Ranipet District Question Paper

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FIRST REVISION TEST - 2023

STANDARD X

Time: 3.00 Hours **Mathematics** **Marks:100**

Part - I

I. Choose the correct answer: **14×1=14**

1) If $\{(a, 8), (6, b)\}$ represents an identity function, then the value of a and b are respectively.
   a) (8, 6) b) (8, 8)
   c) (6, 8) d) (6, 6)
2) $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is.
   a) Linear b) cubic
   c) reciprocal d) quadratic
3) Given $F_1 = 1$, $F_2 = 3$, and $F_n = F_{n-1} + F_{n-2}$ then F_5 is,
   a) 3 b) 5
   c) 8 d) 11
4) Which of the following should be added to make $x^4 + 64$ a perfect square,
   a) $4x^2$ b) $16x^2$
   c) $8x^2$ d) $-8x^2$
5) If the value of discriminant is $\Delta = 0$, then the nature of roots are,
   a) real and equal roots b) real and unequal roots
   c) No real roots d) None of these
6) If A is a 2×3 matrix and B is 3×4 matrix, how many columns does AB have
   a) 3 b) 4
   c) 2 d) 5
7) How many tangents can be drawn to the circle from an exterior Point?
   a) One b) two
   c) infinite d) Zero
8) The Point of intersection of $3x - y = 4$ and $x + y = 8$ is,
   a) (5, 3) b) (2, 4)
   c) (3, 5) d) (4, 4)
9) The equation of a line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$ is,
   a) $7x - 3y + 4 = 0$ b) $3x - 7y + 4 = 0$
   c) $3x + 7y = 0$ d) $7x - 3y = 0$
10) $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
   a) $\sec\theta$ b) $\cot^2\theta$
   c) $\sin\theta$ d) $\cot\theta$

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11) The total surface area of hemi - sphere is how much times the square of its radius.
a) π b) 4π
c) 3π d) 2π

12) The volume of frustum is,
a) $1/3\ \pi r^2 h$ Cu. units b) $1/3\ \pi h\ [R^2 + Rr + r^2]$ cu. units
c) $1/3\ \pi R\ [H^2 + Hr + r^2]$ cu. units d) $1/3\ \pi r\ [R^2 + hr + h^2]$ cu. units

13) Variance of first 20 natural number is
a) 32.25 b) 44.25
c) 33.25 d) 30

14) Which of the following is incorrect?
a) $P(A) > 1$ b) $0 \le P(A) \le 1$
c) $P(\phi) = 0$ d) $P(A) + P(\bar{A}) = 1$

Part - II

II. Answer any 10 Questions. [Q.No. 28 is compulsory] **10×2=20**

15) If $A = \{1, 3, 5\}$ and $B = \{2, 3\}$ then find $A \times B$ and $B \times A$.

16) Using the functions f and g given below, find fog and gof for $f(x) = x - 6$, $g(x) = x^2$.

17) Use Euclid's Division Algorithm to find the Highest Common Factor (HCF) of 867 and 255.

18) Find the sum to infinity of $9 + 3 + 1 + \ldots\ldots$

19) Find the excluded values of the expression $\dfrac{7p + 2}{8p^2 + 13p + 5}$

20) Find the slope of a line joining the given points (–6, 1) and (–3, 2)

21) Find the equation of a line which passes through (5, 7) and makes intercepts on the axes equal in magnitude but opposite in sign.

22) Prove the following identity:
$$\sqrt{\frac{1 + \sin\theta}{1 - \sin\theta}} = \sec\theta + \tan\theta$$

23) From the top of a rock $50\sqrt{3}$ high, the angle of depression of a car on the ground is observed to be 30°. Find the distance of the car from the rock.

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

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

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26) Find the standard deviation of first 21 natural numbers.

27) What is the probability that a leap year selected at random will contain 53 Saturdays.

28) If α and β are the roots of the equation $x^2 - 7x + 10 = 0$, then find the value of $\alpha^2 + \beta^2$.

[or]

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

Part - III

III. Answer any Ten Questions. Five mark questions. [Q.No. 42 is compulsory] 10×5=50

29) Let A = { 1, 2, 3, 4 } and B = { 2, 5, 8, 11, 14 } be two sets. Let $f : A \to B$ 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.

30) A funtion $f : [-5, 9] \to R$ is defined as follows.

$$f(x) = \begin{cases} 6x + 1 ; & -5 \le x < 2 \\ 5x^2 - 1 ; & 2 \le x < 6 \\ 3x - 4 ; & 6 \le x \le 9 \end{cases}$$

