

Business Math

Time: 3 Hours

Max. Marks: 100

General Instructions:

- a) All questions are compulsory
 - b) The questions paper contains 29 questions
 - c) Question 1-4 in section A are very short answer type questions carrying 1 marks each
 - d) Questions 5-12 in section B are short answer type questions carrying 2 marks each
 - e) Questions 13-23 in section C are long answer type questions carrying 4 marks each
 - f) Questions 24-29 in section D are long answer type questions carrying 6 marks each.
 - g) There is no overall choice. However an internal choice is given in three questions of section C and three questions of section D. Do only one out of them.
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Section (A)

Questions from 1-4 are of 1 mark each

Q. No. 1. Choose correct one;

Two sets are said to be disjoint if;

- (a) $A \cup B = \emptyset$
- (b) $A \cup B = A$
- (c) $A \cap B = \emptyset$
- (d) $A \cap B = A$

Q.No.2. The n^{th} term of the G.P. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$ is

Q.No.3. If $\sin x = \frac{-1}{2}$, then 'x' lies in Quadrant.

Q.No.4. The value of n_{p_n} is equal to;

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

Section (B)

Questions from 5-12 are of 2 mark each

- Q.No.5. Let $A = \{a, b\}$, $B = \{a, b, c\}$. Is $A \subset B$? What is $A \cup B$?
- Q.No.6. Find first three terms of a GP whose $a_n = 2^{n+1}$
- Q.No.7. Find the principle value of 'x' for which $\cos 2x = 0$
- Q.No.8. Expand $(3 - \frac{x^2}{6})^4$
- Q.No.9. Define median.
- Q.No.10. Solve the inequality; $4x + 3 < 5x + 7$
- Q.No.11. Ravi obtained 70 and 75 marks in first two unit tests. Find the number of minimum marks he should get in the third test to have an average of at least 60 marks.
- Q.No.12. Solve; $3x + 8 > 2$ when
(I) x is an integer (II) x is a real number

Section (C)

Questions from 13-23 are of 4 mark each

- Q.No.13. 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.
Or
If $G = \{7,8\}$, $H = \{5,4,2\}$ Find; $G \times H$ and $H \times G$
- Q.No.14. Insert three numbers between 1 and 256 so that the resulting sequence is a $G.P.$
- Q.No.15. Prove that $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$
Or
Prove that: $\frac{\sin 5x + \sin 3x}{\cos 5x - \cos 3x} = \tan 4x$

Q.No.16. Simplify; (I) $\frac{9!}{4!3!2!}$ (II) $5P_4$

Q.No.17. Find, $(a + b)^4 - (a - b)^4$.

Q.No.18. Find the middle term(s) in the expansion of; $(3 - \frac{x^3}{6})^7$

Q.No.19. Find the mean of the first 'n' natural numbers.

Or

Find the mean deviation about the median of the data;

36 72 46 42 60 45 53 46 51 49

Q.No.20. Find the variance for the data;

x_i	4	8	11	17	20	24	32
f_i	3	5	9	5	4	3	1

Q.No.21. A coin is tossed two times. Find the probability of;

(I) At least two heads

(II) Exactly two heads

Q.No.22. If $P(A) = 0.6, P(B) = 0.4, P(A \cap B) = 0.2$. Find

(I) $P(A \cup B)$

(II) $P(\text{Not } A)$ and $P(\text{Not } B)$

Q.No.23. Solve the inequality graphically;

$$2x + y \geq 8$$

$$x + 2y \geq 10$$

Section (D)

Questions from 24-29 are of 6 mark each

Q.No.24. If $f = \left\{ \left(x, \frac{x^2}{1+x^2} \right) : x \in R \right\}$ be a function from R to R . Determine the

Domain and range of f

Q.No.25. The sum of first three terms of a GP is $\frac{39}{10}$ and their product is 1. Find 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.26. Find the value of other five trigonometric ratios, given $\cos x = \frac{-1}{2}$; x lies in III quadrant.
Or

Prove the following;

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

Q.No.27. In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 Girls.

Q.No.28. 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

Calculate the mean, variance and the standard deviation for the following distribution;

Class:	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency:	3	7	12	15	8	3	2

Q.No.29. A committee is selected from two men and two women. What is the probability that the committee will have;

(I) No man?

(II) One man?

(III) Two men?