

*This Question Paper contains 12 printed pages.
(Section - A, B, C & D)*

Sl.No.

12 (E)

(MAY, 2021)
(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 53.
- 3) The numbers to the right represent the marks of the question.
- 4) Draw neat diagrams wherever necessary. Take perfect measurement for construction.
- 5) New sections should be written in a new page. Write the answers in numerical order.
- 6) Use of calculator is not permitted.

SECTION - A

- Answer the following as per the given instructions (Questions 1 to 24) (Each carries 1 mark). [24]

- Answer true or false (Questions 1 to 4):

1) $\sqrt{5}$ is an irrational number. [1]

2) $p(x) = 5x^2 + 8x + 3$ has degree of the polynomial as 3. [1]

3) If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, then the equations are consistent. [1]

4) If $D < 0$ then the roots of a quadratic equation are real and equal. [1]

■ Select the appropriate answer and fill up the blanks (Questions 5 to 10).

5) g.c.d. (120, 23) = _____. [1]
(0, 1, 23, 120)

6) If $2x + 3y = 7$ and $3x + 2y = 3$ then $x - y =$ _____. [1]
(4, -4, 2, -2)

7) The Discriminant of the equation $\sqrt{3}x^2 + 2x - \sqrt{3} = 0$ is _____. [1]
(4, 12, 16, 20)

8) Name of the sequence 1, 1, 2, 3, 5, 8, 13, 21, 34 is _____. [1]
(Fibonacci sequence, Parallel sequence, Finite sequence, None of the above)

9) $ABC \leftrightarrow QRP$ is a similarity in $\triangle ABC$ and $\triangle PQR$, $m\angle A = 50$ and $m\angle C = 70$
then $m\angle R =$ _____. [1]
(50, 60, 70, 80)

10) The distance of $A(x, y)$ from origin is _____. [1]
 $(x^2 + y^2, |x - y|, |x + y|, \sqrt{x^2 + y^2})$

■ Answer the following in one sentence, one word or in figure (Questions 11 to 16).

11) Who gave the general formula to solve quadratic equations? [1]

12) If in an AP, $T_{25} - T_{20} = 15$ then find the common difference d . [1]

13) Areas of two similar triangles are 25 and 16. Find the ratio of the perimeters of the triangles. [1]

14) If $\tan 5\theta \cdot \tan 4\theta = 1$, θ is _____. [1]

15) Define secant of a circle. [1]

16) In $\triangle ABC$, $AB = 3$, $BC = 4$, $AC = 5$, then radius of the circle touching all the three sides is _____. [1]

■ Select the most appropriate answer from the given alternatives. (Questions 17 to 22):

17) If θ is the measure of an acute angle and $\sqrt{3} \sin \theta = \cos \theta$, then θ is _____. [1]

(A) 30

(B) 45

(C) 60

(D) 90

18) Mention the angle subtended by the minute hand of a clock on the circular dial between 10:30 and 10:37 hours. [1]

(A) 28

(B) 35

(C) 42

(D) 49

19) The perimeter of a semicircle with diameter 2 cm is _____ cm. [1]

(A) $2 + \pi$

(B) π

(C) $3 + \pi$

(D) $\frac{\pi}{2}$

20) The formula to find the median M is _____. [1]

(A) $\frac{z + 2\bar{x}}{3} = M$

(B) $\frac{z - 2\bar{x}}{3} = M$

(C) $\frac{2z - \bar{x}}{3} = M$

(D) $\frac{2z - 2\bar{x}}{3} = M$

21) The probability of having 8 days in a week is _____. [1]

(A) 0

(B) 1

(C) 2

(D) 3

22) The diameter of the base of a cone is 10 cm and slant height is 5 cm.
Then the area of the base is _____ cm². [1]

(A) 5π

(B) 10π

(C) 25π

(D) 35π

■ Match the following: (Questions 23 to 24)

23)

Part - A		Part - B	
1	T_n	(a)	$a + nd - d$
		(b)	$a - nd - d$

[1]

24)

Part - A		Part - B	
1	Mode	(a)	$l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times C$
		(b)	$l + \left(\frac{f_1 - f_0}{f_1 - f_0 - 2f_2} \right) \times C$

[1]

SECTION - B

■ Answer the following (Any 9) (Questions 25 to 36) (Each carries 2 marks). [18]

25) Find g.c.d. (144, 610) using Euclid's algorithm and find l.c.m. (144, 610) using the relation $ab = \text{g.c.d.}(a, b) \times \text{l.c.m.}(a, b)$. [2]

26) i) $\frac{18}{5^3}$ has _____ digits after decimal points.

ii) If p, q, r are distinct primes, their l.c.m. is _____.