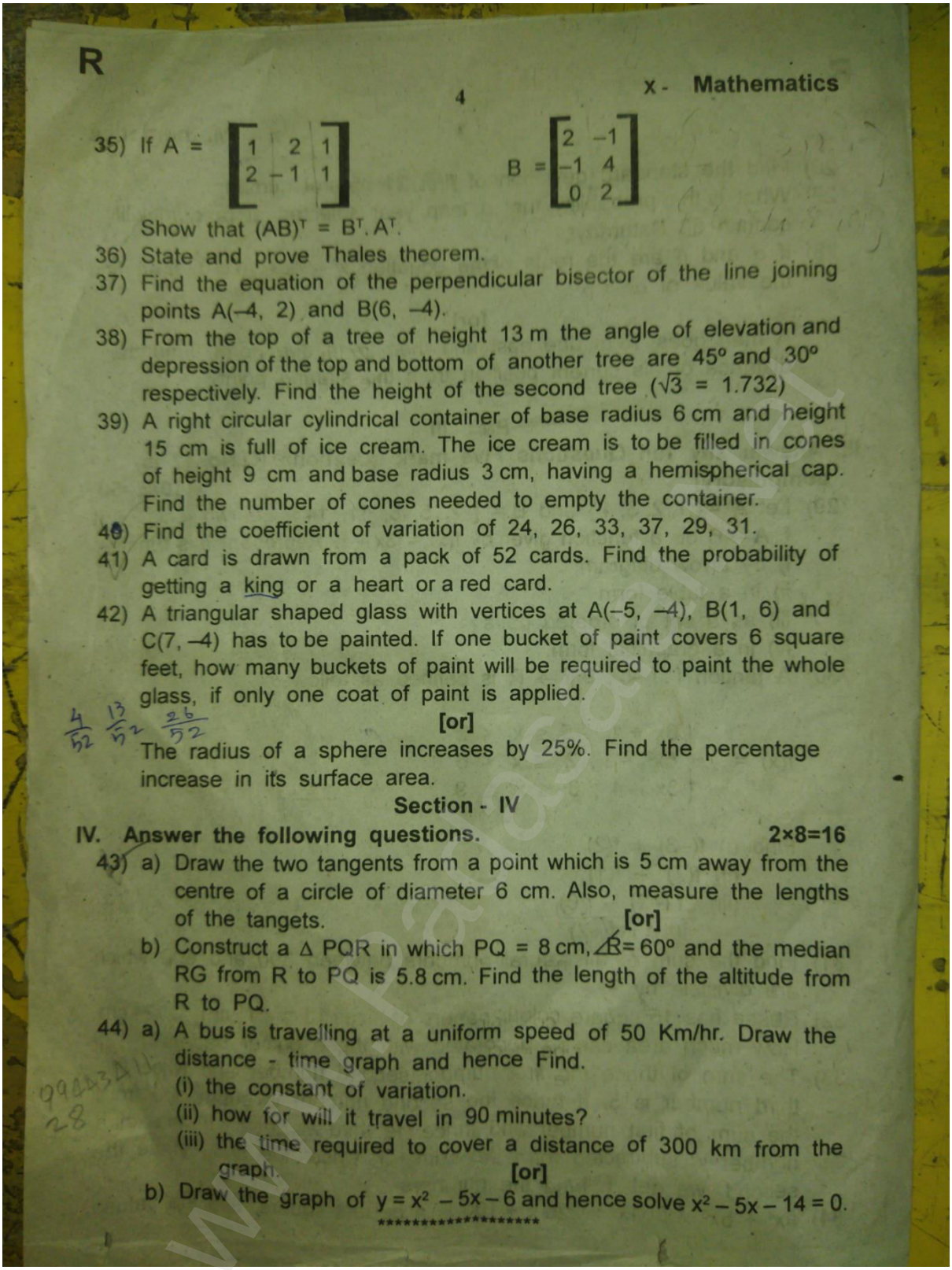
Find (i) $f(-3) + f(2)$
(ii) $f(7) - f(1)$
(iii) $\dfrac{2f(-2) - f(6)}{f(4) + f(-2)}$

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

32) Rekha has 15 square colour papers of sizes 10 cm, 11 cm, ... 24 cm. How much area can be decorated with these colour papers?

33) The sum of thrice the first number, second number and twice the third number is 5. If thrice the second number is subtracted from the sum of first number and thrice the third we get 2. If the third number is subtracted form the sum of twice the first, thrice the second, we get 1. Find the numbers.

34) $ax^4 + bx^3 + 361x^2 + 220x + 100$ is a perfect square, find the values



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35) If $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{bmatrix}$

Show that $(AB)^T = B^T . A^T$.

36) State and prove Thales theorem.

37) Find the equation of the perpendicular bisector of the line joining points A(–4, 2) and B(6, –4).

38) From the top of a tree of height 13 m 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)

39) A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.

40) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

41) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.

42) A triangular shaped glass with vertices at A(–5, –4), B(1, 6) and C(7, –4) has to be painted. If one bucket of paint covers 6 square feet, how many buckets of paint will be required to paint the whole glass, if only one coat of paint is applied.

[or]

The radius of a sphere increases by 25%. Find the percentage increase in its surface area.

Section - IV

IV. Answer the following questions. **2×8=16**

43) a) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangets.

[or]

b) Construct a Δ PQR in which PQ = 8 cm, ∠R = 60° and the median RG from R to PQ is 5.8 cm. Find the length of the altitude from R to PQ.

44) a) A bus is travelling at a uniform speed of 50 Km/hr. Draw the distance - time graph and hence Find.
(i) the constant of variation.
(ii) how for will it travel in 90 minutes?
(iii) the time required to cover a distance of 300 km from the graph.

[or]

b) Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$.

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