse and interpret the statistical data are called units of analysis and interpretation. These units may be in form absolute figures or in relative terms which helps in comparison. The example of such units are : rates, ratios, percentages, co-efficient etc.

72. There are two important techniques of data collection. They are, (i) Census technique and (ii) Sample technique A census is a complete enumeration of each and every unit of the universe, whereas in a sample only a part of the universe is studied and conclusion about the entire universe are drawn on that basis.
73. Population frame refers to the listing of all the units in population under study. The identification of the units those are to be listed sometimes poses serious problem. Therefore, it is essential at the outset of the survey to carry out a careful investigation and decide which units are to be listed and which are to be excluded so that the survey is accurate, complete and does not suffer from inadequacy or obsolescence. This choice of listing the units is known as choice of frame.
74. The sources of data may be primary or secondary. When the investigator collects first hand data for the purpose at hand such data are known as primary data and the sources are primary source. On the other hand if he obtains the data from published or unpublished sources, which are already collected and used by some other person for some other purpose is known as secondary data and the sources are called secondary source.
75. In any statistical survey or enquiry 100% accuracy in final result is practically impossible to achieve because of a number of reasons like (i) statistics are based on estimates, (ii) tools of measurement are not always perfect and (iii) there may be unintentional bias on the part of the investigator, enumerator or informant. Therefore, it is desirable to have reasonably accurate information for the study of a particular problem. For example if we have to measure the weight of students of a class, it may not be accurate upto centigrams. The degrees of accuracy should be decided before the start of the investigation taking onto account the objective and scope of the study.

UNIT - III**GROUP - C : LONG TYPE QUESTIONS**

56. What is statistics in plural sense ? Explain its feature.
57. Explain the importance and scope of statistics.
58. Explain the important functions of statistics.
59. State the scope and limitations of statistics.
60. Discuss the usefulness of statistics in business and industry.
61. "Science without statistics bears no fruit and statistics without science has no root" comment.
62. Explain the reasons for the growth of statistics.
63. Explain the preliminary considerations for starting a statistical survey.
64. What do you mean by statistical unit ? What are the requisites of a good statistical unit ? Explain different types of statistical unit.
65. What do you mean by statistical enquiry ? Explain different types of statistical enquiry.
66. Explain different steps to be considered while planning a statistical investigation.
67. Write short notes on
- (i) Sources of data
 - (ii) Techniques of data collection.
68. Define a statistical unit. State in brief the precaution you would take in the selection of a statistical unit for conducting an enquiry.
69. Define and explain statistics in singular sense.
70. Discuss whether statistics is a science or an art?

UNIT-IV

KEY CONCEPTS

COLLECTION OF DATA

COLLECTION OF DATA

"Data which are gathered originally for a certain purpose are known as **primary data**".

- *Secrist*.

"Data which are used in an investigation but which have been gathered originally by someone else for some other purpose are known as **secondary data**".

- *M. M. Blair*

Methods of collecting primary data :

- Direct personal investigation
- Indirect oral investigation
- Local Reports
- Mailed questionnaire
- Questionnaire sent through enumerator

Sources of Secondary data

Published Sources :

- Government Publications
- International publications
- Semi-Government publications
- Reports of Committees
- Private publication
- Newspapers and periodicals
- Research publications
- Unpublished Sources

Classification and Tabulation of Data

"Classification is the process of arranging data into sequences and groups according to their common characteristics or separating them into different related parts".

- *Horace Secrist*.

Objectives of Classification :

- To condense the data
- To facilitate comparison
- To study the relationship
- To highlight significant features
- To serve as basis of tabulation

Rules / Principles of Classification :

- Homogeneity
- Unambiguous
- Stability
- Exhaustive and mutually exclusive
- Flexible

Criteria or bases used for classification

- Geographical i.e. area wise
- Chronological i.e. on the basis of time
- Qualitative i.e. on the basis of some attribute
- Quantitative i.e. in terms of magnitude

Tabulation

Systematic arrangement of data in rows and columns is called tabulation.

