

Sub. Code: 908

HISSAN KASKI- Grade : XII

Pre-Board Examination-2071

Business Mathematics

Programme: Management

F.M:100

Time: 3 hours

P.M: 35

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

Shift :Day

Attempt all the questions.

Group 'A'

[10 × 2 × 3 = 60]

- Solve for x : $|4x + 3| \leq 5$
 - If $P = \{3, 4, 5\}$, $Q = \{4, 5, 10\}$, then find the relation in $P \times Q$ Satisfying $x \geq y$. Is this relation a function ?
- How many terms of the Series $2+4+6+\dots$ must be taken in order so that sum may be 420.
 - Find the value of K so that $K-2$, $K-6$ and $2K+3$ are in G.P.
- A Committee is to be chosen from 12 men and 8 women and is to consist of 3 men and 2 women. In how many ways can it be formed?
 - If $A = \begin{bmatrix} 1 & -1 \\ 2 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 3 & 3 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 7 \\ 1 & 5 \end{bmatrix}$, show that $AB = AC$ though $B \neq C$.

- If the slope of the line joining the points $(x, 5)$ and $(-1, 2)$ is $\frac{3}{4}$, find the value of x and then find the distance between these two points.

- Obtain the equation of the locus of a point which moves so that its distance from the point $(2, 1)$ is always 3.

- Evaluate using log table : $\frac{\sqrt[3]{(60.45)^2}}{\sqrt[3]{0.08952}}$

- Find the limit $\lim_{x \rightarrow 1} \frac{\sqrt{3x+1} - 2}{x-1}$

- Examine whether the function f defined as follows is continuous or not.

$$f(x) = \begin{cases} \frac{x^2 - 1}{x - 1} & \text{if } x \neq 1 \\ 2 & \text{if } x = 1 \end{cases} \text{ at } x = 1.$$

- Find the derivative of $y = \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3}$.

- Integrate : $\int \frac{x+2}{x-2} dx$.

- If the marginal cost function is given by $MC = 20 - 35x + 5x^2$ and the initial cost is Rs. 50, find the total cost and average cost function.

- Calculate the mean deviation and from the following data.

Height (in inches):	60	62	64	66	68	70
Frequencies:	10	15	20	15	10	5

- b) A card is drawn at random from a pack of 52 cards. Find the probability of getting
- i) a black card ii) not black iii) red card
9. a) If 30 men can do a piece of work in 11 days working 9 hours a day, how many hours a day have 55 men to work in order to finish another work thrice as great in 18 days?
- b) A man sold two books for Rs.2000 each. On one he gains 20% and on the other he loses 20%. Find his gain or loss percentage in the whole transaction.
10. a) Find the arbitrary rate of exchange between Francs and Rupees, if Rs. 75.50=1.50pence, 1.50pence=3.50 marks, 3.90 marks= \$1, \$1=4.80 Francs.
- b) If the bankers discount of Rs. 28000 at 3.5% per annum be equal to the true discount of Rs. 28735 for the same time at same rate, when are the sums due?

Group 'B'

[8×5=40]

11. Solve by Cramer's rule,
- $$x - y - z = -2$$
- $$5x + 20z = 30$$
- $$10y - 20z = 10$$
12. Find, from first principle, the derivative of $y = \sqrt{x}$.
13. The demand function for a certain commodity is $P = \frac{1}{3}x^2 - 10x + 75$. Find the value of x and the corresponding value of P that maximizes the revenue.

14. Maximize the objective function $P = 3x + 2y$ under the constraints $2x - y \leq 1$, $x + 2y \leq 3$ and $x \geq 0, y \geq 0$.

15. Find the mean and standard deviation from the given data.

X:	10	11	12	13	14
F:	3	12	18	12	3

16. A and B started a business with capitals Rs. 20,000 and 30,000 respectively. However A acts as a manager and he get 24% of the total profit as salary and the remaining profit is to be divided in the ratio of their contribution. B gets Rs. 4560 as his profit. How much money should A get?
17. A person buys a house for which he agrees to pay Rs. 500,000 now and Rs. 5000 at the end of each month for 8 years. If the interest is 12% p.a. compounded monthly, what is the cash price of the house?
18. The life of machine purchased at Rs. 100,000 is estimated to be 9 years. The owner received Rs.10,000 thereafter. Find the amount of annual depreciation both simple and compound.

