

Maths

This Question Paper contains 12 Printed Pages.

N-12(E)
(JULY, 2011)

| | |
|--|---|
| प्रश्न पेपरनो सेट नंबर Set No. of Question Paper | |
| 1 | 1 |

PART - A**Time : 75 minutes]****[Maximum Marks : 50****Instructions :**

- (1) There are **50** objective type questions in this part and **all** are **compulsory**.
- (2) The questions are serially numbered from **1** to **50** and each carries **1** mark.
- (3) You are supplied with separate OMR sheet with the alternatives (A) ○, (B) ○, (C) ○, (D) ○ against each question number. For each question, select the correct alternative and darken the circle ○ as ● completely with the pen against the alphabet corresponding to that alternative in the given OMR sheet.

- From the following **1** to **50** questions, select the correct alternative from the given four answers and darken the circle with pen against the alphabet, against the number in OMR sheet.
- Each question carries **1** mark.

1. makes the changes according to the need in the income tax rate .
(A) Prime minister (B) Finance minister
(C) Chief minister (D) Defence minister

2. In the formula $\bar{x} = A + \frac{\sum f_i d_i}{n} \times c$ to find the mean $d_i = \dots$
(A) $x_i - A$ (B) $x_i + A$
(C) $\frac{x_i - A}{c}$ (D) x_i

3. If the discriminant of $2x^2 + 5x - k = 0$ is 81, then the value of $k = \dots$
(A) 7 (B) -7
(C) 2 (D) 5

[Space for
Rough Work]

[Space for Rough
Work]

4. In the formula, $I = \frac{PRN}{100}$ of simple interest,
the meaning of N is
- (A) Principal (B) Time
(C) Simple interest (D) Rate of interest
5. In ΔPQR , $PQ = 8$, $QR = 6$, $PR = 9$.
 $\therefore \Delta PQR$ is triangle.
- (A) Obtuse angled (B) Acute angled
(C) Right angled (D) Equiangular
6. For $A(3, 5)$; and $B(7, 5)$; the mid point of \overline{AB}
- (A) $(5, 5)$ (B) $\left(3, \frac{5}{2}\right)$
(C) $\left(\frac{3}{2}, 5\right)$ (D) $(10, 10)$
7. In a two digit number, sum of the digits is same as the
product of the digits. Hence the number is
- (A) 10 (B) 11
(C) 22 (D) 23
8. The value of discriminant D is of the quadratic
equation $x^2 + 2x + 2 = 0$.
- (A) -4 (B) 4
(C) 12 (D) 0
9. Perimeter of ΔABC is 35 and the perimeter of ΔPQR is 28.
If $PR = 4\sqrt{10}$, then $AC = \dots\dots$, where $\Delta ABC \sim \Delta PQR$.
- (A) $5\sqrt{2}$ (B) $2\sqrt{5}$
(C) $4\sqrt{10}$ (D) $5\sqrt{10}$

10. The reduced form of $\frac{x^2 - 9}{x + 3} = \dots\dots\dots$

- (A) $x - 3$ (B) $x + 3$
 (C) $x^2 - 9$ (D) $9 - x^2$

11. $(6, -3)$ is a point in quadrant.

- (A) First (B) Second
 (C) Third (D) Fourth

12. In a correspondence $ABC \leftrightarrow RPQ$ between ΔABC & ΔPQR , the angle corresponding to $\angle B$ is

- (A) $\angle B$ (B) $\angle Q$
 (C) $\angle R$ (D) $\angle P$

13. Two digit number with unit's digit 'p' and ten's digit 'q' is

- (A) $10x + y$ (B) $10q + p$
 (C) $10y + x$ (D) $10p + q$

14. H.C.F. of $p(x) = x^2 + 1$ and $q(x) = x^2 - 1$ is

- (A) $x^2 - 1$ (B) x^2
 (C) 1 (D) $x^2 + 1$

15. Centre of a circle passing through any three distinct points A, B, C is

- (A) On perpendicular bisectors of \overline{AB} , \overline{BC} , \overline{CA} .
 (B) Centroid of ΔABC .
 (C) Orthocentre of ΔABC .
 (D) On bisectors of $\angle A$, $\angle B$, $\angle C$.

