BOARD OF INTERMEDIATE & SECONDARY EDUCATION HYDERABAD

Excellence – Equity - Empathy

MATHEMATICS MODEL PAPER (CLASS XI)

Time: 2 Hours **M. Marks: 100**

Note: (i) Attempt all questions. Each question carries one mark.
(ii) Write only the answer in full on the first specified page of answer copy with choice (A, B, C & D)

SECTION "A" **Marks: 50**

MULTIPLE CHOICE QUESTIONS (MCQS)

Q.No.1 Choose the correct answer for each from the given options:

1) If A and B be sub sets of set U such that A∪B = 𝕌 then set A and B are called _____ sets.
(a) Cells (b) Exhaustive (c) Difference (d) N.O.T

2) The imaginary part of $(x + 2yi)^2$ is _____.
(a) $4xy$ (b) $-4xy$ (c) $x^2 - 4y^2$ (d) N.O.T

3) The roots of the equation $2x^2 + 5x - 1 = 0$ are:
(a) Equal and real (b) Imaginary (c) Rational (d) Irrational

4) If the terms of A.p decrease in magnitude then common difference must be:
(a) -1 (b) 0 (c) +ve (d) -ve

5) The intersection fo two overlapping set is _____.
(a) Empty (b) Non-Empty (c) Equal (d) Real

6) The sum of the first n even natural number is _____.
(a) n(n+1) (b) $\frac{1}{2}$(n+1) (c) $\frac{1}{2}$n (n+1) (d) 2n

7) If sin x = ½ then x = _____.
(a) $\frac{\pi}{6}, 5\frac{\pi}{6}$ (b) $-\frac{\pi}{6}, 5\frac{\pi}{6}$ (c) $-\frac{\pi}{6}, -5\frac{\pi}{6}$ (d) $\frac{\pi}{3}, 2\frac{\pi}{3}$

8) The point of intersection of right bisector of the sides of triangle is know as:
(a) in-circle (b) E-circle (c) Circum Centre
(d) Circumference of triangle

9) Product of any non-zero complex numbers with its conjugates is a:
(a) Real number (b) Complex number (c) 0 (d) 1

10) For sequence $\{a_n\}$ the quotient $\frac{a_n}{a_{n-1}}$ is called _____.
(a) Common difference (b) Common Ratio (c) G.M (d) H.M

11) An arrangements of finite number of object some or all at a time is called a _____.
(a) Combination (b) Permutation (c) Set (d) N.O.T

12) A gentlemen has 6 rooms for guests. In how many ways can be accommodate 3 guests.
(a) 3 (b) 18 (c) 120 (d) 240

13) The value of $(i)^{400}$ is _____.
(a) I (b) -i (c) 1 (d) -1

14) Which one is a factor of $9x^2 + 25y^2$
(a) $2x + 5y$ (b) $3x - 5y$ (c) $3x + 5iy$ (d) $3ix - 5iy$

15) Let P(n) be a proposition which is true for n=1 and its true for n=k implies its trueness for n=k + 1 then P(n) is true for all:
(a) real n (b) rational n (c) integral n (d) natural n

16) The measure of three angles of triangle are in ration 1:2:3 the triangle is _____.
(a) Right angled (b) Equilateral (c) Isosceles (d) N.O.T

17) In the binomial expansion of $(x + y)^n$ the coefficient of first and last term are:
(a) irrational (b) complex (c) equal (d) unequal

18) $\sin^2\frac{\pi}{6} + \cos^2\frac{\pi}{6} =$ _____.
(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{2}$ (c) 1 (d) 2

19) An arc of unit length of circle of unit radius makes a central angle of:
(a) Zero radian (b) 1 degree (c) 1 radian (d) N.O.T

20) $\sin^2\theta =$ _____.
(a) $1 - \cos^2\theta$ (b) $\frac{1-\cos 2\theta}{2}$ (c) both a and b (d) N.O.T

