Sl.No. 20642

12 (E)

(MARCH, 2020)
(Old Course)

Time : 3 Hours]   *[Maximum Marks : 80*

Instructions :

  1)   Write in a clear legible handwriting.

  2)   This question paper has four Sections A, B, C & D and Question Numbers from 1 to 39.

  3)   All questions are compulsory. There are only internal options.

  4)   The numbers to the right represent the marks of the question.

  5)   Draw neat diagrams wherever necessary.

  6)   New sections should be written in a new page. Write the answers in numerical order.

SECTION - A

■   Answer the following as per instruction (Q.1 to Q.16) (each question-1 mark).   [16]

■   Write true or false.

  1)   The sum of the zero of $3x^2 + 5x - 2$ is $\dfrac{3}{5}$.

  2)   If D = 0 then roots are real and equal.

3) 1, 1, 2, 3, 5, 8, 13, 21, 34, ... is an Arithmetic Progression.

4) Sin 90° = 1.

■ **Choose the correct option from the following:**

5) Find Σf_i from following.

Class	5-10	10-15	15-20	20-25	25-30
Frequency	2	4	3	5	1

(A) 15   (B) 10

(C) 5   (D) 1

6) Probability of certain event is _____.

(A) 0   (B) 0.5

(C) 0.7   (D) 1

7) If $P(A) = 0.45$ then $P(\overline{A}) = $_____.

(A) 0

(B) 0.45

(C) 0.55

(D) 1

8) The solution set of $2x + 4y = 8$ and $x + 2y = 4$ is _____.

(A) $\{(2, 1)\}$

(B) Infinite set

(C) Empty set

(D) $\{(0, 0)\}$

■ Fill in the blanks:

9) If in two digit number the digit at unit place is x and the digit at tens place is 6 then the number is _____.

10) If A (3, 7) and B (5, 3) are given points then _____ is the mid point of $\overline{AB}$.

11) $\csc^2\theta - \cot^2\theta = $ _____.

12) A tangent from P a point in the exterior of a circle touches the circle at Q. If OP = 5, PQ = 3 then diameter of circle is _____.

■ **Answer in one word, one sentence or in one number.**

13) Length of an arc of a circle having radii "r" and angle subtended by arc at the centre of measure θ is _____.

14) If the diameter of sphere is 2 cm, then what is the volume of sphere?

15) A card is selected at random from well shuffled pack of 52 cards. Find the probability that the selected card is a face card.

16) What is the probability of the event "The Sun rises in west."?

SECTION - B

■ **Solve the following (Q.17 to Q.26) (each question-2 marks).** [20]

17) Find the G.C.D. of 115 and 25 by using Euclid algorithm.

18) Find the square root of $6 + 4\sqrt{2}$.

19) Find the sum of the zeros and the product of zeros of the quadratic polynomial $p(x) = 3x^2 - x - 4$.

20) Solve the following by cross multiplication method.

$$3x + y = 5, \ 5x + 3y = 3$$

OR

20) Solve by elimination method.

$$9x - 4y = 14 \text{ and } 7x - 3y = 11$$

21) If $\cos A = \dfrac{4}{5}$ find the value of sin A and tan A.

22) Evaluate $\dfrac{\cos(90° - \theta) \times \sin(90° - \theta)}{\tan(90° - \theta)}$.

OR

22) Prove that : $\sin^2 \theta + \dfrac{1}{1 + \tan^2 \theta} = 1$.

23) A line passing through the centre O of the circle intersects tangent of circle in Q. P is the point of contact of the tangent. If radius of circle is 5 and OQ = 13 find PQ.

OR

23) Radii of two concentric circles are 41 and 9, a chord of the circle with longer radius touches the circle with smaller radius. Find the length of the chord.

24) For some data if Z = 20 and $\overline{X} = 20$ find Median of data.

25) In $\triangle$XYZ the bisector of $\angle Y$ intersect $\overline{ZX}$ in P. If XY : YZ = 2 : 3 and XP = 3.8 find PZ and ZX.

26) Find discriminant of $x^2 + 2x + 4 = 0$.

OR

26) If one of the roots of $kx^2 - 7x + 3 = 0$ is 3 then find k.

SECTION - C

■ **Solve the following sums in details (Q.27 to Q.34) (each question-3 marks).** **[24]**

27) The product of two polynomials is $2x^3 + 3x^2 - 1$ and one of the polynomial is $x^2 + 2x + 1$. Find the other polynomial.

28) Find the roots using quadratic formula, $(x + 2)(x + 3) = 240$.

29) The first term of finite A.P. is 5 the last term is 45 and the sum is 500. Find the number of terms.

OR

29) In an A.P. $T_3 = 8$, $T_{10} = T_6 + 20$ find A.P.

30) Find the Area of ΔABC whose vertices are A (4, 2), B (3, 9) and C (10, 10).

31) Find the Mean.

Class	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	5	10	20	9	6	2

OR

31) Find Median of

Class	4-8	8-12	12-16	16-20	20-24	24-28
Frequency	9	16	12	7	15	1

32) A circle touches all the four sides of □ABCD. Prove that AB + CD = AD + BC.

33) The cost of ploughing a circular field at the rate of Rs. 0.75 per m^2 is Rs. 4158. Find the cost of fencing the field at the rate of Rs. 30 per metre.

34) The cost of painting the surface of sphere is Rs. 1526 at the rate of Rs. 6 per m². Find the radius of sphere. ($\pi = 3.14$)

OR

34) A cylinder of radius 2 cm and height 10 cm is melted into small spherical ball of diameter 1 cm. Find the number of such ball.

SECTION - D

■ **Solve the following in details (Q.35 to Q.39) (each question-4 marks).** **[20]**

35) Construct a line segment and divide it in the ratio 3:5. Write steps of construction also.

OR

35) Draw $\odot(0,4)$, construct a pair of tangent from A where OA = 10 units. Write steps of construction.

36) The difference between two natural numbers is 6, adding 10 to twice of the larger number we get 2 less than 3 times of the smaller number. Find these numbers.

37) The angle of elevation of the top of the tower from two points at a distance "a" and "b" metres from the base and in the same straight line with it are complementary. Prove that the height of the tower is $\sqrt{ab}$ metres.

38) In the figure given below ABCD is a square with its sides having length 8 cm. Find the area of the coloured region. ($\pi = 3.14$)
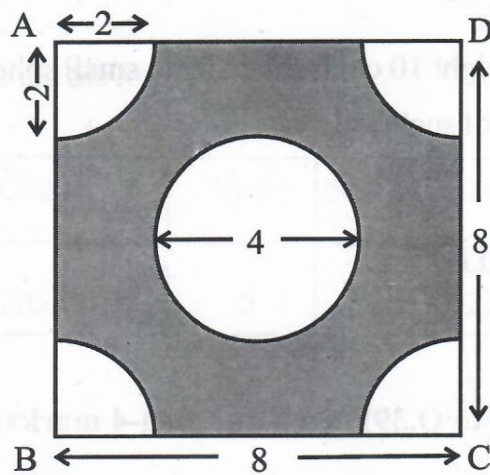
39) Prove that if $BC^2 = AB^2 + AC^2$ in $\triangle ABC$, then $\angle A$ is a right angle.

OR

39) Prove that Areas of two similar acute angled triangles are proportional to squares of corresponding sides.

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