The main objectives of tabulation :

- To simplify complex data
- To facilitate comparison
- To minimise space
- To reveal patterns / trend
- To facilitate reference
- To facilitate statistical analysis

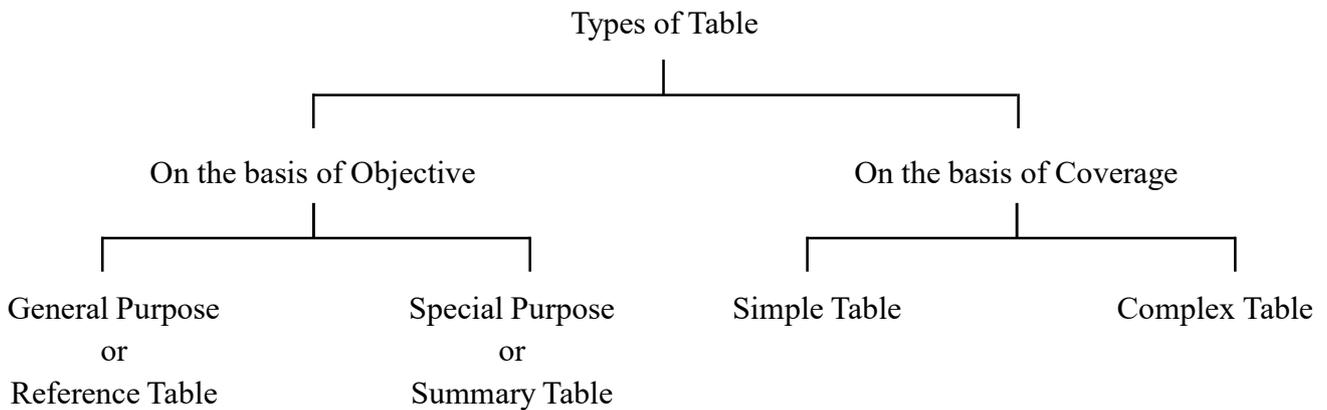
Rules of tabulation :

- It should be simple and precise
- It should be complete and self explanatory

- Should suit the size of paper
- Title should be precise and self explanatory
- Units measurement must be carefully stated
- Figures should avoid unnecessary details
- 'Dilto' mark should not be used in title .

Parts of a Table

- Table Number
- Title
- Captions or Column headings
- Stubs or Row heading
- Body of the table
- Headnote
- Footnote

Types of table :

UNIT - IV**GROUP - A : OBJECTIVE TYPE QUESTIONS**

1. From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.

126. Arrangement of data in rows and columns is:
(i) Classification (ii) Tabulation
(iii) Interpretation (iv) Analysis
127. Data collected for the first time and original in character is :
(i) Primary data (ii) Secondary data
(iii) Published data (iv) Auxiliary data
128. The process of arranging data in groups according to their common features is :
(i) Tabulation (ii) Interpretation
(iii) Classification (iv) Editing
129. Classification that is based on time is :
(i) Functional classification
(ii) Chronological classification
(iii) Numerical classification
(iv) Geographical classification
130. Column heading in a table are known as :
(i) Stub (ii) Caption
(iii) Body (iv) Headnote
131. Row heading in a table are known as :
(i) Title (ii) Stub
(iii) Caption (iv) Heading
132. Table that shows two characteristic of a particular phenomena is :
(i) Simple table (ii) One-way table
(iii) General table (iv) Two way table
133. Classification based on some attribute or quality is :
(i) Chronological classification
(ii) Qualitative classification
(iii) Functional classification
(iv) Quantitative classification
134. The lowest and highest values that can be included in a class is known as :
(i) Class interval (ii) Class limit
(iii) Range (iv) Upper limit
135. The difference between the upper and lower limit of a class is :
(i) Class limit (ii) Class frequency
(iii) Class interval (iv) Class width
136. No. of observations corresponding to a particular class is :
(i) Class limit (ii) Class frequency
(iii) Class interval (iv) Class mark
137. List of questions pertaining to a survey is known as :
(i) Mailed questionnaire (ii) Questionnaire
(iii) Schedule (iv) Mailing list
138. The process of tabulation succeeds :
(i) Data collection (ii) Classification
(iii) Analysis (iv) Interpretation

