SET – 1

MODEL PAPER – 1
S.S.C. PUBLIC EXAMINATIONS – 2021
MATHEMATICS
(English Medium)

Class : X **(Max. Marks : 100)** **Time : 2hr. 45 min.**

Instructions to students :

1. **There are four sections and 33 questions in this paper.**
2. **Answers should be written in a given answer sheets.**
3. **There is an internal choice in Section – IV**
4. **Write all the questions visible and legibly.**
5. **15 Minutes are given for reading the question paper and 2hr 30 min given for writing answers.**

Section – I

Note : 1. Answer all the Questions.

2. Each Question carries 1 mark **12 x 1 = 12 M**

1. Distance from $(\sin\theta, \cos\theta)$ to the origin is ……. ( )

   A) $\tan\theta$ B) $\sin\theta$ C) $\cos\theta$ D) 1

2. $p(x) = x^2 - 5x + 6$ then p(3) = ... ( )

   A) 1 B) 2 C) 0 D) -2

3. If α, β are zeroes of $ax^2 + bx + c$ *then* $\alpha + \beta =$ .....$(a \neq 0)$ ( )

   A) $\frac{b}{a}$ B) $-\frac{b}{a}$ C) $\frac{a}{b}$ D) $-\frac{a}{b}$

4. $\frac{2\tan 30^0}{1+\tan^2 45^0}$ ( )

   a) $\sin 60^0$ b) $\cos 60^0$ c) $\tan 30^0$ d) $\sin 30^0$

5. The 10^{th} term of the A.P. 5, 1, -3, -7, …….is …… ( )

   A) 31 B) -31 C) -35 D) 35

6. HCF (84, 120) = ... ( )

   A) 6 B) 12 C) 3 D) 1

7. The zero value of $p(x) = 3x - 2$ is ..... ( )

   A) $\frac{3}{2}$ B) $-\frac{3}{2}$ C) $\frac{2}{3}$ D) $-\frac{2}{3}$

8. Find the area of sector, whose radius is 7 cm. with the given angle : ( )

a) 60^0 b) 30^0 c) 72^0 d) 90^0

9. $1 + \cot^2\theta =$ ( )

A) $\cot^2\theta$ B) 0 C) 1 D) $\text{cosec}^2\theta$

10. The set of all natural numbers which divide 51 is ..... ( )

A) $\{3,17\}$ B) $\{1,3,17\}$ C) $\{1,3,17,51\}$ D) $\{\ \}$

11. Distance between the points (0,0) and ($\cos\alpha$, $a\sin\alpha$) is .... ( )

A) 0 units B) 1 units C) 2 units D) units

12. The slope of the line perpendicular to X – axis is .... ( )

A) 0 B) 1 C) 1/2 D) not defined

Section – II

Note : 1. Answer all the Questions.

2. Each Question carries 2 Marks. **8 x 2 = 16 M**

13. Let A = $\{a,e,i,o,u\}$ *and* $B = \{a,i,u\}$. Show that $A \cup B = A$.

14. For what value of 'p' the following pair of equations has a unique solution.

$2x + py = -5$ *and* $3x + 3y = -6$

15. If $p(x) = 5x^7 - 6x^5 + 7x - 6$, find

(i) coefficient of x^5 (ii) degree of $p(x)$

16. Which of these are arithmetic progressions and why ?

a) 2,3,5,7,8,10,15,……

b) 2,5,7,10,12,15……

17. Is getting a head complementary to getting a tail ? Give reasons.

18. Find the mode of the 5, 6, 9, 10, 6, 12, 3, 6, 11, 10, 4, 6, 7.

19. Find the midpoint of the line segment joining the points (2,7) and (12,-7).

20. A boy observed the top of an electric pole at an angle of elevation of 60^0 when the observation point is 8 meters away from the foot of the pole. Find the height of the pole.

Section – III

Note : 1. Answer all the Questions.

2. Each Question carries 4 Marks **8 x 4 = 32 M**

21. Solve $3^x = 5^{x-2}$

22. Solve the following systems of equations :

$x + y = 2.\,;\;\; 2x + 2y = 4$

23. If $A = \{0,2,4,6\}$, $B = \{3,5,7\}$ *and* $C = \{p,q,r\}$ then fill the appropriate symbol, $\in$ or $\notin$ in the blanks.

(i) 0.....A. (ii) 3.....C (iii) 4.....B (iv) 8 ..... A

24. Verify that 1 and $\frac{3}{2}$ are the roots of the equation $2x^2 - 5x + 3 = 0$

25. Check whether (5,-2), (6,4) and (7,-2) are the vertices of an isosceles triangle.

26. The marks obtained in mathematics by 30 students of Class X of a certain school are given in table below. Find the mean of the marks obtained by the students.

Marks obtained (x_i)	10	20	36	40	50	56	60	70	72	80	88	92	95
Number of student (f_i)	1	1	3	4	3	2	4	4	1	1	2	3	1

27. Give $\cot\theta = \frac{7}{8}$, then evaluate (i) $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ (ii) $\frac{(1+\sin\theta)}{\cos\theta}$

28. One card is drawn from a well – shuffled deck of 52 cards. Calculate the probability that the card will (i) be an ace, (ii) not be an ace.

Section – IV

Note : 1. Answer all the Questions.

2. Each Question carries 8 marks

3. There is an internal choice for each question **5 x 8 = 40 M**

29. List all the subsets of the following sets.

(i) C= $\{x,y,z\}$ (ii) D= $\{a,b,c,d\}$ (iii) E= $\{1,4,9,16\}$ (iv) F= $\{10,100,1000\}$

(or)

If $\log\left(\frac{x+y}{3}\right) = \frac{1}{2}(\log x + \log y)$, then find the value of $\frac{x}{y} + \frac{y}{x}$

30. If A, B and C are interior angles of a triangle ABC, then show that $\tan\left(\frac{A+B}{2}\right) = \cot\frac{C}{2}$

(or)

Show that $\frac{1-\tan^2 A}{\cot^2 A - 1} = \tan^2 A$

31. Thirty women were examined in a hospital by a doctor and their of heart beats per minute were recorded and summarised as shown. Find the mean heart beats per minute for these women, choosing a suitable method.

Number of heart beats/ minute	65-68	68-71	71-74	74-77	77-80	80-83	83-86
Number of women	2	4	3	8	7	4	2

(or)

Show that the points (1,7), (4,2), (-1,-1) and (-4,4) are the vertices of a square.

32. E and F are points on the sides PQ and PR respectively of ΔPQR. for each of the following state whether $EF \parallel QR$ or not ?

i) PE = 3.9 cm EQ = 3 cm PF = 3.6 cm and FR = 2.4 cm.

ii) PE = 4 cm QE = 4.5 cm PF = 8 cm and RF = 9 cm.

(or)

A train travels a distance of 480 km at a uniform speed. If the speed had been 8km/h less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

33. Draw the graphs of the given polynomial and find the zeroes. Justify the answers.

(i) $p(x) = x^2 - x - 12$ (ii) $p(x) = x^2 - 6x + 9$

(or)

Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.