

Model question paper of  
**Building Mathematical Ability** = soft skills  
under Mrudh Komalya B.A., V sem.

I. Answer all the 40 questions. Each question carries 1 marks (40 × 1 = 40)

1) Find the duplicate ratio of 5:6:

- a) 9:4
- b) 25:36
- c) 4:25
- d) 12:19

2) If y varies directly with the square of x, and if y = 4 when x = 3, then value of y when x = 2 is

- a) 15/4
- b) 16/9
- c) 3
- d) 9/16

3) Find the fourth proportional to 6, 14 and 15.

- a) 60
- b) 45
- c) 28
- d) 35

4) If 16 women working 7 hours per day can paint a mural in 48 days, how many days will it take 14 women working 12 hours a day to paint the same mural?

- a) 42 days
- b) 32 days
- c) 45 days
- d) 35 days

5) The value of x when  $x : \frac{8}{9} = \frac{3}{6} : \frac{4}{2}$  is

- a) 2/9
- b) 1/2
- c) 5/4
- d) 8/5

- 6) Suppose  $x$  varies jointly with  $y$  and the square root of  $z$ . When  $x = -18$  and  $y = 2$ , then  $z = 9$ . Find  $y$  when  $x = 10$  and  $z = 4$ .
- a)  $5/3$
  - b)  $3/5$
  - c)  $-5/3$
  - d)  $-3/5$
- 7) When asked how old she was, Beth replied "In two years I will be twice as old as I was five years ago". Then she is
- a) 5 years old
  - b) 10 years old
  - c) 12 years old
  - d) 14 years old
- 8) Which of the following is a declarative statement?
- a) It's right
  - b) He says
  - c) Two may not be an even integer
  - d) I love you
- 9) In propositional logic, which of the following is equivalent to  $p \rightarrow q$ ?
- a)  $\sim p \rightarrow q$
  - b)  $\sim p \vee q$
  - c)  $\sim p \vee \sim q$
  - d)  $p \rightarrow q$
- 10) If  $F_1$ ,  $F_2$  and  $F_3$  are propositional formulae such that  $F_1 \wedge F_2 \rightarrow F_3$  and  $F_1 \wedge F_2 \rightarrow F_3$  are both tautologies, then which of the following is TRUE?
- a) Both  $F_1$  and  $F_2$  are tautologies
  - b) The conjunction  $F_1 \wedge F_2$  is not satisfiable
  - c) Neither is a tautology
  - d) None of these

- 11) The functionally complete set is
- $\{ \neg, \wedge, \vee \}$
  - $\{ \downarrow, \wedge \}$
  - $\{ \uparrow \}$
  - None of these
- 12) Which of the following are tautologies
- $a \vee b \rightarrow b \wedge c$
  - $a \wedge b \rightarrow b \vee c$
  - $a \vee b \rightarrow (b \rightarrow c)$
  - none of these
- 13) The statement "if  $x^2 = 25$  then  $x = 5$ " is
- an inverse statement
  - a converse statement
  - a contrapositive statement
  - None of the above
- 14) If the cost of 8 pens is Rs. 200/-, then the cost of 18 pens is
- 832
  - 240
  - 375
  - 450
- 15) A shopkeeper buys an article at a discount of 20% on the listed price from a wholesaler. The shopkeeper marks up the price by 10% on the listed price. A buyer pays Rs 231 to get it after paying a sales tax at the rate of 5% on the price asked for. The profit percentage is
- 35.7 %
  - 37.5%
  - 38%
  - 38.7%
- 16) The rate of sales tax on trousers is 10%. One can buy a pair of trousers at Rs 660. The marked price of trouser then is
- Rs 500
  - Rs 600
  - Rs 700
  - Rs 800