The End.

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Group 'A'

[10 × 2 × 3 = 60]

1. a) Rewrite so that x is alone between the inequality sign.
 $-7 < -2x + 3 < 5$.
b) Find the domain of the function, $f(x) = \sqrt{x-1}$, $X \in R$.
2. a) In GS, if $a=2$, $r=2$ & $t_n=128$, $n=?$
b) Divide 60 into 3 parts which are in AP such that the last one is 3 times the first.
3. a) In how many ways can the letters of the word "COMMERCE" be arranged?
b) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -3 \end{pmatrix}$ & $C = \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix}$
Prove that ; $A(BC) = (AB)C$

4. a) If A,B,C are collinear points such that $AB = BC$ and the coordinates of A,B,C are $(a, 2)$, $(1, 3)$ & $(5, b)$ respectively, find a and b .
b) Find the equation of the line passing through $(4, -3)$ & $(3, 4)$.
5. a) Using the log table, find the value of $\sqrt[6]{\frac{8.12}{62.9 \times 0.28}}$
b) Evaluate $\lim_{x \rightarrow \infty} \frac{\sqrt{9x^2 + 8x + 1}}{3x - 1}$
6. a) Find the points of discontinuity of the function
 $f(x) = \frac{3x + 5}{x^2 - x - 6}$
b) Find the derivative of $\frac{e^x}{x + 1}$.
7. a) Evaluate: $\int \frac{ax^2 + bx + c}{x} dx$.
b) If the demand function is $P = 30 - 2Q$. Find the marginal revenue when level of Output is 5.
8. a) Find the SD of following data ; 10, 15, 25, 20, 30, 40, 50, 10.
b) Two dice are rolled once, what is the probability of getting a total of 5 or 7?
9. a) If Rs.88.44 was paid into mohar, suki and paisa in the ratio of 3: 2: 1. How many of each were there?

b) An article is listed 20% above the selling price and the cost price is 20% below the selling price. Find the rate of discount & profit.

9. a) Cheese is marked at £ 4.125 cwt or 2.35 francs per kg. Which is cheaper if £1= 25.2 francs , 1 kg = 2.2 lbs, 1 cwt = 112lbs ?

b) The Banker's discount on a bill due 6 months hence at 6% is Rs. 37.08, find the true discount.

Group 'B' [8×5=40]

10. Solve the following equations using Cramer's rule.

$$x + y - 2z = 1$$

$$2x - 7z = 3 \quad \text{and}$$

$$x + y - z = 5$$

11. Find, from the first principle, the derivative of $\frac{1}{2x+3}$.

12. The marginal revenue function for a firm's production is $MR = -0.04x + 10$, where x is number of units sold;

a) Determine the total revenue from selling 200 units of the product.

b) What is the added revenue associated with an increase in sale from 100 to 200 units?

13. Maximize $z = 2x + 3y$ subject to constraints:

$$2x + y \leq 14$$

$$x + 2y \leq 10$$

$$x, y \geq 0$$

14. From the following data, find the mean deviation from median and also find Coefficient of MD.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	4	6	10	20	10	6	4

15. A and B start a business with capitals of 5:7. They withdraw $\frac{2}{3}$ and $\frac{3}{4}$ of their capitals respectively at the end of 4 & 6 months. At the end of the year, a profit of Rs. 2,660 is to be divided. Find the share of each.

16. How much should be paid now to secure annuity of Rs. 300 to being at once at to continue for 10 years, the rate of interest being 8% p.a.?

17. A certain sum of money placed out at simple interest for 3 years at $5\frac{1}{2}\%$ p.a. brings Rs. 18.4375 more in 3 years than if it were placed out at compound interest for the same time at 5% p.a. Find the sum.

The End.