This Question Paper contains 12 Printed Pages.

N-12(E)

(MARCH, 2011)

Set No. Of Question Paper	
0	5

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.

[Space for Rough Work]

1. On walking 'a' metres on the hilly way, making an angle of 30° with the ground, one can reach the height 'b' metres from the ground. Then .....

(A) $a = b$ (B) $2a = b$

(C) $2a = \sqrt{3}\, b$ (D) $a = 2b$

2. Formula to find the curved surface area of Sphere is .....

(A) $\pi r^2 h$ (B) $4\pi r^2$

(C) $3\pi r^2$ (D) $2\pi r^2$

3. The angle of elevation of the top of the building from a point A on the ground is 45°. If the distance of the building from the point A is x and the height of the building is y, then .....

(A) $x = y$ (B) $x < y$

(C) $x > y$ (D) $x = 2y$

4. If $n = 100$, $\Sigma f_i d_i = 0$ and $A = 15$,
then the value of mean $\bar{x}$ = ...

(A) 100 (B) 115
(C) 15 (D) 11.5

5. If $n = 50$, $A = 20$ and mean $\bar{x} = 19.7$,
then the value of $\Sigma f_i d_i$ = ...

(A) 35 (B) (– 35)
(C) 15 (D) (– 15)

6. $n = 100$, $A = 12$, $\bar{x} = 12$, $\therefore \Sigma f_i d_i$ = ...

(A) 12 (B) 0
(C) 100 (D) (– 12)

7. $\bar{x} = \bar{y} + 3$, $\therefore \bar{y} = \bar{x} +$ .....

(A) 0 (B) 3
(C) (– 3) (D) 6

8. Under section 80 C, investment in ..... upto fixed limit is exempted in income tax.

(A) PPF (B) Bank FD
(C) Shares (D) Mediclaim

9. Under section ..... of income tax, mediclaim premium is exempted.

(A) 80 C (B) 88 C
(C) 80 D (D) 88 D

10. Senior citizen has invested Rs. 90,000 annually, under section 80 C. He will get the exemption of Rs. ..... from his income.

(A) 1,00,000 (B) 1,85,000
(C) 1,50,000 (D) 90,000

11. For A(4, 3) and B(8, 9); the mid point of $\overline{AB}$ = ...

(A) $\left(2, \frac{3}{2}\right)$ (B) $\left(4, \frac{9}{2}\right)$

(C) (6, 6) (D) (2, 3)

12. The distance between origin and point (x, y) is .....

(A) x (B) y

(C) $x + y$ (D) $\sqrt{x^2 + y^2}$

13. The centroid of a triangle with vertices A(3, 2), B(7, 5) and C(2, 2) is .....

(A) (3, 4) (B) (4, 3)

(C) $\left(\frac{7}{2}, \frac{5}{2}\right)$ (D) $\left(6, \frac{9}{2}\right)$

14. Sum of the ages of five persons, five years ago, was 50 years. The sum of the ages of the same persons will be ..... years after five years.

(A) 100 (B) 75

(C) 60 (D) 80

15. In a two digit number, number at unit's place is 'p' and number at ten's place is 'r'. The two digit number is .....

(A) $10x + y$ (B) $10p + r$

(C) $10r + p$ (D) $10y + x$

16. Solution set of $x + y - 1 = 0$ and $2x + 2y = 2$ is .....

(A) {(1, 0)} (B) {(0, 1)}

(C) Null set (D) Infinite set

[Space for Rough Work]

17. $\Delta ABC \sim \Delta PQR$. Perimetre of ΔABC is 35 and that of ΔPQR is 28. If $PR = 4\sqrt{10}$, then $AC =$ .....

(A) $5\sqrt{2}$ (B) $5\sqrt{10}$

(C) $2\sqrt{5}$ (D) $4\sqrt{10}$

18. Length of a diagonal of a Square is 10. Its area = ...

(A) 100 (B) $5\sqrt{2}$

(C) 50 (D) 25

19. In ΔABC, $m\angle B = 90°$. $\overline{BM}$ is an altitude on hypotenuse $\overline{AC}$. AM = 16, AC = 25, $\therefore$ BM = ...

(A) 12 (B) 20

(C) $\sqrt{41}$ (D) 9

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

(A) $\angle P$ (B) $\angle Q$

(C) $\angle R$ (D) $\angle B$

21. Bisector of $\angle P$ intersects $\overline{RQ}$ in S in ΔPQR. QS : RS = 4 : 5. If PQ = 4, then PR = ...

(A) 4 (B) 5

(C) 9 (D) 10

22. $\Delta PQR \sim \Delta XYZ$ and PQ : QR : PR = 3 : 5 : 7. If the perimeter of ΔXYZ is 22.5, then YZ = ...

