MODEL QUESTION PAPER 2019-2020

X STD

MATHEMATICS

Time Allowed: 15 min + 2 ½ hrs **Maximum Marks: 100**

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

Note: This question paper contains four parts.

PART –I

(Marks: 14)

Note : (i) Answer all the 14 questions **14 x 1=14**

(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer

1. A={a,b,p}, B={2,3},C={p,q,r,s} then n[(A∪C)XB] is

(1). 8 (2). 20 (3). 12 (4). 16

2. When a positive integer is divided by 3, what are the possible remainders?

(1).0, 1, 2 (2)0, -1, -2 (3). 0, 1, 0 (4). 0, 0, 1

3. If 6 times the 6^{th} term of an A.P is equal to 7 times the 7^{th}term, then the 13^{th} term of the AP is

(1). 0 (2). 6 (3). 7 (4). 13

4. If the HFC of 65 and 117 is expressible in the form of 65m -117, then the value of m is

(1). 4 (2). 2 (3). 1 (4). 3

5. $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives

(1). $\frac{x^2-7x+40}{(x-5)(x+5)}$ (2). $\frac{x^2+7x+40}{(x-5)(x+5)(x-1)}$ (3). $\frac{x^2-7x+40}{(x^2-25)(x+1)}$ (4). $\frac{x^2+10}{(x^2-25)(x+1)}$

6. If the number of columns and rows are not equal in a matrix then it is said to be a

(1). Diagonal matrix (2). Rectangular matrix

(3). Square matrix (4). Identity matrix

7. Which of the following can be calculated from the given matrices $A=\begin{pmatrix}1&2\\3&4\\5&6\end{pmatrix}$ $B=\begin{pmatrix}1&2&3\\4&5&6\\7&8&9\end{pmatrix}$

(i) A^2 (ii) B^2 (iii) AB (iv) BA

(1). (i) and (ii) only (2). (ii) and (iii) only

(3). (ii) and (iv) only (4). All of these

8. When proving that a quadrilateral is a trapezium, it is necessary to show

(1) Two sides are parallel (2) Two parallel and two non-parallel sides

(3) Opposite sides are parallel (4) All sides are of equal length

9. The slope, *x*-intercept, y-intercept for the equation 3x-4y+2=0.

(1). $\frac{3}{4}, \frac{-2}{3}, \frac{1}{2}$ (2). $\frac{3}{2}, \frac{-3}{2}, \frac{-1}{2}$ (3). $\frac{1}{2}, 0, \frac{1}{2}$ (4). $\frac{-3}{2}, \frac{+2}{3}, \frac{-1}{2}$

10. $\tan\theta \operatorname{cosec}\theta^2 - \tan\theta$ is equal to

(1). $\sec\theta$ (2). $\cot^2\theta$ (3). $\sin\theta$ (4). $\cot\theta$

11. The ratio of the volume of a cylinder, a cone and a sphere if each has the same diameter and same height is

(1). 1:2:3 (2). 2:1:3 (3). 1:3:2 (4). 3:1:2

12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then r_1 $r_2$is

(1). 2 : 1 (2). 1 : 2 (3). 4: 1 (4). 1 : 4

13. If the standard deviation of x, y, z is p then the standard deviation of 3x + 5, 3y + 5, 3z + 5 is

(1). 3p + 5 (2). 3p (3). P + 5 (4). 9p + 15

14. Which of the following is not a measure of dispersion?

(1). Range (2). Standard deviation

(3). Arithmetic means (4). Variance

PART –II

(Marks: 20)

II. Answer 10 questions. (Question No. 28 is compulsory) 10 x 2=20

15.If $A = \{1,3,5\}$ and $B = \{2,3\}$ then (i) find $A\times B$ and $B\times A$(ii) Is $A\times B = B\times A$? If not why?

16.Let$X = \{1,2,3,4\}$ and$Y = \{2,4,6,8,10\}$ and R = {(1,2),(2,4),(3,6),(4,8)}. Show that R is a function and find its domain, co-domain and range?

17. Find all positive integers, when divided by 3 leaves remainder 2.

18.Write an A.P. whose first term is 20 and common difference is 8.

19. In a G.P. 729, 243, 81,... find t_7.

20. Find the values of x, y and z of $\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$

21.Determine the nature of the roots for the following quadratic equations

$15x^2+11x+2$

22.Find the LCM: x^3-27, $(x-3)^2$, x^2-9

23. The length of the tangent to a circle from a point P, which is 25cm away from the centre, is 24cm. What is the radius of the circle?