[Space for Rough Work]

[Space for Rough
Work]

16. On walking 'a' meters on the hilly way, making an angle of measure 30° with the ground, one can reach the height 'b' meters from the ground. Then
- (A) $a = 2b$ (B) $a = b$
(C) $2a = b$ (D) $2a = \sqrt{3}b$
17. Centroid of a triangle with vertices A(1, 3), B(5, 4) and C(-3, 2) is
- (A) (3, 1) (B) (1, 3)
(C) $\left(\frac{3}{2}, \frac{9}{2}\right)$ (D) $\left(\frac{9}{2}, \frac{3}{2}\right)$
18. In $\odot(O, r)$, $\widehat{AB} \cong \widehat{CD}$. If $m\angle OCD = 30^\circ$, then $m\angle AOB = \dots\dots\dots$
- (A) 30° (B) 60°
(C) 90° (D) 120°
19. In $\triangle ABC$, A-D-B and A-E-C. If $\overline{DE} \parallel \overline{BC}$ and $AB : AC = 3 : 4$, then
- (A) $AD : BD = 3 : 4$ (B) $BD : EC = 4 : 3$
(C) $EC : BD = 4 : 3$ (D) $AE : BD = 3 : 4$
20. L.C.M. of $x^2 - 1$ and $x^2 + x = \dots\dots\dots$
- (A) $x(x + 1)$ (B) $(x + 1)$
(C) $(x + 1)(x - 1)$ (D) $x(x + 1)(x - 1)$
21. Solution set of $x + 4y = 3$ and $3x - 2y = 2$ is
- (A) null set (B) $\left\{\left(1, \frac{1}{2}\right)\right\}$
(C) infinite set (D) $\left\{\left(\frac{1}{2}, 1\right)\right\}$
22. Volume of a cylinder with radius 4 cm and the same height is cu.cm.
- (A) 2π (B) 4π
(C) 18π (D) 64π

23. For $p(x) = x^3 + 2x^2 + 6x + 5$, $p(-1) = \dots\dots\dots$
 (A) 0 (B) -1
 (C) 1 (D) 2
24. In $\odot(O, 4)$, the length of chord \overline{AB} is 4, $\therefore m\angle AOB = \dots\dots\dots$
 (A) 30° (B) 60°
 (C) 90° (D) 120°
25. Simple interest on Rs. 800 for two years at 8% is Rs. $\dots\dots\dots$
 (A) 8 (B) 16
 (C) 64 (D) 128
26. $(1 - \cos \theta)(1 + \cos \theta) = \dots\dots\dots$
 (A) $\cos^2 \theta$ (B) $\operatorname{cosec}^2 \theta$
 (C) $2 - \cos^2 \theta$ (D) $\frac{1}{\operatorname{cosec}^2 \theta}$
27. 11^{th} term of an A.P, whose n^{th} term is $(37n + 41)$,
 will be $\dots\dots\dots$
 (A) 441 (B) 448
 (C) 446 (D) 450
28. The ratio of radii of two spheres is 2 : 3,
 \therefore the ratio of their volumes is $\dots\dots\dots$
 (A) 27 : 8 (B) 4 : 9
 (C) 8 : 27 (D) 9 : 4
29. From the conditions for the similarity of triangles, $\dots\dots\dots$
 is not the condition for similar triangles.
 (A) SSA (B) AAA
 (C) SSS (D) SAS

[Space for Rough Work]

[Space for Rough
Work]

