Time: 3 hrs

Instructions

1. This question paper has 5 Sections A, B, C, D and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) Type Questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) Type Questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) Type Questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Section-A

Section A consists of 20 questions of 1 mark each

1. If HCF of 306 and 657 is 9, then the LCM is

(a) 19428 (b) 27352 (c) 22338 (d) None of these

2. A point P is 13 cm from the centre of the circle. The length of the tangent drawn from P to the circle is 12 cm. Then, the radius of the circle is

(a) 3 cm (b) 5 cm (c) 9 cm (d) 7 cm

3. The prime factorisation of 351 is

(a) $3^3 \times 13$ (b) 3^3 (c) $3^2 \times 5$ (d) $3^2 \times 5^2$

4. A standard deck of 52 cards is shuffled. Ritu draws a single card from the deck at random. The probability that the card is jack, is

(a) $\frac{1}{2}$ (b) $\frac{1}{52}$ (c) $\frac{3}{52}$ (d) $\frac{1}{13}$

5. If $d_i = x_i - 20$, $\Sigma f_i d_i = 300$ and $\Sigma f_i = 40$, then the value of $\bar{x}$ is

(a) 20.3 (b) 32 (c) 27.5 (d) 22.9

6. The discriminant of the quadratic equation $6x^2 - 7x + 2 = 0$ is

(c) 5 (d) None of these

(a) $\sqrt{41}$ (b) $\frac{1}{12}$

7. The first term of an AP is -7 and the common difference is 5. Its 18th term is

(a) 97 (b) 92 (c) 83 (d) 78

8. C is the mid-point of PQ, if P is (4, x), C is (y, -1) and Q is (-2, 4), then x and y respectively are

(a) - 6 and 1 (b) - 6 and 2 (c) 6 and -1 (d) 6 and - 2

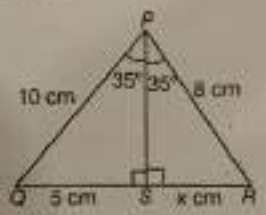
9. The radius of a wheel is 0.25 m. The number of approximate revolutions it will make to travel a distance of 11 km, is

(a) 5000 (b) 7000 (c) 6000 (d) 1000

10. If 2 is a zero of polynomial $f(x) = 4x^2 + 4x - 4a$, then the value of a is

(a) 6 (b) 2 (c) 4 (d) 8

11. The value of x in the given figure is



(a) 5 cm (b) 4 cm (c) 2 cm (d) 3 cm

12. The coordinates of the point which divides the line segment joining the points (4,-3) and (8, 5) in the ratio 1 : 3 internally are

(a) (4, 3) (b) (7, 3) (c) (3, 5) (d) (5, -1)

13. If tan A + Sec A = x, find Sec A - tan A

(a) 1/x (b) 0 (c) 1 (d) -1

14. If a pair of linear equations is consistent, then the lines will be

(a) always coincident (b) parallel

(c) always intersecting (d) intersecting or coincident

15. The LCM and HCF of two non-zero positive numbers are equal, then the numbers must be

(a) prime (b) coprime (c) composite (d) equal

16. The mean of the following distribution is

x_i	12	14	18	20
f_i	3	5	8	7

(a) 19.5 (b) 18 (c) 16.95 (d) 15.24

17. A fair dice is rolled. Probability of getting a number greater than 3 is

(a) 0 (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

18. If $2 \cos 3\theta = \sqrt{3}$, then the value of θ is

(a) 60° (b) 30° (c) 10° (d) 15°

Directions In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

19. **Assertion (A)** A coin is tossed 30 times and head appears 20 times. Then, the probability of getting a tail is $\frac{1}{3}$.

Reason (R) Probability of happening of an event = Number of trials in which the event happened / Total number of trials.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is true but Reason (R) is false

(d) Assertion (A) is false but Reason (R) is true

20. **Assertion (A)** If S_n is the sum of the first n terms of an AP, then its nth term is given by

$a_n = S_n - S_{n-1}$.

Reason (R) The 8th term of the AP : 3, 8, 13, ..., is 43.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is true but Reason (R) is false

(d) Assertion (A) is false but Reason (R) is true

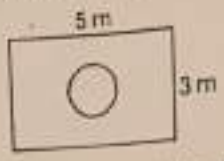
Section-B

Section B consists of 5 questions of 2 marks each

21. Two dice are thrown simultaneously. Find the probability of getting a multiple of 2 on one die and a multiple of 3 on the other die.

Or

Suppose you drop a die at random on the rectangular region shown in figure.



What is the probability that it will land inside the circle of diameter 2 m?

22. Prove that $(1 + \tan^2\theta)(1 + \sin\theta)(1 - \sin\theta) = 1$.

Or

Determine the value of x, such that $2\,\text{cosec}^2 30° + x\sin^2 60° - \frac{3}{4}\tan^2 30° = 10$.