- 17) The listed price of a refrigerator is Rs. 9700. If a sales tax of 6% is charged from the buyer, then selling price of the refrigerator is
- a) Rs 10000
  - b) Rs 10200
  - c) Rs 10282
  - d) Rs 11282
- 18) The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:
- a) 15
  - b) 16
  - c) 18
  - d) 25
- 19) A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20%?
- a) 3
  - b) 4
  - c) 5
  - d) 6
- 20) Find the Simple Interest on Rs. 10,000 for 7 years at 5% p.a.
- a) Rs 2,000
  - b) Rs 7,600
  - c) Rs 3,500
  - d) Rs 1,500
- 21) The interest calculated only on the principal regardless of the interest earned so far is called
- a) Compound interest
  - b) Simple interest
  - c) Annualised interest
  - d) Real interest
- 22) Compound interest on Rs. 5,000 at 5% rate of interest p. a. for 3 years is
- a) Rs 645.50
  - b) Rs 732.18
  - c) Rs 788.125
  - d) Rs 978.58

- 23) The amount of Rs. 20,000 at 5% p. a. for 3 years on Compound Interest is
- a) Rs 3,397.2
  - b) Rs 2,638.1
  - c) Rs 4,325.3
  - d) Rs 3,152.5
- 24) What sum lent at compound interest would amount to Rs. 6,615 at 5% p.a. in two years?
- a) Rs 5,000
  - b) Rs 4,750
  - c) Rs 6,500
  - d) Rs 6,000
- 25) In Inventory Turnover calculation, what is taken in numerator?
- a) Sales
  - b) Cost of Goods Sold
  - c) Opening Stock
  - d) Closing Stock
- 26) Collection of a fixed amount at a fixed interval of time by the insurance companies is called
- a) Contribution
  - b) Premium
  - c) Instalment
  - d) EMI
- 27) A graphical representation of a frequency distribution is
- a) a scatter plot
  - b) an ogive curve
  - c) a histogram
  - d) a straight line
- 28) Frequency of a variable is always
- a) in percentage
  - b) a fraction
  - c) an integer
  - d) none of the above

- 29) Data taken from the publication, 'Agricultural situation in India' will be considered as:
- Primary data
  - Secondary data
  - Primary and secondary data
  - Neither primary nor secondary data
- 30) A sample consists of:
- all units of the population
  - 50 percent units of the population
  - 5 percent units of the population
  - any fraction of the population
- 31) Sampling is inevitable in the situation(s)
- blood test of a person
  - when the population is infinite
  - testing of life of dry battery cells
  - all the above
- 32) Simple random sample can be drawn with the help of:
- random number tables
  - chit method
  - roulette wheel
  - all the above
- 33) Which of the following is a measure of central value?
- Median
  - Standard deviation
  - Mean deviation
  - Quartile deviation
- 34) If a constant 5 is added to each observation of a set, the mean is:
- increased by 5
  - decreased by 5
  - 5 times the original mean
  - not affected
- 35) If the two observations are 20 and -20, their arithmetic mean is:
- 10
  - 20
  - 0
  - none of the above

36) Mean of a set of values is based on:

- a) all values
- b) 50 percent values
- c) first and last value
- d) maximum and minimum value

37) Histogram is useful to determine graphically the value of:

- a) mean
- b) median
- c) mode
- d) all the above

38) The correct relation between variance and standard deviation (S.D.) of a variable X is :

- a)  $S.D. = [\text{Var}(X)]^2$
- b)  $S.D. = [\text{Var}(X)]^{1/2}$
- c)  $S.D. = \text{Var}(X)$
- d) none of the above

39) Formula for coefficient of variation is:

- a)  $C.V. = (S.D./\text{mean}) * 100$
- b)  $C.V. = (\text{mean}/S.D.) * 100$
- c)  $C.V. = (\text{mean} * S.D.) / 100$
- d)  $C.V. = 100 / (\text{mean} * S.D.)$

40) If X and Y are independent then the value of correlation coefficient is

- a) 1
- b) 0
- c) -1
- d) 2

**Answer all the questions. Each question carries 2 marks.**

- 1) The amount of money raised at a school fundraiser is directly proportional to the number of people who attend. Last year, the amount of money raised for 100 attendees was 2.5 lakhs. If 700 people attend this year then the amount of money in lakhs raised is
  - a) Rs 17.3
  - b) Rs 25.0
  - c) Rs 17.5
  - d) none of the above
  
- 2) Let  $x_1 = 3$ ,  $y_1 = 4$ , and  $y_2 = 6$ . Let  $y_1$  and  $y_2$  vary inversely with  $x_1$  and  $x_2$  respectively. Then value of  $x_2$  is
  - a) 5
  - b) 3
  - c) 2
  - d) 5
  