24. The radius of a spherical balloon increases from 12cm to 16cm as air being pumped into it. Find the ratio of the surface area of the balloon in the two cases

25. From the top of tree of height 13m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree ($\sqrt{3}$ = 1.732).

26. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

27.A coin is tossed thrice. What is the probability of getting two consecutive tails?

28. State Ceva's theorem.

PART –III

(Marks: 50)

III. Answer 10 questions (Question No. 42 is compulsory) 10 x 5=50

26. Let *A* = The set of all natural numbers less than 8, *B* = The set of all prime numbers less than 8, *C* = The set of even prime number. Verify that (A∩B) XC = (AXC) ∩ (BXC)

27. Let *A* = { 1,2 ,3 , 4} and *B* = {2,5,8,11,14}be two sets. Let *f*:*A*→*B* be a function given by *f(x)* = 3x-1. Represent this function

(i) By arrow diagram (ii) In a table form

(iii) As a set of ordered pairs (iv) In a graphical form

31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

32. Find the sum of: $15^2+16^2+17^2+\ldots\ldots\ldots+28^2$.

33. Solve the following system of linear equations in three variables

3x-2y+z = 2, 2x+3y-z = 5, x+y+z = 6.

34. Find the square root of: $64x^4-16x^3+17x^2-2x+1$

35. If one root of the equation $3x^2+kx+81=0$ (having real roots) is the square of the other then find *k*.

36. State and prove Angle Bisector Theorem (ABT)?

37. Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

38. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse is 200m high, find the distance between the two ships ($\sqrt{3} = 1.732$).

39. Find the sum to n terms of the series 5 + 55 + 555 + ……

40. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.

41. The time taken (in minutes) to complete a homework by 8 students in a day are given by 38, 40, 47, 44, 46, 43, 49, 53. Find the coefficient of variation.

42. Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3 respectively. They are rolled and the sum of the numbers on them is noted. Find the probability of getting each sum from 2 to 9 separately.

PART – IV

(Mark – 16)

IV. Answer both the questions: **2 x 8 = 16**

43. Construct a triangle similar to the given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$)

OR

Draw a circle of diameter 6cm from a point P, which is 8cm away from to centre. Draw two tangents PA and PB to the circle and measure their lengths.

44. Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$.

OR

Graph the quadratic equation $x^2 - 9 = 0$ and state the nature of solutions.

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MODEL QUESTION PAPER-SLOW LEARNERS (100 MARKS)
ANSWER KEY - QUESTION PAPER
MATHEMATICS –X-STANDARD
PART –I
(Marks: 14)

Note : (i) Answer all the 14 questions **14 x 1=14**
(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer

Sl. no	Answers	Options
1	12	(3)
2	0,1,2	(1)
3	0	(1)
4	2	(2)
5	X^2-7x+40/(x^2-25)(x+1)	(3)
6	Rectangular Matrix	(2)
7	(ii) and (iv) only	(3)
8	Two parallel and two non-parallel sides	(2)
9	3/4,-2/3,1/2	(1)
10	CotΘ	(4)
11	3:1:2	(4)
12	2:1	(1)
13	3P	(2)
14	Arithmetic mean	(3)

PART –II
(Marks: 20)

II. Answer 10 questions. (Question No. 28 is compulsory) **10 x 2=20**

15. AXB ≠ BXA (i.e.) (1, 2) ≠ (2, 1)
16. Domain = {1, 2, 3, 4}
    Co-domain= {2, 4, 6, 8, 10}
    Range = {2, 4, 6, 8}
17. The integers are **2, 5,8,11**.
18. The A.P are 20, 28, 36,…….
19. n =7, t7 =1.
20. x=3, y=12, z=3
21. Δ>0, Roots are real and unequal.
22. L.C.M = $(x-3)^2(x+3)$ (x^2-6x+9).
23. In a Right Angled Triangle OPA
    $PA^2=OP^2-OA^2$
    PA= 7cm.
24. Ratio of curved surface area of balloons = 9:16
25. **The height of the second tree = 35.516 cm**
26. Range =L-S
    Smallest value = 56.41
27. **P (A) = 1/4**
28. **Cave's Theorem:**

PART –III

(Marks: 50)