139. Classification on the basis of gender is :
- (i) Functional classification
 - (ii) Qualitative classification
 - (iii) Quantitative classification
 - (iv) Chronological classification
140. When the class intervals are so fixed that the upper limit of one class is the lower limit of the next class the classification method is known as :
- (i) Exclusive method
 - (ii) Inclusive method
 - (iii) Open ended method
 - (iv) Interval method
141. A variable which takes any value in a scale is a :
- (i) Continuous variable
 - (ii) Discrete variable
 - (iii) Constant
 - (iv) Integer
142. A variable which takes only integer values is a :
- (i) Continuous variable
 - (ii) Discrete variable
 - (iii) Constant
 - (iv) Integer
143. The mid point of a class interval is also known as
- (i) Class mark
 - (ii) Frequency
 - (iii) Median
 - (iv) Interval
144. When a table is prepared and presented on the basis of one characteristics of the data it is called :
- (i) Bi-variate table
 - (ii) Simple table
 - (iii) Complex table
 - (iv) General table
145. Data collected from published sources are :
- (i) Primary data
 - (ii) Secondary data
 - (iii) Original data
 - (iv) Census data

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

56. What is secondary data ?
57. What is primary data ?
58. What do you mean by tabulation ?
59. What do you mean by class interval ?
60. What is classification ?
61. What are class limits ?
62. What is a frequency distribution ?
63. What is chronological classification ?
64. What is a complex table ?
65. What is headnote ?

2. (b) Fill in the blanks :

59. Classification is the _____ step in tabulation.
60. Classification of data on the basis of time is known as _____ classification.
61. Data which are not originally collected but obtained from published / unpublished sources are _____ data.
62. Row headings in a table are known as _____,
63. Classification on the basis of attributes are _____ classification.
64. The number of observations in a particular class is called the _____ of the class.
65. Arrangement of data in rows and columns is known as _____.

2. (c) Express the following in one word / term each.

54. Systematic arrangement of data in rows and columns.
55. The data which are collected by the investigator for the first time and original in character.
56. Column heading in a table.
57. Row heading in a table.
58. Table that shows two characteristics of a particular phenomena.
59. The process of arranging data in groups or classes according to their common features.
60. Classification that is made on the basis of time.

2. (d) Correct the underlined portion of the following sentences.

54. Data collected for the first time is known as secondary data.
55. Data collected from published sources are primary data.
56. The heading of a row in a statistical table is known as title.
57. Arrangement of data in rows and columns is known as classification.
58. In chronological classification data are classified on the basis of location.
59. In an inclusive class interval the upper limit is excluded from the same class interval.
60. Caption refers to the horizontal row heading of a statistical table.

UNIT - IV**GROUP - A : ANSWERS**

1. From the alternatives given under each bit write serially the correct answer along with its serial number against each bit.

- | | |
|--|--------------------------------------|
| 126. (ii) Tabulation | 136. (ii) Class frequency |
| 127. (i) Primary data | 137. (ii) Questionair |
| 128. (iii) Classification | 138. (ii) Classification |
| 129. (ii) Chronological classification | 139. (ii) Qualitative classification |
| 130. (ii) Caption | 140. (i) Exclusive method |
| 131. (ii) Stub | 141. (i) Continuous variable |
| 132. (iv) Two way table | 142. (ii) Discrete variable |
| 133. (ii) Qualitative classification | 143. (i) Class mark |
| 134. (ii) Class limit | 144. (ii) Simple table |
| 135. (iii) Class interval | 145. (ii) Secondary data |

2. Do as Directed Questions

2. (a) Answer the following questions in one sentence each.

- | | |
|---|--|
| 56. Data compiled by someone other than the user is called secondary data. | 62. A frequency distribution refers to data classified on the basis of some variable that can be measured, such as, prices, wages, number of units produced or consumed etc. |
| 57. Data originally collected in the process of investigation are primary data. | 63. Classification made on the basis of time is known as chronological classification. |
| 58. Tabulation means systematic arrangement of data in columns and rows. | 64. A table which shows two or more characteristics is called a complex table. |
| 59. The difference between the upper limit and lower limit of a class is called class interval. | 65. Headnote is a brief explanatory statement applying to all the data or major part of the data in a table. |
| 60. Classification is grouping of related facts into classes or groups. | |
| 61. Class limits are the lowest and highest values that can be included in a class. | |

2. (b) Fill in the blanks :

- | | |
|-------------------|-----------------|
| 59. First | 63. Qualitative |
| 60. Chronological | 64. Frequency |
| 61. Secondary | 65. Tabulation |
| 62. Stub | |

2. (c) Express the following in one word / term each.

- | | |
|------------------|----------------------------------|
| 54. Tabulation | 58. Two-Way Table |
| 55. Primary data | 59. Classification |
| 56. Caption | 60. Chronological classification |
| 57. Stub | |

2. (d) Correct the underlined portion of the following sentences.