- 3) Apply the principle of variation to find how long 25 men will take to plough 30 acres, if 5 men take 9 days to plough 10 acres.
  - a) 5 days
  - b)  $5\frac{1}{2}$  days
  - c)  $5\frac{2}{5}$  days
  - d)  $5\frac{4}{5}$  days
  
- 4)  $P \rightarrow (Q \rightarrow R)$  is equivalent to
  - a)  $(P \wedge Q) \rightarrow R$
  - b)  $(P \vee Q) \rightarrow R$
  - c)  $(P \vee Q) \rightarrow \neg R$
  - d) None of these
  
- 5) Which of the following are tautologies?
  - a)  $((P \vee Q) \wedge Q) \leftrightarrow Q$
  - b)  $((P \vee Q) \wedge \neg P) \rightarrow Q$
  - c)  $((P \vee Q) \wedge P) \rightarrow P$
  - d) Both (a) & (b)



- 6) A trader professes to sell his goods at a loss of 8% but uses a weight of 900 grams in place of a 1 kg weight. What is his real loss or gain per cent?
- 2% loss
  - 2.22% gain
  - 2% gain
  - None of these
- 7) The price of a TV set inclusive of sales tax of 9% is Rs 17407. Find its marked price. If the sales tax is increased to 13%, how much more does the customer pay for the TV set?
- Rs 12,300, Rs 492
  - Rs 12,000, Rs 492
  - Rs 12,300, Rs 491
  - Rs 12,000, Rs 491
- 8) A man buys Rs. 20 shares paying 9% dividend. The man wants to have an interest of 12% on his money. The market value of each share is:
- Rs. 12
  - Rs. 15
  - Rs. 18
  - Rs. 21
- 9) Rs. 2,000 is deposited in a bank for two years at Simple Interest of 6.5%. How much will be the balance at the end of 2 years?
- Rs 2600
  - Rs 2,260
  - Rs 4500
  - Rs 3,350
- 10) Vineet has taken a personal loan of 5 lakh rupees for an yearly interest rate of 13% and a tenure of 5 years, then the EMI of the loan is
- Rs 10350
  - Rs 11475
  - Rs 11377
  - Rs 11503

- 11) The average of five numbers is 40 and the average of another four numbers is 50. The average of all numbers taken together is:
- a) 44.44
  - b) 45.00
  - c) 45.55
  - d) 90.00
- 12). The median of eight observations 208, 205, 212, 209, 207, 210, 208, 206
- a) 206
  - b) 208
  - c) 210
  - d) 211
- 13). In a bivariate data 10 observations on x and y gives,  
 $\sum x = 56$ ,  $\sum y = 138$ ,  $\sum x^2 = 1357$ ,  $\sum y^2 = 2136$  and  $\sum xy = 836$ . The coefficient of correlation between x and y is
- a) 0.1286
  - b) 0.3541
  - c) 0.4123
  - d) 0.1891
- 14) The mean and standard deviation of a set of values are 12 cms and 3 cms respectively. The coefficient of variation is
- a) 25 %
  - b) 32 %
  - c) 27%
  - d) 23%
- 15) A bivariate data of 10 observations on x and y gives,  $\sum x = 56$ ,  $\sum y = 138$ ,  $\sum x^2 = 1357$ ,  $\sum y^2 = 2136$  and  $\sum xy = 836$ . Then regression coefficient of y on x is approximately
- a) 0.06
  - b) 0.273
  - c) 1.96
  - d) 4.16

I. Answer all 40 questions each carries 1 marks

Unit 1 :	<i>Mathematics</i>	-	13 questions
Unit 2 :	<i>Commercial Mathematics</i>	-	13 questions
Unit 3 :	<i>Statistics</i>	-	14 questions

II. Answer all 15 questions each carries 2 marks

Unit 1 :	<i>Mathematics</i>	-	5 questions
Unit 2 :	<i>Commercial Mathematics</i>	-	5 questions
Unit 3 :	<i>Statistics</i>	-	5 questions

#### Scheme of Examination

End-semester examination : 70 marks

Continuous Assessment : 30 marks (Test/s:20marks,Assignment:10marks)

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Total : 100marks