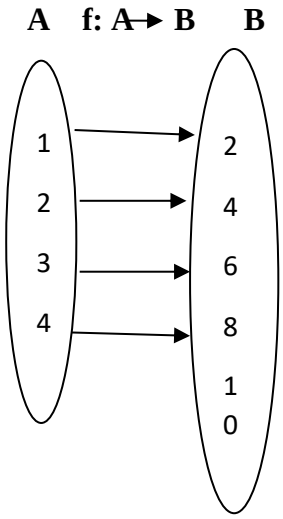
III. Answer 10 questions (Question No. 42 is compulsory) **10 x 5=5**

29. **(A∩B) XC** = ***{(2, 2), (3, 2), (5, 2)}***

(AXC) ∩ (BXC) = *{(2, 2), (3, 2), (5, 2)}*

(A∩B) XC = (AXC) ∩ (BXC), Hence verified.

30. **i) Arrow diagram**



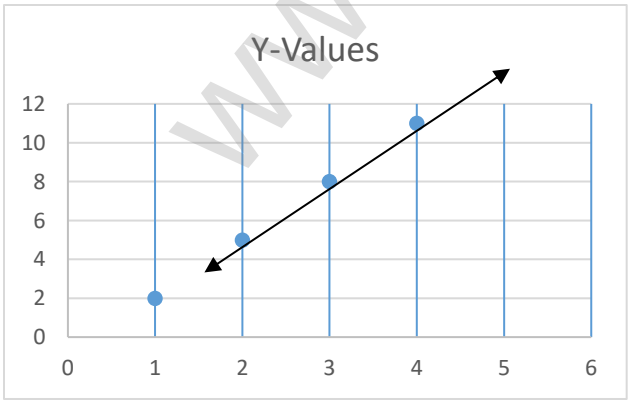
ii) **Set of ordered pair.**

f(x) = **{(1, 2), (2, 5), (3, 8), (4, 11)}**

iii) **Table**

x	**1**	**2**	**3**	**4**
f(x)	**2**	**5**	**8**	**11**

iv) **Graph**



31. **n =43,S_n=19264.**
32. $15^2+16^2+17^2+\ldots\ldots+28^2$= **6699**
33. The value of **x=1, y=2, z=3.**

34. **$64x^4-16x^3+17x^2-2x+1 = \pm (8x^2-x+1)$.**
35. The value of k= -36
36. Angle Bisector Theorem (ABT) statement with proof
37. Area of quadrilateral = **79 sq. Units**
38. The distance between two ships = **546.4m**
39. **$S_n = \frac{50(10n-1)}{81} - \frac{5n}{9}$**
40. **Total surface area of a toy= 1056 cm^2**
41. **Mean = 45; Standard Deviation =4.53; Co-efficient of variation =10.07%**
42. **i) P (A) =1/18 ii) P (B) =1/9 iii) P(C) =1/6 iv) P (D) =1/6 v) P (E) =1/6**
vi) P (E) =1/6 vii) P (E) =1/9 viii) P (E) =1/18

PART – IV
(Mark – 16)

IV. Answer both the questions: **2 x 8 = 16**

43. a) **ΔPQR is similar to a triangle $\Delta PQ'R'$**
$\Delta PQ'R'$ is the required triangle each of whose side is seven third of its corresponding sides of ΔPQR.
b) **The length of the Tangent is = 7.4 cm**.

44. a) Parabola points: Table: 1: $y = x^2 - 4$

x	-3	-2	-1	0	1	2	3	4
$y = x^2 - 4$	5	0	-3	-4	-3	0	5	12

Table 2: (straight line)

$y = x^2 + 0x - 4$
$0 = x^2 - x - 12$
$y = x + 8$

Table 2: **$y = x + 8$**

x	-1	0	1
$y = x + 8$	7	8	9

Point of intersection: (-3, 5) and (4, 12) x- coordinates =-3, 4
Solution: x= -3, 4.
Scale: x –axis 1 cm = 1 unit
y –axis 1 cm = 2 units.

b) Parabola points Table: 1; **$y = x^2 - 9$**

x	-3	-2	-1	0	1	2	3
$y = x^2 - 9$	0	-5	-8	-9	-8	-5	0

Point of intersection: (-3, 0) and (3, 0) x- coordinates =-3, 3
Solution: The parabola intersects x-axis at two distinct points hence the equation $x^2 - 9 = 0$ has real and unequal roots.
Scale: x –axis 1 cm = 1 unit
y –axis 1 cm = 2 units.