30. Circumcentre of an equilateral triangle is
 (A) its centroid (B) outside the triangle
 (C) on one of the sides (D) a vertex
31. If $\tan \theta = 1$, then $\sin \theta \cdot \cos \theta = \dots\dots\dots$
 (A) 1 (B) 2
 (C) $\frac{1}{\sqrt{2}}$ (D) $\frac{1}{2}$
32. The cost price of fan is Rs. 800 cash or it can be purchased by paying Rs. 425 cash as down payment and remaining amount to be paid after two months, giving the interest of Rs. 35. So, the value of the instalment is Rs.
 (A) 405 (B) 410
 (C) 420 (D) 475
33. Curved surface area of a Sphere with radius 7 cm is sq.cm.
 (A) 308 (B) 462
 (C) 616 (D) 2464
34. If the roots of the quadratic equation are distinct and real, then
 (A) $D > 0$ (B) $D < 0$
 (C) $D = 0$ (D) $D \geq 0$
35. The roots of the quadratic equation $x^2 - x - 30 = 0$ are
 (A) (-6, 5) (B) (5, 6)
 (C) (6, -5) (D) (-5, -6)
36. In a frequency distribution, $n = 100$, $A = 15$, $\bar{x} = 15$
 $\therefore \sum f_i d_i = \dots\dots\dots$
 (A) 15 (B) 0
 (C) 100 (D) -15
37. % surcharge is to be paid by tax payee with the annual income of more than Rs. 10,00,000. (10 lacs)
 (A) 2 (B) 5
 (C) 10 (D) 20

38. In ΔABC , $a = 5$, $b = 12$, $c = 13$, \therefore Its inradius =
- (A) 6.5 (B) 6
(C) 5.5 (D) 2

[Space for Rough
Work]

39. $\frac{x}{x-3} + \frac{3}{3-x} = \dots\dots\dots$ (Simplify)

- (A) 0 (B) $\frac{x+3}{x-3}$
(C) $\frac{x-3}{x+3}$ (D) 1

40. Mean of first 10 natural numbers =

- (A) 5.5 (B) 55
(C) 27.5 (D) 30

41. Formula to find volume of Sphere is

- (A) $\frac{4}{3} \pi r^3$ (B) $4 \pi r^2$
(C) $\frac{2}{3} \pi r^3$ (D) $3 \pi r^2$

42. Approximate decimal value of $\frac{1}{\sqrt{3}} = \dots\dots\dots$

- (A) 1.73 (B) 1.41
(C) 0.58 (D) 0.20

43. H.C.F. of polynomials $p(x)$ and $q(x)$ is 1.

Hence, their L.C.M. =

- (A) $p(x) - q(x)$ (B) $\frac{p(x) \cdot q(x)}{2}$
(C) $\frac{1}{p(x) \cdot q(x)}$ (D) $\pm p(x) \cdot q(x)$

44. For Prafulaben, maximum income of Rs. is tax free.

- (A) 1,00,000 (B) 1,35,000
(C) 1,85,000 (D) 2,50,000

45. If cyclic quadrilateral is parallelogram also, then it is

- (A) Square (B) Rectangle
(C) Parallelogram (D) Rhombus

[Space for Rough
Work]

46. If $3 \sin \theta = 4 \cos \theta$, then $\tan \theta = \dots\dots\dots$

- (A) $\frac{3}{2}$ (B) $\frac{2}{3}$
(C) $\frac{4}{3}$ (D) $\frac{3}{4}$

47. is the reciprocal of additive inverse rational expression of $\frac{x-3}{2+x}$.

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

48. In $\triangle ABC$, $m\angle A + m\angle B = m\angle C$.

If $AC = 7$, $BC = 24$, then $AB = \dots$

- (A) 17 (B) 25
(C) 31 (D) 56

49. If $x = 2$ is a root of the equation $kx^2 + 3x - 4 = 0$, then the value of $k = \dots\dots\dots$

- (A) $\frac{1}{2}$ (B) 2
(C) $-\frac{1}{2}$ (D) -2

50. Mean of a data is 84. If each observation is added by 3 and then divided by 5, then the new mean =

- (A) 17.4 (B) 8.4
(C) 87 (D) 16.8

N-12(E)

PART - B

Time : 2 Hours]

[Maximum Marks : 50

Instructions :-

- (1) There are total **Four** sections in this question paper with total 17 questions.
- (2) **All** the questions are **compulsory**. Internal options are there.
- (3) Draw the figures wherever necessary. Retain all the lines of construction.
- (4) Figures in right side represents the marks of the question.