- | | |
|----------------|---------------|
| 54. Primary | 58. Time |
| 55. Secondary | 59. Exclusive |
| 56. Caption | 60. Stub |
| 57. Tabulation | |

UNIT - IV**GROUP - B : SHORT TYPE QUESTIONS****3. Short Questions to be answered within 30 words**

- | | |
|--|---|
| 126. Define primary data. | 136. What is a discrete series ? |
| 127. What is secondary data ? | 137. What is a cumulative frequency distribution ? |
| 128. Write any two methods of collecting primary data. | 138. What do you mean by inclusive class interval ? |
| 129. Write any two objectives of classification. | 139. What is univariate frequency distribution ? |
| 130. Write two merits of primary data. | 140. What is open-end classification ? |
| 131. What is classification of data ? | 141. What do you mean by bivariate frequency distribution ? |
| 132. What is qualitative classification ? | 142. What do you mean by tabulation ? |
| 133. What is quantitative classification ? | 143. What is an higher order table ? |
| 134. What is a continuous variable ? | 144. What are the bases of classification ? |
| 135. What is a discrete variable ? | 145. What do you mean by frequency of a class? |

4. Answer the following questions within 50 words each.

- | | |
|--|--|
| 76. Mention the objectives of classification. | 83. Mention the different methods of primary data collection. |
| 77. Explain qualitative classification of data. | 84. Classify and explain tables on the basis of coverage. |
| 78. Differentiate between primary data and secondary data. | 85. Write four important rules of tabulation. |
| 79. Differentiate between classification and tabulation of data. | 86. Explain different types of variables. |
| 80. Distinguish between mailed 'questionnaire' method and 'schedule sent through enumerators' method of primary data collection. | 87. State the characteristics of an ideal classification. |
| 81. Write the qualities of a good questionnaire. | 88. Explain chronological classification with example. |
| 82. What is direct personal investigation method of collecting primary data and where it is suitable ? | 89. Distinguish between inclusive and exclusive type of continuous series. |
| | 90. Give a specimen of a statistical table showing its different parts. |

UNIT - IV**GROUP - B : ANSWERS****3. Short Questions to be answered within 30 words**

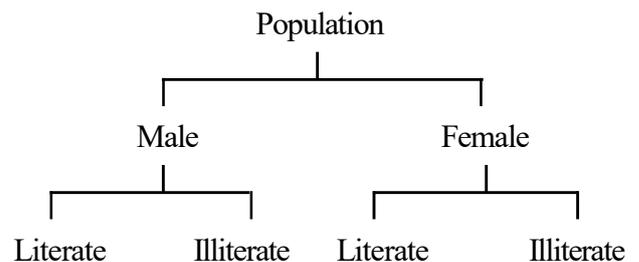
126. The data which are collected by the investigator for the first time and are original in character are known as primary data.
127. Data which are compiled by some one other than the user are called secondary data. They are not original in character.
128. Methods of collecting primary data are
- Direct personal interview a method.
 - Indirect oral interview method.
 - Mailed questionnaire method.
 - Information from correspondent etc.
129. Objectives of classification (any two)
- Classification eliminates unnecessary details and makes the mass of complex data simple, brief logical and understandable.
 - Classification facilitates comparison.
 - It helps detect the most significant features of the data at a glance.
130. The merits of primary data are
- Primary data are original in character and reliable.
 - Primary data are collected as per the requirement of the objective of enquiry.
131. Classification refers to the division of data into various homogenous groups or classes having some common characteristics.
132. When the data are classified on the basis of some attribute or quality or descriptive characteristics which are not capable of being described numerically like sex, nationality, beauty, honesty etc. that is called qualitative classification.
133. When the nature and type of data collected is such that it can be quantitatively measured then the data are classified on the basis of some measurable variable like height, weight, profit production etc. This type of classification is known as quantitative classification.
134. A continuous variable is one which can take all possible values (integral or fractional) in a given specified range or scale. Examples of such variable are height, weight, distance etc.
135. A discrete variable is one which takes only integral values not fractional values. Example of such variables are countable not measurable like number of animals, birds or persons etc.
136. A discrete series is one which is formed taking into account discrete variable. In this type of series data are presented in a way that exact measurements of units are clearly indicated.
137. When frequency of two or more classes are added up such totals are called cumulative frequencies. The distribution formed with such frequencies are called cumulative frequency distribution.