21) If A = {1, 2, 3}, B = {1, 2} then which of the following relation is correct.
(a) A∩B ⊆ A (b) A∩B ⊆ A∪B (c) A∪B ⊆ A (d) All of these

22) The set of complex number is defined as:
(a) $\{x \mid x \in \mathbb{R}\}$ (b) $\{(a, b)\ a \in A,\ b \in B\}$ (c) $\{(a, b) \mid a, b \in \mathbb{R}\}$ (d) N.O.T

23) If ω is complex root of unity and $w^n = w^2$ then n is:
(a) 1 (b) 3K, K ∈ ℕ (c) 3K + 1, K ∈ ℕ (d) 3K + 2, K ∈ ℕ

24) A sequence every term of which after first term is obtained by adding a fixed number in the preceding term is called.
(a) G.P (b) H.P (c) A.P (d) N.O.T

25) If A and B are disjoint then O (A∪B) =?
(a) O(A) . O(B) (b) O(A) + O(B) (c) O(A)-O(B) (d) N.O.T

26) Sum of the cubes of the first n natural numbers $1^3 + 2^3 + 3^3 + \ldots\ldots + n^3 =$ _____.
(a) $\frac{n(n+1)}{2}$ (b) $\frac{n(n+1)(2n+1)}{6}$ (c) $\frac{n^2(n+1)^2}{4}$ (d) n (n+1)

27) I radian is equal to:
(a) 57° 17' 45" (b) 1° (c) 0.01745° (d) 180°

28) If in triangle ABC S(S-a) = (S-b) (S-c) then ∝ =?
(a) $\overline{\wedge}$ (b) $\overline{\wedge}/_2$ (c) $\overline{\wedge}/_3$ (d) $\overline{\wedge}/_4$

29) If the middle term in expansion of $\left(\frac{a}{2}+2\right)^8$ is 1120 then a =?
(a) 2 (b) -3 (c) 1 (d) 0

30) In how many ways a cricket eleven be chosen out of 14 player's so that a particular player is included.
(a) 286 (b) 364 (c) 78 (d) N.O.T

31) The harmomic mean of $\frac{1}{x}$ and $\frac{1}{y}$ is:
(a) $\frac{x+y}{2xy}$ (b) $\frac{2(x+y)}{xy}$ (c) $\frac{2xy}{x+y}$ (d) $\frac{2}{x+y}$

32) The solution set of the system $x + y = 7$ and $x^2 - xy + y^2 = 13$ is:
(a) $\{(-4,3),(-3,-4)\}$ (b) $\{(4,3)\ (3,4)\}$
(c) $\{(4,3),(-3,-4)\}$ (d) $\{(-4,-3),(3,-4)\}$

33) If Re(z + 2) = - 1 where Z = x + iy then x = _____.
(a) -3 (b) -1 (c) 1 (d) 4

34) For what value of x is (x – 3, 3) = (-5, 3)
(a) -5 (b) -7 (c) -2 (d) -8

35) If in triangle a=300 b=120 and r=150° then its area is:
(a) 18000 (b) 6000 (c) 900 (d) 9000

36) If $i = \sqrt{-1}$ then $\frac{1+i}{i}$ =?
(a) -i (b) -1 + i (c) 1 - i (d) -1-i

37) If sum and product of the roots of quadratic equation are $\frac{b}{a}$ and $\frac{c^2}{a}$ respectively the equation is:
(a) $x^2 - b^2x + ac^2 = 0$ (b) $abx^2 - b^2x + ac^2 = 0$
(c) $abx^2 - x + ac^2 = 0$ (d) $ax^2 + bx + c = 0$

38) How many terms of series 10+8+6+..... will make a sum zero.
(a) 8 (b) 9 (c) 10 (d) 11

39) How many signals can be made with 3 flags of different colour by hosting 1 or 2 or 3 one above the other.
(a) 15 (b) 20 (c) 25 (d) 30