(A) 4.5 (B) 7.5

(C) 10.5 (D) 15

23. In ΔABC and ΔPQR, $m\angle A = m\angle R$ and $\angle B \cong \angle Q$. The correspondence ..... is similarity between them.

(A) ABC $\leftrightarrow$ PQR (B) ABC $\leftrightarrow$ QRP

(C) ABC $\leftrightarrow$ RQP (D) ABC $\leftrightarrow$ RPQ

24. $(1 - \cos\theta)\ (1 + \cos\theta) =$ .....

(A) $\text{cosec}^2\theta$ (B) $\cos^2\theta$

(C) $2 - \cos^2\theta$ (D) $\frac{1}{\text{cosec}^2\theta}$

25. If $7\cos^2\theta + 3\sin^2\theta = 4$, then $\tan\theta =$ .....

(A) 7 (B) $\frac{7}{3}$

(C) 3 (D) $\sqrt{3}$

26. $\sin^2 60° - \tan 45° + \cos^2 30° - \cot 90° =$ .....

(A) 1 (B) 2

(C) $\frac{1}{2}$ (D) 3

27. Formula to find total surface area of Rs. 5 coin is .....

(A) $\pi r^2 h$ (B) $\pi r\ (r + h)$

(C) $2\pi r\ (r + h)$ (D) $\pi r l$

28. The radius of a Sphere is ..... cm, if its curved surface area is 616 sq. cm.

(A) 6 (B) 7

(C) 8 (D) 5

29. Volume of a Sphere with radius 1.5 cm is ..... cu.cm.

(A) 4.5 π (B) 5 π

(C) 5.5 π (D) 4 π

30. Sum of first n natural numbers = ...

(A) $\frac{n}{2}$ (B) $\frac{n+1}{2}$

(C) $\frac{n(n+1)}{2}$ (D) $\frac{n-1}{2}$

31. While purchasing in instalment scheme, the formula to find simple interest = ...

(A) $I = \frac{PRN}{100}$ (B) $I = \frac{PR^2N}{100}$

(C) $I = \frac{P^2RN}{100}$ (D) $I = \frac{PRN^2}{100}$

32. Simple interest on Rs. 500 at 10% is ..... for two years.

(A) Rs. 100 (B) Rs. 110

(C) Rs. 120 (D) Rs. 10

33. If $\frac{(3x-3)^2}{(1-x)^2} = m$, then m = ...

(A) 3 (B) (– 3)

(C) 9 (D) (– 9)

34. α = ... is a solution of quadratic equation $x^2 + 7x + 12 = 0$.

(A) 7 (B) 4

(C) (– 3) (D) 3

35. Value of discriminant D is ..... for the quadratic equation $5x^2 - 6x + 1 = 0$.

(A) 16 (B) 56

(C) $\sqrt{56}$ (D) 4

36. If one of the roots of the equation $kx^2 + 3x - 4 = 0$ is $x = 2$, then the value of k = ...

(A) $\frac{1}{2}$ (B) $\left(-\frac{1}{2}\right)$

(C) 2 (D) (– 2)

37. Any angle inscribed in a semi-circle is of measure .....

(A) 30° (B) 90°

(C) 120° (D) 60°

38. If ⊙(P, 5) and ⊙(Q, 4) touch each other externally, then PQ = ...

(A) 5 (B) 9

(C) 1 (D) 7

39. If cyclic quadrilatic is a parallelogram, then it is .....

(A) Rhombus (B) Rectangle

(C) Square (D) Trapezium

40. If ⊙(P, 5) and ⊙(Q, r) are congruent circles, then .....

(A) $r = 5$, $P \neq Q$ (B) $r = 5$, $P = Q$

(C) $r \neq 5$, $P = Q$ (D) $r \neq 5$, $P \neq Q$

41. If ⊙(P, 3) and ⊙(Q, r) are concentric circles, then .....

(A) $P = Q$, $r = 3$ (B) $P \neq Q$, $r = 3$

(C) $P \neq Q$, $r \neq 3$ (D) $P = Q$, $r \neq 3$

42. Intersection set of all the radii of a Circle is .....

(A) ϕ (B) {Centre of circle}

(C) Circle (D) Interior of circle

43. The length of semi-circular arc of ⊙(O, 5) is .....

(A) 2π (B) π

(C) 5π (D) 10π

44. $p(x) = -x^2$ and $q(x) = x^3$. Their $h(x)$ = ...

