Dheeran Vidhyaalayaa Matric Hr Secondary School

BOARD EXAM MODEL QUESTION PAPER

10th Standard

MATHEMATICS

1. READ ALL THE QUESTIONS CAREFULLY AND WRITE THE ANSWER
2. THE QUESTION PAPER COMPRISES OF FOUR PARTS
3. YOU MUST ANSWER FOR THE QUESTION 29 AND 42 AS COMPUSORY

Exam Time : 03:00:00 Hrs Total Marks : 100

I. CHOOSE THE CORRECT ANSWER: 14 x 1 = 14

1) If g={(1,1), (2,3), (3,5), (4,7)} is a function givrn by g(x)=αx+β then the values of α and β are
(a) (-1,2) (b) (2,-1) (c) (-1,-2) (d) (1,2)

2) The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
(a) 2025 (b) 5220 (c) 5025 (d) 2520

3) If A = 2^{65} and B = $2^{64}+2^{63}+2^{62}+...+20$ Which of the following is true?
(a) B is 2^{64} more than A (b) A and B are equal (c) B is larger than A by 1 (d) A is larger than B by 1

4) If (x - 6) is the HCF of x^2 - 2x - 24 and x^2 - kx - 6 then the value of k is
(a) 3 (b) 5 (c) 6 (d) 8

5) For the given matrix A = $\begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is
(a) 2 x 3 (b) 3 x 2 (c) 3 x 4 (d) 4 x 3

6) The perimeters of two similar triangles△ABC and △PQR are 36 cm and 24 cm respectively. If PQ = 10 cm, then the length of AB is
(a) $6\frac{2}{3}$ (b) $\frac{10\sqrt{6}}{3}cm$ (c) $60\frac{2}{3}cm$ (d) 15cm

7) A tangent is perpendicular to the radius at the
(a) centre (b) point of contact (c) infinity (d) chord

8) The slope of the line joining (12, 3) , (4, a) is $\frac{1}{8}$ The value of 'a' is
(a) 1 (b) 4 (c) -5 (d) 2

9) (2, 1) is the point of intersection of two lines.
(a) x - y - 3 = 0; 3 x - y - 7 = 0 (b) x + y = 3; 3x + y =7 (c) 3x + y =3; x + y = 7 (d) x + 3y - 3 = 0; x - y - 7 = 0

10) If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$:1 then the angle of elevation of the sun has measure
(a) 45° (b) 30° (c) 90° (d) 60°

11) The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1$ =1:2 then $r_2:r_1$ is
(a) 1:3 (b) 1:2 (c) 2:1 (d) 3:1

12) The volume of a frustum if a cone of height L and ends -radio and r_1 and r_2 is
(a) $\frac{1}{3}\pi h1(r_1^2+r_2^2+r_1r_2)$ (b) $\frac{1}{3}\pi h(r_1^2+r_2^2-r_1r_2)$ (c) $\pi h(r_1^2+r_2^2+r_1r_2)$ (d) $\pi h(r_1^2+r_2^2-r_1r_2)$

13) If a letter is chosen at random from the English alphabets {a,b,...,z}, then the probability that the letter chosen precedes x
(a) $\frac{12}{13}$ (b) $\frac{1}{13}$ (c) $\frac{23}{26}$ (d) $\frac{3}{26}$

14) IF the probability of the non happening of a event is q, then the probability of happening of that event is
(a) 1-q (b) q (c) q/2 (d) ∝q

II. ANSWER ANY TEN OF THE FOLLOWING: 15 x 2 = 30

QUESTION NUMBER 29 IS COMPULSORY

15) Represent the function f(x)=$\sqrt{2x^2-5x+3}$ as a composition of two functions.

16) Find the least positive value of x such that

$67 + x \equiv 1 \pmod 4$

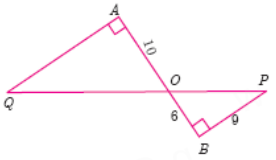
17) Find the sum of first 28 terms of an A.P whose n^{th} term is 4n-3.

