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10th MATHS MODEL PAPER 1   Date : 29-Nov-19

10th Standard

Maths   Reg.No. :

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

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

PART I   14 x 1 = 14

ANSWER ALL

1) If $n(A \times B) = 6$ and $A = \{1,3\}$ then $n(B)$ is
   (a) 1   (b) 2   (c) 3   (d) 6

2) $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
   (a) linear   (b) cubic   (c) reciprocal   (d) quadratic

3) Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy
   (a) $1 < r < b$ (b) $0 < r < b$ (c) $0 \leq r < b$ (d) $0 < r \leq b$

4) The value of $(1^3+2^3+3^3+...15^3) - (1+2+3+...+15)$ is
   (a) 14400   (b) 14200   (c) 14280   (d) 14520

5) A system of three linear equations in three variables is inconsistent if their planes
   (a) intersect only at a point   (b) intersect in a line   (c) coincides with each other   (d) do not intersect

6) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{pmatrix}$ and $C = \begin{pmatrix} 0 & 1 \\ -2 & 5 \end{pmatrix}$, Which of the following

   statements are correct?

   (i) $AB + C = \begin{pmatrix} 5 & 5 \\ 5 & 5 \end{pmatrix}$

   (ii) $BC = \begin{pmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{pmatrix}$

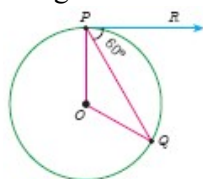   (iii) $BA + C = \begin{pmatrix} 2 & 5 \\ 3 & 0 \end{pmatrix}$

   (iv) $(AB)C = \begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$

   (a) (i) and (ii) only   (b) (ii) and (iii) only   (c) (iii) and (iv) only   (d) all of these

7) If in triangles ABC and EDF, $\dfrac{AB}{DE} = \dfrac{BC}{FD}$ then they will be similar, when
   (a) $\angle B = \angle E$ (b) $\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$

8) In figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle PQR$ is

   (a) 120° (b) $100°$ (c) $110°$ (d) $90°$

9) The area of triangle formed by the points $(-5, 0)$, $(0, -5)$ and $(5, 0)$ is
   (a) 0 sq.units   (b) 25 sq.units   (c) 5 sq.units   (d) none of these

10) $(2, 1)$ 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

11) The value of is $sin^2\theta + \frac{1}{1+tan^2\theta}$ equal to
   (a) $tan^2\theta$ (b) 1   (c) $cot^2\theta$ (d) 0

12) If $(\sin \alpha + \text{cosec } \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then the value of k is equal to
   (a) 9   (b) 7   (c) 5   (d) 3

13) The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is
   (a) 60π cm^2 (b) 68π cm^2 (c) 120π cm^2 (d) 136π cm^2

14) Which of the following is not a measure of dispersion?
   (a) Range   (b) Standard deviation   (c) Arithmetic mean   (d) Variance

$$10x \ 2 = 20$$

PART II
ANSWER ANY 10 QUESTIONS IN WHICH QUESTION NO. 28 IS COMPULSORY.

15) Find k if f o g(k) = 5 where f(k)=2k-1.

16) Let A = {0, 1, 2, 3} and B = {1, 3, 5, 7, 9} be two sets. Letf: A → B be a function given by f(x) = 2x + 1. Represent this function as a set of ordered pairs.

17) We have 34 cakes. Each box can hold 5 cakes only. How many boxes we need to pack and how many cakes are unpacked?

18) Find the least positive value of x such that
   $67 + x \equiv 1 \pmod 4$

19) Find the sum of
   2+4+6+..+80

20) The father's age is six times his son's age. Six years hence the age of father will be four times his son's age. Find the present ages (in years) of the son and father.

21) Find the value of a, b, c, d from the equation $\begin{pmatrix} a - b & 2a + c \\ 2a - b & 3c + d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$

22) Show that $\triangle$ PST~$\triangle$ PQR
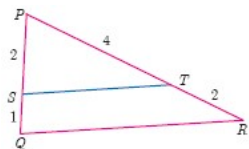
23) Find the area of the triangle whose vertices are (-3,5) , (5,6) and (5,-2)

24) prove that $\frac{sinA}{1+cosA} = \frac{1-cosA}{sinA}$

25) A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground as 60° . Find the distance between the foot of the tower and the ball.($\sqrt{3}$ =1.732)

26) A cylindrical drum has a height of 20 cm and base radius of 14 cm. Find its curved surface area and the total surface area.