SECTION - A

With the calculation, in short, answer the following Q. No. 1 to 8.

Each question is of 2 marks.

1. The price of 1 kg. tea is seven times the price of 1 kg. sugar. If the price of 5 kg. sugar and 4 kg. tea is Rs. 660, then obtain two linear equations in two variables. 2
 2. Find H.C.F. of $p(x) = x^4 - 2x^3 - 15x^2$ and $q(x) = x^3 - 9x$. 2
 3. Find the L.C.M. of the polynomials $x^3 + 2x^2 - 3x$ and $2x^3 + 5x^2 - 3x$. 2
 4. Find the sum of first 12 terms of an Arithmetic Progression
2, 6, 10, 14, 2
- OR**
4. Find the 10th term of an Arithmetic Progression
115, 100, 85, 70, 2
 5. \overline{PM} is median in ΔPQR . If $PQ^2 + PR^2 = 148$ and $PM = 7$, then find the length of \overline{QR} . 2
 6. P is a point in the exterior of $\odot(O, 3)$ and $OP = 5$. If a line passing through P touches the circle at A, then find AP. 2

7. Prove that : 2
 $\sec^2 \theta + \operatorname{cosec}^2 \theta = \sec^2 \theta \cdot \operatorname{cosec}^2 \theta.$

OR

7. Prove that : $\frac{\sec \theta - 1}{\sec \theta + 1} = \frac{1 - \cos \theta}{1 + \cos \theta}$

8. Find the length of \overline{AB} , joining the points $A(a \cos \theta, 0)$ and $B(0, a \sin \theta)$, where $a > 0$. 2

SECTION - B

Answer the following questions from No. 9 to 12 with the calculations.

(Each question is of 3 marks)

9. Simplify : 3

$$\frac{x}{4x^2 + 6x + 2} + \frac{x}{4x^2 + 10x + 6} - \frac{2x}{4x^2 + 8x + 3}$$

OR

9. Simplify :

$$\frac{a^4 - (a-2)^2}{(a^2 + 2)^2 - a^2} + \frac{a^2 - (a^2 - 2)^2}{a^2(a+1)^2 - 4} + \frac{a^2(a-1)^2 - 4}{a^4 - (a+2)^2}$$

10. A cyclist travels a distance of 48 km. at constant speed. If the speed of the cyclist is increased by 4 km / hr, he would have taken 1 hour less. Find the original speed of the cyclist. 3

11. The cash price of a cupboard is Rs. 1500 or in an instalment scheme, it can be purchased by paying Rs. 700 cash as down payment and an instalment of Rs. 840 after six months. Calculate the rate of interest. 3

12. The shadow of a tower is 27 m., when the angle of elevation of Sun is 30° . When the angle of elevation of Sun becomes 60° , find the length of the shadow of the tower. 3

SECTION - C

Answer the following questions from No. 13 to 15, as directed, with the calculations. (Each question is of 4 marks)

13. If the mean of the following data is 113.26, find the missing frequency 'f'. 4

| | | | | | | |
|-----------|-----|-----|-----|-----|-----|-----|
| Score | 110 | 111 | 112 | 113 | 114 | 115 |
| Frequency | 4 | 6 | 15 | 30 | f | 20 |

OR

13. If the mean of the following frequency distribution is 13.84, then find the missing frequency 'f'.

| | | | | | | |
|-----------|-----|-----|------|-------|-------|-------|
| Class | 0-2 | 2-6 | 6-12 | 12-16 | 16-30 | 30-50 |
| Frequency | 3 | 5 | 12 | f | 7 | 3 |

14. If a circle touches the sides of a parallelogram, then prove that it is a Rhombus. 4
15. A solid is made of a cylinder with both conical ends. The total length of the solid is 41 cm and radius of the cylinder is 5 cm. If the height of both the cones is 12 cm., then find the total surface area of the solid. ($\pi = 3.14$) 4

