Exam: Hr. Sec. Part I   Max Marks: 100

Subject: Business Mathematics   Time: 3 Hours

Section (A) Long Answer Type Questions (5Q × 6M = 30Marks)

Q.No.1. The sum of first three terms of a GP is $\frac{39}{10}$ and their product is 1. Fid the common ratio and the terms.

   Or

If p^{th} and q^{th} terms of an AP are $\frac{1}{q}$ and $\frac{1}{p}$ respectively. Show that the sum of first pq terms is $\frac{pq=1}{2}$

Q.No.2. Find the value of other five trigonometric, given $\cos x = \frac{-1}{2}$; x lies in 3ʳᵈ quadrant.

   Or

Prove the following;

$$\frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = \frac{-\sin 2x}{\cos 10x}$$

Q.No.3. Find the middle term(s) I the expansion of $\left\{3 - \frac{x^3}{6}\right\}^7$

   or

Find the coefficients of $a^5 b^7$ in the expansion of $(a - 2b)^{12}$

Q.No.4. Find the mean deviation about the median of the data;

36	72	46	42	60	45	53	46	51	49

   Or

Find the variance of the first 'n' natural numbers.

Q.No.5. Find Q.D. (Quartile Deviation) from the following data;

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

Or

Find the S.D (Standard Deviation) from the following data;

x_i	6	10	14	18	24	28	30
f_i	2	4	7	12	8	4	3

Section (B) Short Answer Type Questions (10Q×4M=40Marks)

Q.No.6. If $n(X) = 17, n(Y) = 23$ and $n(X \cup Y) = 38$. Find $n(X \cap Y)$. Where

X and Y are two sets.

Q.No.7. If $G = \{7,8\}, H = \{5,4,2\}$ Find; $G \times H$ and $H \times G$

Q.No.8. Insert three numbers between 1 and 256 so that the resulting sequence

is a G.P.

Q.No.9. Prove that $\dfrac{\sin(x+y)}{\sin(x-y)} = \dfrac{\tan x + \tan y}{\tan x - \tan y}$

Q.No.10. If $\dfrac{1}{6!} + \dfrac{1}{7!} = \dfrac{x}{8!}$. Find the value of 'x'

Q.No.11. Simplify;   (I) $\dfrac{9!}{4!3!2!}$ (II) 5_{P_4}

Q.No.12. Find $(a + b)^4 - (a - b)^4$.

Q.No.13. A coin is tossed two times. Find the probability of;
   (I) At least two heads   (II) Exactly two heads

Q.No.14. Solve the following inequalities;

   (I) $4x + 3 < 5x + 7$ (II) $\dfrac{x}{3} > \dfrac{x}{2} + 1$

Q.No.15. Solve the following system of inequalities graphically.

   (I) $2x + y > 6$ (II) $3x + 4y \leq 12$

Section (C) Very Short Answer Type Questions (10Q×2M=20Marks)

Q.No.16. Let $A = \{a, b\}, B = \{a, b, c\}$. Is $A \subset B$? What is $A \cup B$?

Q.No.17. If $(x + 1, y - 2) = (3,1)$. Find 'x' and 'y'

Q.No.18. Find first three terms of a GP whose $a_n = 2^{n+1}$

Q.No.19. Find first five terms of sequence $a_n = n\left(\dfrac{n^2+5}{4}\right)$

Q.No.20. Find the principle value of 'x' for which $\cos 2x = 0$

Q.No.21. Define median.

Q.No.22. Write sample space for the random experiment of tossing a coin twice.

Q.No.23. If $\frac{2}{11}$ is the probability of an event. What is the $p(NotA)$

Q.No.24. If $P(A) = 0.6, p(B) = 0.4. P(A \cap B) = 0.2$. Find $P(A \cup B)$

Q.No.25. Solve the inequality for 'x'

$$3x - 6 \geq 9$$

Section (C) Very Short Answer Type Questions (10Q×1M=10Marks)

Q. No. 26. Do as directed.

(I) Two sets are said to be disjoint if;

(a) $A \cup B = \emptyset$ (b) $A \cup B = A$

(c) $A \cap B = \emptyset$ (d) $A \cap B = A$

(II) The nth term of the G.P. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$, ... is ....

(III) If $\sin x = \frac{-1}{2}$, then 'x' lies .... Quadrant.

(IV) The value of n_{p_n} is equal to;

(a) 1   (b) 2

(c) n (d) 0

(V) The mean of 1, 2, 3, 4,5 is ....

(VI) Which of the following is true?

(a) $AM \geq GM$ (b) $AM > GM$

(c) $AM < GM$ (d) $AM \leq GM$

(VII) The probability of an event is greater than 1.   (True/False)

(VIII) The probability of an event E satisfies; $0 \leq P(E) \leq 1$

(True/False)

(IX) For the events A and B, $P(A \cap B) = P(A) + P(B) - P(A \cup B)$

(True/False)

(X) If S is the sample space, then P(S) is;

(a) n   (b) 2

(c) 0   (d) 1