27) Find the range and coefficient of range of the following data: 25, 67, 48, 53, 18, 39, 44.

28) A bag contains 5 blue balls and 4 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) blue (ii) not blue.

ANSWER ANY 10 QUESTIONS IN WHICH QUESTION NO. 42 IS COMPULSORY.

29) Let f: A $\longrightarrow$ B be a function defined by f(x) = $\frac{x}{2}$ -1, where A={2,4,6,10,12}, B={0,1,2,4,5,9}, Represent f by

(i) set of ordered pairs

(ii) a table

(iii) an arrow diagram

(iv) a graph

30) Let A ={x $\in$ W| x < 2}, B={x $\in$ N| < x ≤ 4} and C=(3,5). Verify that

A x (B $\cap$ C) = (A x B) $\cap$ (A x C)

31) Find the largest number which divides 1230 and 1926 leaving remainder 12 in each case.

32) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

33) Find the square root of $289x^4$ - $612x^3$ + $970x^2$ - 684x + 361

34) Solve for x, y : $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} + 2 \begin{bmatrix} -2x \\ -y \end{bmatrix} = \begin{bmatrix} -5 \\ 8 \end{bmatrix}$

35) A girl looks the reflection of the top of the lamp post on the mirror which is 66 m away from the foot of the lamppost. The girl whose height is 12.5 m is standing 2.5 m away from the mirror. Assuming the mirror is placed on the ground facing the sky and the girl, mirror and the lamppost are in a same line, find the height of the lamp post.

36) Let P(11, 7), Q(13.5, 4) and R(9.5, 4) be the midpoints of the sides AB, BC and AC respectively of Δ ABC. Find the coordinates of the vertices A, B and C. Hence find the area of Δ ABC and compare this with area of ΔPQR.

37) prove the following identities.

Ã $\frac{1+sin\theta}{1-sin\theta}$ = $sec\theta + tan$

38) To a man standing outside his house, the angles of elevation of the top and bottom of a window are 60° and 45° respectively. If the height of the man is 180 cm and if he is 5 m away from the wall, what is the height of the window?($\sqrt{3}$ =1.732)

39) The radius and height of a cylinder are in the ratio 5:7 and its curved surface area is 5500 sq.cm. Find its radius and height.

40) A solid consisting of a right circular cone of height 12 cm and radius 6 cm standing on a hemisphere of radius 6 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of the water displaced out of the cylinder, if the radius of the cylinder is 6 cm and height is 18 cm.
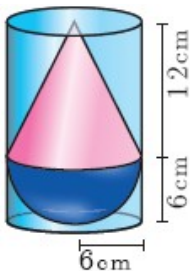

41)

A teacher asked the students to complete 60 pages of a record note book. Eight students have completed only 32, 35, 37, 30, 33, 36, 35 and 37 pages. Find the standard deviation of the pages yet to be completed by them.

42) A bag contains 12 blue balls and x red balls. If one ball is drawn at random (i) what is the probability that it will be a red ball? (ii) If 8 more red balls are put in the bag, and if the probability of drawing a red ball will be twice that of the probability in (i), then find x.

43) a) Draw a tangent to the circle from the point P having radius 3.6 cm, and centre at O. Point P is at a distance 7.2 cm from the centre.

(OR)

b) In fig. if PQ||BCandPR||CD prove that
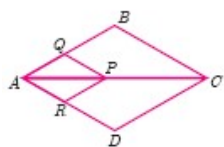
$$\frac{QB}{AQ} = \frac{DR}{AR}$$

44) a) Solve $\frac{1}{3}$ (x + y - 5) = y - z = 2x - 11 = 9 - (x + 2x)

(OR)

b) Graph the following quadratic equations and state their nature of solutions.
x^2 - 6x + 9 = 0