(A) x^3 (B) $(-x^2)$

(C) x^6 (D) $(-x^5)$

45. If $p(x) = 12(x-1)$ and $q(x) = 17(x+1)$, then $h(x)$ = ...

(A) 1 (B) $x-1$

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

46. From the following, ... is not a polynomial in x.

(A) $\sqrt{x}-5$ (B) $3x^2-\sqrt{5}$

(C) $\frac{3}{2}x^2-x-2$ (D) $5x^2-x+1$

47. From the following, ... is rational expression, but not a polynomial.

(A) $\frac{x-5}{x-3}$ (B) $\frac{x^2-9}{x-3}$

(C) $\frac{x^3-8}{x^2+2x+4}$ (D) $\frac{x-3}{3-x}$

48. If $\frac{a-1}{p(a)} = \frac{a^2+a+1}{a^3-1}$, then $p(a)$ = ...

(A) 1 (B) a^2-1

(C) $a+1$ (D) $(a-1)^2$

49. Remainder is ....., when $x^{31}+1$ is divided by $x-1$.

(A) 3 (B) 2

(C) 4 (D) 1

50. 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)

N-12(E)

(MARCH, 2011)

PART - B

Time : 2 Hours] ***[Maximum Marks : 50***

Instructions :-

(1) There are **four** sections in this part of the question paper and total **1** to **17** questions are there.
(2) **All** the questions are **compulsory.** Internal options are given.
(3) Draw figures wherever required. Retain all the lines of construction.
(4) The numbers at right side represent the marks of the question.

SECTION - A

*Answer the following questions from **1** to **8** in short.*

*Each question carries **2** marks.*

1. Find the solution set of the following pair of linear equations. **2**

$2x + y = 35$ ..... (1)

$3x + 4y = 65$ ..... (2)

2. Find the discriminant of the quadratic equation $x^2 + 5x + 1 = 0$. **2**

3. Find the sum of first 11 terms of an Arithmetic Progression 2, 9, 16, 23, ... **2**

OR

3. Find the 60th term of an Arithmetic Progression 10, 20, 30, 40, ...

4. The cash price of a bicycle is Rs. 1,000. In instalment scheme, cash down payment is of Rs. 450 and two monthly instalments of Rs. 300 each. Find the rate of interest charged in the instalment scheme. **2**

5. The cost price of a wrist-watch is Rs. 800. It can be purchased by paying Rs. 425 as cash down payment and the remaining amount to be paid after two months, giving interest of Rs. 35. Find the value of the instalment. **2**

6. $\Delta PQR \sim \Delta MNO$. PQ = 8, MN = 6 in ΔPQR and ΔMNO respectively. If the area of ΔPQR is 72 unit, then find the area of ΔMNO. **2**

7. Using trigonometric identities, prove that **2**

$\sec^2\theta + \text{cosec}^2\theta = \sec^2\theta \cdot \text{cosec}^2\theta$

OR

7. Prove that $\tan 5° \cdot \tan 25° \cdot \tan 45° \cdot \tan 65° \cdot \tan 85° = 1$

8. Find the distance betwen the points (7, 5) and (2, 5). **2**

SECTION - B

*Answer the following questions from No. **9** to **12** with calculations.*
*(Each question is of **3** marks)*

9. Find H.C.F. and L.C.M. of the polynomials $p(x) = x^3 - 8$, $q(x) = x^3 + 8$ and $r(x) = x^4 + 4x^2 + 16$. **3**

10. Simplify : **3**

$$\frac{x+4}{x^2+2x-8} + \frac{x-4}{x^2-2x-8} + \frac{2x}{4-x^2}.$$

OR

10. Simplify :

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

11. While selling a Calculator for Rs. 56, the profit in percentage is equal to its cost price in rupees. Find the cost price of the Calculator. **3**

12. A flag-staff of height h stands on the top of the tower. If the angles of elevation of the top and bottom of the flag-staff are respectively α and β from a point on the ground, prove that the height of the tower is **3**

$\frac{h\tan\beta}{\tan\alpha - \tan\beta}$, where $\alpha > \beta$.

SECTION - C

*Solve the following questions from No. **13** to **15**, as per the instruction.*
*(Each carries **4** marks)*

13. Find the missing frequency for the following frequency distribution, if its Mean is 43.75. **4**

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	8	4	20	45	64	32	*f*	8	2	2

14. 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. **4**

15. Find the curved surface area of a Sphere, whose diametre is 10 cm. ($\pi = 3.14$) **4**

OR

15. How many litres of water can be stored in cylindrical tank with radius 1.4 m and height 4 m ?

SECTION -D

*Solve the following questions from No. **16** to **17**. (Each carries **5** marks)*

16. Prove that "Angles in a segment corresponding to minor arc are congruent". **5**

OR

16. Prove that "Angle made by a chord with tangent at one end point of the chord and the angle subtended by the chord in the alternate segment are congruent".

17. Using the centre of a Circle, draw a tangent to the circle through a point in the exterior of circle. How many such tangents are drawn ? Here, radius = 3 cm and the distance of the point, in the exterior of their circle, from the centre is 7 cm. **5**
