

TILOTTAMA SECONDARY SCHOOL

Assignment-2077

Sub : Business Mathematics

Time : 3 Hours

Class : 12

F.M : 100



Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt All Questions:

Group A

[10×2×3=60]

1. a. Rewrite $-5 \leq x \leq -2$ using absolute value sign.
 b. Let $A = \{1, 2, 3\}$. Find the relation in $A \times A$ satisfying the condition $x > y$ for all $(x, y) \in (A \times A)$. Find the domain of the relation.
2. a. Insert 5 A.M's between 1 and 43.
 b. Sum to n terms of the series: $5+55+555+\dots$
3. a. In how many ways can 6 players be selected from 7 men and 5 ladies consisting of 4 men and 2 ladies?
 b. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$, show that $A^2 - 2A - 5I = 0$, where I and O are identity and null matrix of order 2 respectively.
4. a. Determine the ratio in which $2y-x+2=0$ divides the line joining (3,-1) and (8,9).
 b. Find the equation of the line through the point of intersection of $x+2y=5$, $x-3y=7$ and passing through the point (0,0).
5. a. Evaluate: $\sqrt[3]{\frac{1}{2.35 \times 6.472}}$ by using four figure log table .
 b. Evaluate: $\lim_{x \rightarrow 3} \frac{x-3}{\sqrt{x-2}-\sqrt{4-x}}$
6. a. Test for continuity the function, $f(x) = \begin{cases} x^2-9 & \text{when } x \neq 3 \\ x-3 & \text{when } x = 3 \end{cases}$ at $x = 3$
 b. Find $\frac{dy}{dx}$ if $x^3 + y^3 = 3ax$.
7. a. Evaluate: $\int \frac{2x+5}{\sqrt{x^2+5x}} dx$
 b. If the marginal cost of a product is given by $MC=36-20x+6x^2$ and the initial cost is Rs.20. Find the total cost and average cost function.
8. a. Calculate the mean deviation from the mode of the following frequency table.

Marks	10	20	30	40	50	60
No. of Stds.	3	7	10	20	12	8

- b. What is the probability of being 5 Saturdays in a month of 29 days?
9. a. In a race of one kilometer, Mr.X beats Mr Y by 70m and Mr. Y beats Mr.Z by 80m .By how much does Mr. X beats Mr.Z?
 b. If the cost of an article is Rs 1500,What should be the marked price of the article in order to get 20% profit on cost price allowing 10% discount on marked price?
- 10.a.At what rate is the bankers discount calculated when a bill of Rs 5000 is accepted by a bank for Rs 4700 due 8 month.
 b. If 90 dollars=75Euro,60Euro=89.10 Swiss Francs,56 Swiss Francs=£25 and £1=Rs134.40,how many rupees are equivalent to 500 dollars?

Group B

[5×8=40]

11. Prove that:
$$\begin{vmatrix} a+x & b & c \\ a & b+y & c \\ a & b & c+z \end{vmatrix} = xyz \left(1 + \frac{a}{x} + \frac{b}{y} + \frac{c}{z} \right)$$

12. Find from first principles the derivative of $\frac{1}{\sqrt{x+5}}$

13. Given the demand function $P = 20 - Q$ and the total cost function $C = Q^2 + 8Q + 2$ determine the optimal output Q price P and the total profit under profit maximization

14. Solve the following L.P problem graphically: Maximize $(z) = x + y$ subject to the constraints $x + y \geq 2$, $4 \geq 2x - y$ and $2 \geq y$.

15. Calculate the mean and standard deviation of the following data:

Profit(Rs)	0-10	10-20	20-30	30-40	40-50
No.of shops	8	13	16	8	5

- 16.A and B started business with capitals of Rs.5000 and Rs.4000 respectively,after 6 months they admitted C with a capital of Rs.8000.If the Profit at the end of the year amounts to Rs.13000,find the share of each in profit.
- 17.A machine ,the life of which is estimated to be 10 yrs ,cost Rs.10000.Calculate its scrap value at the end of its life,depreciation on the reducing instalment system being charged at 10% p.a
- 18.Find the amount of an immediate annuity of Rs.700 a year for 4 years at 5%p.a.

*****Best of Hard Labour*****