SECTION - D

Answer the following questions from No. 16 to 17. (Each question is of 5 marks)

16. Prove that : "If an altitude is drawn to the hypotenuse of a right-angled triangle, then the triangles formed are similar to given triangle and also they are mutually similar." 5
- OR**
16. Prove that : "Square of the length of the hypotenuse of a right-angled triangle is the sum of the squares of the lengths of the other two sides."
17. Draw \overline{PQ} such that $PQ = 5$ cm. Construct major segment on \overline{PQ} containing the angle having the measure of 30° . Write the steps of construction. 5

Maths

SECTION - C

Answer the following questions from No. 13 to 15, as directed, with the calculations. (Each question is of 4 marks)

13. If the mean of the following data is 113.26, find the missing frequency 'f'. 4

| | | | | | | |
|-----------|-----|-----|-----|-----|-----|-----|
| Score | 110 | 111 | 112 | 113 | 114 | 115 |
| Frequency | 4 | 6 | 15 | 30 | f | 20 |

OR

13. If the mean of the following frequency distribution is 13.84, then find the missing frequency 'f'.

| | | | | | | |
|-----------|-----|-----|------|-------|-------|-------|
| Class | 0-2 | 2-6 | 6-12 | 12-16 | 16-30 | 30-50 |
| Frequency | 3 | 5 | 12 | f | 7 | 3 |

14. If a circle touches the sides of a parallelogram, then prove that it is a Rhombus. 4
15. A solid is made of a cylinder with both conical ends. The total length of the solid is 41 cm and radius of the cylinder is 5 cm. If the height of both the cones is 12 cm., then find the total surface area of the solid. ($\pi = 3.14$) 4

SECTION - D

Answer the following questions from No. 16 to 17. (Each question is of 5 marks)

16. Prove that : "If an altitude is drawn to the hypotenuse of a right-angled triangle, then the triangles formed are similar to given triangle and also they are mutually similar." 5

OR

16. Prove that : "Square of the length of the hypotenuse of a right-angled triangle is the sum of the squares of the lengths of the other two sides."
17. Draw \overline{PQ} such that $PQ = 5$ cm. Construct major segment on \overline{PQ} containing the angle having the measure of 30° . Write the steps of construction. 5

SECTION - C

Answer the following questions from No. 13 to 15, as directed, with the calculations. (Each question is of 4 marks)

13. If the mean of the following data is 113.26, find the missing frequency 'f'. 4

| | | | | | | |
|-----------|-----|-----|-----|-----|-----|-----|
| Score | 110 | 111 | 112 | 113 | 114 | 115 |
| Frequency | 4 | 6 | 15 | 30 | f | 20 |

OR

13. If the mean of the following frequency distribution is 13.84, then find the missing frequency 'f'.

| | | | | | | |
|-----------|-----|-----|------|-------|-------|-------|
| Class | 0-2 | 2-6 | 6-12 | 12-16 | 16-30 | 30-50 |
| Frequency | 3 | 5 | 12 | f | 7 | 3 |

14. If a circle touches the sides of a parallelogram, then prove that it is a Rhombus. 4
15. A solid is made of a cylinder with both conical ends. The total length of the solid is 41 cm and radius of the cylinder is 5 cm. If the height of both the cones is 12 cm., then find the total surface area of the solid. ($\pi = 3.14$) 4

SECTION - D

Answer the following questions from No. 16 to 17. (Each question is of 5 marks)

16. Prove that : "If an altitude is drawn to the hypotenuse of a right-angled triangle, then the triangles formed are similar to given triangle and also they are mutually similar." 5
- OR**
16. Prove that : "Square of the length of the hypotenuse of a right-angled triangle is the sum of the squares of the lengths of the other two sides."
17. Draw \overline{PQ} such that $PQ = 5$ cm. Construct major segment on \overline{PQ} containing the angle having the measure of 30° . Write the steps of construction. 5