[2]

27) Find the zeros of the quadratic polynomial $p(x) = x^2 - 5x - 6$. [2]

28) Find the sum of the given A.P. [2]

$$25 + 21 + 17 + 13 + \dots + (-51)$$

29) Is 0 a term of A.P. 200, 196, 192, ..., -200? If yes, what is its order? [2]

30) Find the value of [2]

$$\frac{5\sin^2 30^\circ + \sin^2 45^\circ - 4\tan^2 30^\circ}{2\sin 30^\circ \cos 30^\circ + \cot 45^\circ}$$

31) Radii of two concentric circles are 41 and 9. A chord of the circle with larger radius touches the circle with smaller radius. Find the length of the chord. [2]

32) P is in the exterior of a circle at distance 34 from the centre O. A line through P touches the circle at Q. PQ = 16, find the diameter of the circle. [2]

33) Draw the figures for the intersection of a line and circle in the same plane [2]

Case i) $l \cap S = \emptyset$

ii) $l \cap S = \{p\}$

Where S is the set of points on the circle and l is the line.

34) How many maximum litres of petrol can be contained in a cylindrical tank with hemispherical ends having radius 0.42 m and total height 3.84 m? [2]

35) A survey regarding the weights (in kg) of 45 students of class X of a school was conducted and the following data was obtained. Find the median of this data. [2]

Weight (in kg)	20-25	25-30	30-35	35-40	40-45	45-50	50-55
Number of students	2	5	8	10	7	10	3

36) A card is selected at random from well-shuffled pack of 52 cards. Find the probability that the selected card is [2]

i) a face card

ii) of diamond

iii) not an ace

iv) is an ace of black colour

SECTION - C

■ Answer any six questions with calculations (Questions 37 to 45) (Each carries 3 marks). [18]

37) Find the zeros, the sum and the product of zeros of $p(x) = x^2 + 9x + 14$. [3]

38) Obtain a quadratic polynomial $p(x) = ax^2 + bx + c$, where sum of zeros is $\frac{8}{5}$

and product of zeros is $\frac{3}{5}$, ($a < 0$). [3]

- 39) The ratio of present ages of a mother and her daughter is 8:3. After 5 years, the ratio of their ages will be 9:4. Find their present ages. [3]
- 40) If the roots of the quadratic equation $(k+1)x^2 - 2(k-1)x + 1 = 0$ are real and equal, find the value of k . [3]
- 41) Find the coordinates of the point which divides $\overline{AB}$ in the ratio 2:3 from B. The coordinates of A and B are (3, -6) and (-2, -1) respectively. [3]
- 42) D (3, 2), E (5, 6) and F (-1, 7) are the mid-points of the sides $\overline{BC}$, $\overline{CA}$ and $\overline{AB}$ of $\triangle ABC$ respectively find the coordinates of A, B and C. [3]
- 43) The radius of a field in the form of a sector is 21 m. The cost of constructing a wall around the field is ₹ 1875 at the rate of ₹ 25 per meter. If it costs ₹ 10 per m^2 to till the field, what will be the cost of tilling the whole field? [3]
- 44) Find the area of the minor segment whose chord subtends an angle of measure 120 and radius of the circle is 42 cm. [3]

- 45) A box contains 100 cards marked with numbers 1 to 100. If one card is drawn from the box, find the probability that it bears [3]

- i) Single digit number
- ii) Two digit number
- iii) A perfect square

SECTION - D

- Answer any five questions with calculations (Questions 46 to 53) (Each carries 4 marks). [20]

- 46) Prove that : Areas of two similar triangles are proportional to squares of corresponding sides for acute angled triangles. [4]

- 47) State Pythagoras Theorem. Prove Pythagoras Theorem for a ΔPQR right angled at R. [4]

- 48) Divide a 6 cm line-segment into three congruent parts. Write the steps of construction. [4]

- 49) Draw a circle of radius 3 cm. From a point 6 cm away from the centre, construct two tangents to the circle from this point. Measure them. [4]

- 50) A string of a kite is 100 m long and it makes an angle of measure 60° with the horizontal. Find the height of the kite, assuming that there is no slack in the string. [4]

- 51) The radius of a conical tent is 4 m and slant height is 5 m. How many meters of canvas of width 125 cm will be used to prepare 12 tents? If the cost of canvas is ₹ 20 per meter, then what is the total cost of 12 tents? ($\pi = 3.14$) [4]

- 52) The mode of the following frequency distribution of 165 observations is 34.5. Find the value of a and b . [4]

Class	5-14	14-23	23-32	32-41	41-50	50-59	59-68
Frequency	5	11	a	53	b	16	10

- 53) Find the mean of the data given below : [4]

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	8	3	20	3	4	8

