

Final Paper (15 March 2017)

Class XI

Paper- MATHEMATICS

(Set-A)

Time: 3hrs.

M.M. 100

Note: Attempt all questions.

1. Q1 to Q4 carry 1 mark each.
2. Q5 to Q 12 carry 2 marks each
3. Q13 to Q23 carry 4 marks each.
4. Q24 to Q29 carry 6 marks each.

SECTION - A

Question number 1 to 4 carry 1 mark each.

- Q1. Find domain and range of following function $f(x) = -|x|$
- Q2. Find the radian measure of $-47^{\circ}30'$
- Q3. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$ find x .
- Q4. If $\frac{2}{11}$ is probability of an event 'A', what is probability of event 'not A'.

SECTION – B

Question number 5 to 12 carry 2 marks each.

- Q5. If $A = \{3, 4, 5\}$ write power set of A.
- Q6. Find general solution for the following equation: $\sin 2x - \sin 4x + \sin 6x = 0$
- Q7. Express the following in form $a + ib$.
- $$\frac{5 + \sqrt{2}i}{1 - \sqrt{2}i}$$
- Q8. Solve $5x - 3 < 7$ when (i) x is an integer (ii) x is real number
- Q9. How many words, with or without meaning, can be formed using all letters of word EQUATION.
- i) 5 letters are used at a time
 - ii) all letters are used at a time
- Q10. By using the concept of equation of line, prove that the three points (3, 0), (-2, -2) and (8, 2) are collinear.
- Q11. Find the ratio in which YZ-plane divides the line segment formed by joining the points (-2, 4, 7) and (3, -5, 8)
- Q12. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box, what is probability that
- i) all will be blue
 - ii) at least one will be green

SECTION – C

Question number 13 to 23 carry 4 marks each

Q13. Let $A = \{1, 2, 3, 4, 6\}$. Let R be relation on A defined by $\{(a, b) ; a, b \in A, b \text{ is exactly divisible by } a\}$

- i) Write R in roster form
- ii) Find the domain and range of R

Q14. Prove that $(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4 \cos^2 \left(\frac{x+y}{2} \right)$

Q15. If $(x + iy)^3 = u + iv$ then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$

Q16. What is the number of ways of choosing 4 cards from the pack of 52 playing cards? In how many of these

- i) four cards are of same suit
- ii) four cards belong to four different suits.
- iii) four cards are face cards
- iv) two are red cards and two are black cards

Q17. If $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the A.M. between a and b, then the value of 'n'

Q18. Find the sum of the sequence 7, 77, 777, 7777, to n terms.

Q19. Find the co-ordinates of foot of perpendicular from the point (-1, 3) to the line $3x - 4y - 16 = 0$

Q20. Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$

Q21. Find derivatives of 'Sin x' using first Principle method.

Q22. Rewrite the following statement with "If-then" in four different ways. "If natural number is odd, the its square is also odd."

Q23. Two dice are thrown and the sum of the numbers which come up on the dice is noted. Write the following events in roster form, which pairs of these events are mutually exclusive?

- A : the sum is even
B : the sum is multiple of 3
C : the sum of less than 4
D : sum is greater than 11

SECTION – D

Question number 24 to 29 carry 6 marks each

Q24. In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers find

- (i) the number of people who read at least one of the newspapers
- (ii) the number of people who read exactly one newspaper

Q25. Prove the following by using principle of mathematical induction $\forall n \in \mathbb{N}$

$$\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \dots + \frac{1}{(3n-1)(3n+2)} = \frac{n}{(6n+4)}$$

Q26. Solve the following system of inequalities graphically

$$\begin{aligned} 3x + 2y &\leq 150 \\ x + 4y &\leq 80 \\ x &\leq 15, y \geq 0 \end{aligned}$$

Q27. The coefficients of three consecutive terms in expansion of $(1+a)^n$ are in ratio 1: 7: 42. Find on n and a .

Q28. Find, the co-ordinates of the foci and the vertices, the eccentricity and length of latus rectum, conjugate axis along which axis, transverse axis along which axis of hyperbolar $16x^2 - 9y^2 = 576$

Q29. Find mean, variance and standard deviation for the following data:

Class	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequencies	2	3	5	10	3	5	2