138. The classes in which lower and upper limits are included such as 0-9, 10-19 are called inclusive type of class interval.
139. The frequency distribution on the basis of one variable like height, weight, mark etc. are called as univariate frequency distribution.
140. When the lower limit of the 1st class or the upper limit of the last class or both are not specified then that classification is called open-ended classification.
141. The classification of data on the basis of two criteria or variable simultaneously is called a bi-variate classification. Classification of students on the basis of their age and weight simultaneously is a bivariable classification.
142. Tabulation is an orderly and systematic arrangement of data into rows and columns and it attempts to present huge and heterogeneous data in precise and homogeneous manner.
143. When the data are classified on the basis of three or more characteristics and shown in a table simultaneously the table is known as higher-order table or manifold table.
144. The different bases of classification are :
- (i) Geographical
 - (ii) Chronological
 - (iii) Quantitative
 - (iv) Qualitative
145. The number of observations corresponding to a particular class is known as the frequency of that class.

4. Answer the following questions within 50 words each.

76. The main objectives of classifications are :
- (i) To condense the mass of data
 - (ii) To facilitate comparison
 - (iii) To study and establish relationship
 - (iv) To bring out significant features to the fore
 - (v) To facilitate use of different statistical techniques for meticulous study of the data.
77. Qualitative classification is the process of classifying data according to some qualitative traits which are not capable of quantitative

measurement like, sex, literacy, religion, education, occupation etc. In this type of classification the data are classified according to presence or absence of the attribute. For example a population can be classified on the basis of sex and literacy as follows :



78. The point of difference between primary and secondary data are :

Primary Data	Secondary Data
<ul style="list-style-type: none"> ● It is collected from a primary source i.e. where data originate. ● It is collected for 1st time. ● It is in shape of raw material. ● Collection of primary data is expensive. ● It is likely to give more accurate results. 	<ul style="list-style-type: none"> ● It is collected from a secondary source i.e. where the data are stored. ● It is already collected and used by some one else. ● It is in shape of finished product. ● It is less expensive or cheap as compared to primary data. ● As it is collected for a different purpose it may not give as accurate result as the primary data.

79. The difference between classificatio and dabulation can be mentioned as follows :

Classification	Tabulation
<ul style="list-style-type: none"> ● It is arrangement of data into classes and sub-classes. ● It is a statistial method of analysis of data. ● Classification is the 1st stage of organisation of data and precedes tabulation. 	<ul style="list-style-type: none"> ● It is arrangement of data into rows and columns. ● It is a method of presentaton of data. ● Tabulation is the second stage in organisaton of data, hence succeed classification.

80. The difference between the two methods of data collection can be stated as follows.

Schedule	Questionnaire
<ul style="list-style-type: none"> ● Enumerators carry the schedule to the informants. ● It is filled up by the enumetator on the basis of information supplied by the informant. ● This method is suitable when scope of enquiry is limited. ● This method can be used when the informant are illitreate. ● It is expensive. 	<ul style="list-style-type: none"> ● Questionnaire is sent to the informant by post. ● It is filled up by the informant himself. ● This method is suitable when scope of enquiry is vast and wide. ● This method can be used only when the targeted population is literate. ● It is comparatively cheaper.