18) Simplify $\frac{1}{x^2-5x+6} + \frac{1}{x^2-3x+2} - \frac{1}{x^2-8x+15}$

19) Solve $3p^2 + 2\sqrt{5}p - 5 = 0$ by formula method.

20) If $A = \begin{bmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{bmatrix}$ then Find 2A + B.

21) QAand PB are perpendiculars to AB. If AO = 10 cm, BO=6 cm and PB=9 cm. Find AQ.



22) A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?

23) Show that the given points are collinear: (-3, -4) , (7, 2) and (12, 5)

24) Check whether the given lines are parellel or perpendicular
5x + 23y + 14 = 0 and 23x − 5y + 9 = 0

25) If $\sqrt{3}$ tan θ=1, then find the value of $\sin^2\theta$-$\cos^2\theta$

26) If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area?

27) Find the maximum volume of a cone that can be carved out of a solid hemisphere of radius r units.

28) The standard deviation and mean of a data are 6.5 and 12 5 respectively. Find the coefficient of variation.

29) The marks scored by 5 students in a test for 50 marks are 20, 25, 30, 35, 40. Find the S.D for the marks. If the marks are converted for 100 marks, find the S.D. for newly obtained marks.

III. ANSWER ANY TEN OF THE FOLLOWING: 13 x 5 = 65

QUESTION NUMBER 43 IS COMPULSORY

30) If the function f: R⟶ R defined by

$$f(x) = \begin{cases} 2x+7, x < -2 \\ x^2 - 2, -2 \le x < 3 \\ 3x - 2, x \ge 3 \end{cases},$$

(i) f(4)
(ii) f(-2)
(iii) f(4)+2f(1)
(iv) $\frac{f(1)-3f(4)}{f(-3)}$

31) The product of three consecutive terms of a Geometric Progression is 343 and their sum is $\frac{91}{3}$.Find the three terms.

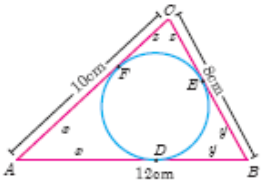
32) Find the sum of
$15^2+16^2+17^2+..+28^2$

33) A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

34) The roots of the equation $2x^2$ - 7x + 5 = 0 are α and β. Without solving for the roots, find $\frac{\alpha+2}{\beta+2} + \frac{\beta+2}{\alpha+2}$

35) Seven years ago, Varun's age was five times the square of swati's age. Three years hence Swati's age will be two fifth of Varun's age. Find their present ages.

36) A circle is inscribed in △ABC having sides 8 cm, 10 cm and 12 cm as shown in figure,Find AD, BE and CF.



37) A(-3, 0) B(10 - 2) and C(12, 3) are the vertices of ΔABC. Find the equation of the altitude through A and B.

38) A tv tower stands vertically on a bank of a canal. thw tower is watched from a point on the other bank directly opposite to it.the angel of elevation of the top of the tower is 58°. from another point 20m away from this point on the line joining this point of the tower,the angel of elevation of the top of the tower is 30°.find the height of the tower and the width of the canal.(tan58°=1.6003)

39) Seenu's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (underground tank) which is in the shape of a cuboid. The sump has dimensions 2 mx1.5 mx1 m. The overhead tank has its radius of 60 cm and height 105 cm. Find the volume of the water left in the sump after the overhead tank has been completely filled with water from the sump which has been full, initially.

40) A metallic sheet in the form of a sector of a c rcle of radius 21 cm has central angle of 216°. The sector is made into a cone by bringing the bounding radii together. Find the volume of the cone formed.

41) Marks of the students in a particular subject of a class are given below:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of students	8	12	17	14	9	7	4

Find its standard deviation.

42) A coin is tossed thrice. Find the probability of getting exactly two heads or atleast one tail or consecutive two heads.

43) 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

IV. ANSWER ALL THE QUESTIONS: 2X8=16

ANSWER ANY ONE FROM GEOMETRY AND GRAPH:

44) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x \quad 6 = 0$

45) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$

46) Draw a triangle ABC of base BC = 5.6 cm, ∠A=40^o and the bisector of ∠A meets BC at D such that CD = 4 cm

47) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.

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