

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

Sl.No.

12 (E)

(MARCH, 2020)
(New 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 instructions given (1 to 16) (Each of one mark). [16]

■ Answer the following :

- 1) What will be the graph for the equation $6x - 2x^2 + 7$?
- 2) State the roots of quadratic equation $ax^2 + bx + c = 0$ if $b^2 - 4ac > 0$.

■ Select the most appropriate answer from the given alternatives :

3) $2k + 1$, 13 , $5k - 3$ are three consecutive terms of an A.P., then $k =$ _____.

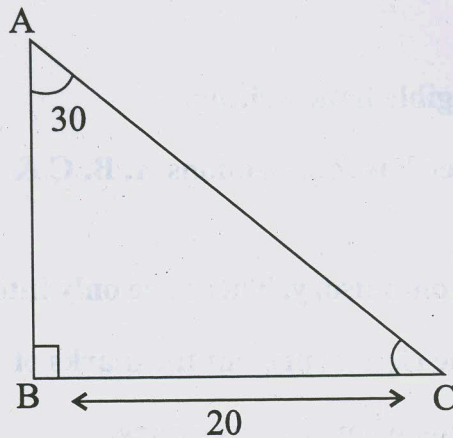
(A) 9

(B) 4

(C) 17

(D) 13

4) For the given figure $BC = 20$ cm and $\angle A = 30^\circ$, then $AB =$ _____ and $AC =$ _____.



(A) $20\sqrt{3}$, 40

(B) 40, $20\sqrt{3}$

(C) $\frac{20}{\sqrt{3}}$, 40

(D) 40, $\frac{20}{\sqrt{3}}$

5) Mode - Mean = _____ (Median - Mean)

(A) 2

(B) 4

(C) 3

(D) 6

6) From the given rational numbers _____ will have non-terminating recurring decimal.

(A) $\frac{17}{32}$

(B) $\frac{17}{248}$

(C) $\frac{17}{160}$

(D) $\frac{17}{64}$

■ Fill up the blanks :

- 7) L.C.M. of 23, 35, 46 is _____.
- 8) If $13x + 19y = 90$ and $19x + 13y = 70$ then $x + y =$ _____.
- 9) The present age of father is x years and the total age of his two sons is y years, then the sum of their ages 5 years hence will be _____.

■ Answer the following in short :

- 10) If $A\left(\frac{m}{2}, 5\right)$ is the midpoint of the line segment joining $Q(-6, 7)$ and $R(-2, 3)$ then find the value of m .

- 11) If $\sin A = \frac{1}{3}$ then find the value of $9\cot^2 A + 9$.

- 12) Find the area of a square inscribed in a circle of radius 8 cm.

- 13) If the ratio of the volume of two spheres is $64 : 27$, then find the ratio of their surface area.

■ State whether the following statements are true or false :

- 14) The perpendicular at a point of contact to the tangent to a circle passes through the centre.
- 15) If $P(A)$ is a probability for any event A , then $P(\bar{A}) < P(A)$.
- 16) The probability of having 53 Mondays in the year 2020 is $\frac{3}{7}$.

SECTION - B

■ Solve the following (17 to 26) (2 marks each)

[20]

17)

Marks scored	20	25	28	29	33	38	42	43
No. of students	6	20	24	28	15	4	2	1

- a) Find the probability of the students getting more than 40 marks.
- b) Find the probability of the students getting less than 30 marks.

18) Prove that square root of 7 is an irrational number.

19) The sum of the squares of two consecutive odd positive integers is 650. Find the numbers.

20) Solve the pairs of equations :

$$\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2 ; \frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1.$$

OR

20) Find the value of k for the following equations having infinitely many solutions
 $3x - (k + 1)y = 20$ and $(k + 2)x - 10y = 40$.

21) Prove $\frac{2\sin\theta\cos\theta - \cos\theta}{1 - \sin\theta + \sin^2\theta - \cos^2\theta} = \cot\theta$.

22) Evaluate :

$$4(\sin^4 30^\circ + \cos^4 60^\circ) - \frac{2}{3}(\sin^2 60^\circ - \cos^2 45^\circ) + \frac{1}{2}\tan^2 60^\circ.$$

OR

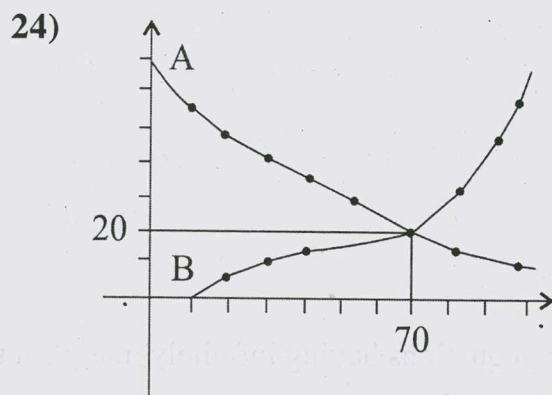
22) Evaluate :

$$\frac{(\sec^2 27^\circ - \cot^2 63^\circ) + (\sin^2 52^\circ + \sin^2 38^\circ)}{(\operatorname{cosec}^2 34^\circ - \tan^2 56^\circ) + \tan 10^\circ \cdot \tan 20^\circ \cdot \tan 30^\circ \cdot \tan 70^\circ \cdot \tan 80^\circ}.$$

23) Two concentric circles are of radii 7 cm and 25 cm. Find the length of the chord of the larger circle which touches the smaller circle.