81. The following are the qualities of a good questionnaire.
- (i) The questions asked should be short and clear.
 - (ii) The questions should be simple to answer and easy to understand.
 - (iii) The number of questions should be few and adequate.
 - (iv) The questions should be specific and unambiguous.
 - (v) The questions should be precise and such that they can be answered in 'Yes/No'.
 - (vi) Questions purely private in nature should be avoided.
 - (vii) Question should not be based on mathematical calculations.
 - (viii) Objective type questions are to be set only.
82. The direct personal investigation method of collecting primary data is a method under which the investigator himself gets in touch with the people at the spot, observes them, interviews them and collects the first hand information. This method is suitable under the following circumstances.
- (i) The area of investigation is limited
 - (ii) The area of enquiry is limited
 - (iii) Importance is given to accuracy and purity of data
 - (iv) Confidential data is to be collected
 - (v) Stress is given to originality
83. Different methods of collecting primary data are
- (i) Direct personal investigation method
 - (ii) Indirect oral investigation method
 - (iii) Local correspondents
 - (iv) Schedule sent through enumerators
 - (v) Mailed questionnaire method
84. On the basis of coverage tables can be classified as simple and complex tables. A simple table is one where data are classified with respect to a single characteristic. It is also called a one way table. On the other hand if data are classified into different classes taking two or more characteristics simultaneously it is called a complex or manifold table.
85. Important rules or principles of tabulation are :
- (i) It should be simple and precise so that it can be easily understood.
 - (ii) It should be complete and self explanatory. It must have all the parts : table number, title caption, stub, body, head notes and footnotes.
 - (iii) It should suit the size of the paper.
 - (iv) The title of the table should be clear and precise and should give clear idea about the contents of the table.
86. Variables are of two types : (i) Continuous variable and (ii) Discrete variable. A continuous variable is one which can take all the possible values, integral as well as fractional values in a given range or scale such as : height, weight, distance etc. On the other hand discrete variable is one which takes only integral values. They don't take all possible values in a scale. The example of such variable is number of boys, animals, families, birds etc.
87. The characteristics of an ideal classification are :
- (i) Homogeneity - The data should be kept in homogenous groups.
 - (ii) Unambiguous - The groups should be rigidly defined.
 - (iii) Stability - Classification should be stable and should not be changed frequently.

- (iv) Exhaustive and mutually exclusive - The classification used be exhaustive so that each and every item belong to one of the groups. The classes should be numerically exclusive so that each item comes under one and one group only.
 - (v) Flexible - A good classification should be flexible.
88. When classification of data is made on the basis of time it is called chronological classification and the series so formed is called a time series. Under this classification normally the data are listed in a chronological order of their happening. The figures of population, production, sales, advertisement expense etc. are presented using this method. For example :

Population of India from 1961 to 2001

Year	1961	1971	1981	1991	2001
Population (in crores)	43.92	54.82	68.33	84.63	102.37

89. In inclusive type of classification the upper and lower limit of the class are included in the class. For example in a class 20-29, the value 20 as well as 29 are included in the same class and the next class starts from 30 and thus there remains a gap between the upper limit and lower limit of two adjacent classes.

On the otherhand in exclusive classification the upper limit value of a class is excluded from the same class and included in the next class. For example in class 20-30 the value 30 is not included in the class 20-30 but in the next class 30-40. The upper limit of a class becomes the lower limit of the next class and thus there remain no gap like the inclusive clarification.

90. Following is a specimen of a table indicating its different parts.

TABLE NO.

Title

Head Note

Caption				
Stub. (Row Headings)	Column Heading	Column Heading	Column Heading	Column Heading

Foot Notes.

UNIT - IV

GROUP - C : LONG TYPE QUESTIONS

71. What is primary data ? Explain different methods of collecting primary data.
72. Distinguish between primary data and secondary data and explain the questionnaire system of collecting primary data.
73. Explain the requisites of a good questionnaire.
74. What is secondary data ? Outline the sources of secondary data and mention the precautions to be observed while using secondary data.
75. Distinguish between classification and tabulation of data. Discuss the essentials of good tabulation.
76. Discuss the objectives and types of classification of statistical data.
77. State the principles of classifying statistical data.
78. Explain the basic principles involved in construction of a frequency table.
79. What is tabulation ? How it is different from classification ? Explain different parts of a statistical table.
80. What do you understand by classification ? Explain the important characteristics of classification.
81. Construct an imaginary table showing a population, sex wise and religion wise. (Hindu, Muslim, Christians and Others).
82. From the given cumulative frequencies find simple frequencies.
- | | | | | | | | | | |
|----------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Less than | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| Cumulative Frequency | 29 | 224 | 465 | 582 | 634 | 644 | 650 | 653 | 655 |
83. Convert the following Cumulative frequency distribution into a simple frequency distribution.
- | | | | | | | | | | | | |
|----------------------|----|----|----|----|----|----|----|----|----|----|-----|
| Above | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Cumulative Frequency | 80 | 77 | 72 | 65 | 55 | 43 | 28 | 16 | 10 | 8 | 0 |
84. Prepare a blank table to show distribution of students of a college with respect to
- (i) Sex
 - (ii) Faculties - Arts, Science, Commerce
 - (ii) Four years
85. Convert the following inclusive series into an exclusive series.
- | | | | | | |
|---|-----|-------|-------|-------|-------|
| x | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 |
| f | 3 | 3 | 11 | 6 | 5 |