40) If n is a positive integer $2^{n+1} > (2n+3)$ is term for all.
(a) n ⩾ 4 (b) n ⩾ 5 (c) n ⩾ 3 (d) N.O.T

41) The sum of cube roots of -64 is?
(a) w (b) w^2 (c) 1 (d) Zero

42) Which of the following is incorrect.
(a) 60th part of 1 degree is equal to 1 minute
(b) 60th part of 1 minute is equal to 1 second
(c) An a cute angle is always less then 90°
(d) An obtus angle lies b/w 90° and 270°

43) $\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$ is named as:
(a) Law of sine (b) Laws of cosines (c) Law of tangent (d) Hero's formula

44) In G.P of negative numbers the common ratio must be.
(a) Zero (b) Positive Number (c) Negative Number (d) A.O.T

45) A complex number whose additive and multiplicative inverse are equal.
(a) i (b) -i (c) both a and b (d) N.O.T

46) The discriminant of the quadratic equation $ax^2 + bx + c = o$ is:
(a) $b^2 - 4ac$ (b) $\sqrt{4ac - b^2}$ (c) $\sqrt{b^2 + ac}$ (d) both b and c

47) If the number of elements in set A is n number of elements in P(A) = _____.
(a) n (b) 2^n (c) 3^n (d) N.O.T

48) Sin (180° + θ) sin (90° - θ) =
(a) sinθ cosθ (b) –sinθ cosθ (c) $\sin^2\theta$ (d) $\cos^2\theta$

49) A set which contains all the under consideration is called _____ set.
(a) Finite (b) Infinite (c) Universal (d) Super

50) An angle is said to be positive if rotation is:
(a) Clockwise (b) Horizontal (c) Vertical (d) Anti Clockwise

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SECTION "B"

Marks: 30

Note: Solve any SIX of the following questions. Each Question Carries 05 Marks.

Q.No.2 Verify Cx (A-B) = (CxA) – (CxB) when A = {0,1}, B = {1,2} and C = {a,b}?

Q.No.3 If $\propto$, B are the roots of $ax^2 + bx + c = 0, a \neq o$ form the equation whose roots are $\propto^3, B^3$?

Q.No.4 If in a G.P the fifth term in 9 times the third term and its second term in 6 find G.P?

Q.No.5 Obtain the simplified form the coefficient of "y" in the expansion $\left(y^2 + \frac{b^3}{y}\right)^5$

Q.No.6 A belt 24.75 meters long passes around a 1.5cm diameter pulley. As the belt makes two complete revolution in a minute how many radians does the wheel turn in one second?

Q.No.7 Solve the equation: $\sqrt{x^2 + 3x + 2} + \sqrt{x^2 + 3x + 8} = 3$

Q.No.8 prove that $1^2 + 2^2 + 3^2 + \ldots\ldots + n^2 = \frac{n(n+1)(2n+1)}{6}\ \forall\ n \in \mathbb{N}$

Q.No.9 Without tables find the value of $\sin\frac{7\pi}{12}$

Q.No.10 Solve Sin3θ – Sinθ = 0

SECTION "C"

Note: Solve any TWO of the following question: Each question (6+4=10) Marks.

Q.No.11 (a) Prove that the roots of equation are real $y^2 - 2y\left(m + \frac{1}{m}\right) + 3 = 0\ \forall\ m \in \mathbb{R}$

(b) In how many ways can party of 3 students and 2 teacher formed out of 15 students and 4 teachers?

Q.No.12 (a) A piece of plastic 1 meter long is bent to form an isosceles triangle with 95^0 as of its largest angle find the length of the sides?

(b) Find the 8^{th} term in the expansion of $\left(\frac{x}{3} - \frac{y}{3}\right)^{12}$

Q.No.13 (a) Solve the systems of equation: $\begin{matrix} 2x^2 + xy = 2 \\ x^2 + 2xy + y^2 = 1 \end{matrix}$

(b) Solve the triangle ABC, with a = 200 cm, b = 100 cm, c = 150 cm

THE END