OR

23) Prove that the parallelogram circumscribing a circle is a rhombus.



- Find the median of the data from the above graph.
- State the type for curve A and curve B.

- 25) A man of height 156 cm stands under a semicircular arc at a distance of 36 cm from one end such that his head touches the arc. Find the width of arc.

- 26) Find the roots by factorisation.

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$

OR

- 26) Find the roots : $3x^2 - 4\sqrt{3}x + 4 = 0$.

SECTION - C

- Answer the following as asked with calculations (27 to 34) (Each of 3 marks).[24]

27) On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $(x - 2)$ and $(-2x + 4)$ respectively. Find $g(x)$.

28) The sum and the difference of the reciprocals of the ages of Aishwarya and her

daughter Aaradhya is $\frac{5}{40}$ and $\frac{3}{40}$ respectively. Find their ages.

29) Under a project of 'one child one tree' undertaken by a school students plants the trees in a pattern of first row three plants, second row 5 plants and 3rd row 7 plants and so on. The last row has 37 plants. Find the number of students in the school.

OR

29) Find the 31st term of an A.P., whose 11th term is 88 and 16th term is 73. Which term of this series will be the 1st negative term?

30) The quadrilateral whose vertices are A(1, 0), B(7, 0), C(6, 3) and D(2, 3). Find it's area.

- 31) The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. The median of the given frequency distribution is 137 units. Find the no. of consumers whose monthly consumption is between 105-125 and also for 145-165.

Monthly Consumption in units	65-85	85-105	105-125	125-145	145-165	165-185	185-205
No. of Consumers	04	05	-	20	-	08	04

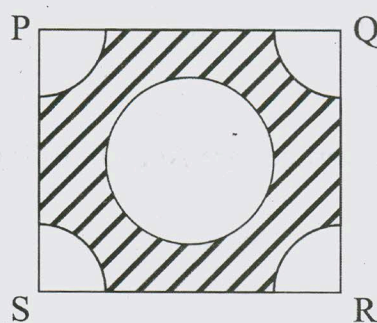
OR

31)

Lifetime (In Hours)	0-200	200-400	400-600	600-800	800-1000	1000-1200
Frequency	9	35	50	61	38	32

The above data gives the information on the observed lifetimes (in hours) of 225 electrical components. Find the mean.

- 32) A quadrilateral is drawn to circumscribe a circle, then prove that the sum of it's opposite sides are equal.
- 33) From each corner of a square of a 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in fig. Find the area of the remaining portion of the square.



- 34) A platform with dimensions $22\text{ m} \times 14\text{ m} \times 2.5\text{ m}$ is formed from the earth digging the well with diameter 7 m . Find the depth of the well.

OR

- 34) A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and the slant height of the top 2.8 m . Find the area of the canvas used for making the tent. Find the cost of the canvas of the tent at the rate of ₹ 350 per m^2 (Note that the base of the tent will not be covered with canvas).

SECTION - D

- Answer the following as asked with calculations (35 to 39) (Each of 4 marks).[20]

- 35) Draw a triangle PQR with $QR = 7\text{ cm}$, $\angle Q = 60^\circ$, $\angle P = 90^\circ$, then construct a triangle AQC whose sides are $\frac{3}{4}$ times the correspondings sides of triangle PQR.

OR

- 35) Let ABC be a right triangle in which $AB = 6\text{ cm}$, $BC = 8\text{ cm}$ and $\angle B = 90^\circ$, BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle. (Steps of constructions not required).
- 36) Two water taps together can fill a tank in one hour and twelve minutes. The tap of smaller diameter takes 1 hour more than the larger one to fill the tank separately. Find the time in which each tap can separately fill the tank.

37) An observer spots a balloon moving with the wind in a horizontal line at a height of 105 m from the ground. The angle of elevation of the balloon after sometime reduces from 60° to 30° . Find the distance travelled by the balloon during the interval.

38) A tank in shape of a frustum having diameter of top and bottom are 6 m and 10 m respectively. If the height is 3 m then how many litres of oil can be filled in it. How many drums of 200 l each can be filled?

39) In triangle MNO, $\angle O = 90^\circ$, then prove that $MN^2 = NO^2 + MO^2$.

OR

39) In an equilateral triangle ABC, D is a point on side BC such that $BC = 3BD$ then

prove that $\frac{AD^2}{AB^2} = \frac{7}{9}$.