23. If the 3rd and 9th terms of an AP are 4 and - 8 respectively, which term of this AP is zero?

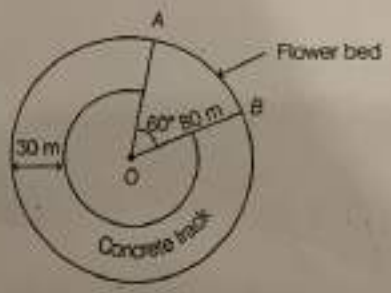
24. The quadratic equation $x^2 - 3x + p = 0$ has distinct real roots, then find the value of p.

25. If two tangents inclined at an angle of 60° are drawn to a circle of radius 5 cm, then find the length of each tangent.

Section-C

Section C consists of 6 questions of 3 marks each

26. In the given figure AOB is a flower bed in the shape of a sector of a circle of radius 80 m and $\angle AOB = 60°$. Also a 30 m wide concrete track is made as shown in the figure.



Two friends Vicky and Rachin went to the concrete track. Rachin said that area of the track is 10205 m^2. Is he right? Explain.

27. Prove that $\sin\theta(1 + \tan\theta) + \cos\theta(1 + \cot\theta) = \sec\theta + \text{cosec}\theta$

Or

If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$.

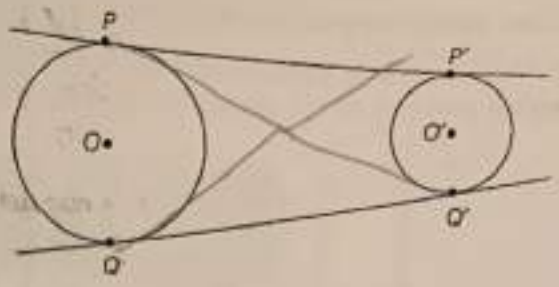
28. Prove that $\sqrt{3}$ is an irrational.

Or

There is a circular path around a sports field. Sania takes 18 min to drive one round of the field, while Ravi takes 12 min for the same. Suppose they both start at the same point and at the same time and go in the same direction. After how many minutes will they meet again at the starting point?

29. In ΔABC, $\angle B = 90°$ and $BD \perp AC$. If AC = 10 cm and AD = 4 cm, then find the value of BD.

30. In the given figure, PP' and QQ' are the two common tangents of the two circles. Show that PP' = QQ'.



31. Solve for x, $2\left(\frac{2x+3}{x-3}\right) - 25\left(\frac{x-3}{2x+3}\right) = 5$ 1, 6

Section- D

Section D consists of 4 questions of 5 marks each

32. A tent is in the form of a cylinder on which a cone is surmounted. If height and diameter of cylindrical portion are 2.1 m and 4 m and slant height of cone is 2.8 m, find the area of used canvas in making this tent. Also, find the volume of air within tent. 56·57 33·642

33. From a point, 36 m above the surface of a lake, the angle of elevation of a bird is observed to be 30° and angle of depression of its image in the water is observed to be 60°. Find the actual height of the bird above the surface of the lake. 36

34. The following table shows the age distribution of cases of a certain disease admitted during a year in a particular hospital.

Age (in years)	5 - 14	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64	Total
Number of cases	6	11	21	23	14	5	80

Find the modal age.

Or

If the median of the distribution given below is 30, find the values of x and y.

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
Number of students	5	X	20	15	y	5	60

5, 10

35. In the given figure, AD is the bisector of ∠BAC of ΔABC.

Prove that $\frac{BD}{DC} = \frac{AB}{AC}$

Or

CD and GH are respectively the bisectors of ∠ACB and ∠EGF such that D and H lie on sides AB and FE of ΔABC and ΔEFG, respectively. If ΔABC ~ ΔFEG, show that

(i) $\frac{CD}{GH} = \frac{AC}{FG}$ (ii) $\Delta DCB \sim \Delta HGE$ (iii) $\Delta DCA \sim \Delta HGF$.

Section-E

Case study-based questions are compulsory

36. Vikas is working with TCS and he is sincere and dedicated to his work. He pay all his taxes on time and invest the some amount of his salary in funds for his future.

He invested some amount at the rate of 12% simple interest and some other amount at the rate of 10% simple interest. He received yearly interest of Rs. 130. But, if he interchanges the amounts invested, he would have received Rs. 4 more as interest. On the basis of above information, answer the following questions.

(i) Consider the amount invested at 12% be p and at 10% be q. Then, formulate the required linear equation for first condition. (1)

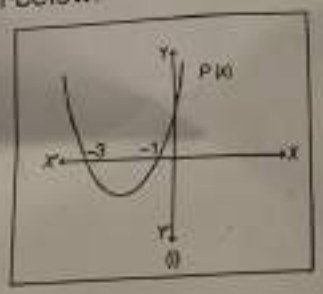
(ii) Now, formulate the linear equation for the second condition? (1) 5,7

(iii) Find the value of p and q. (2)

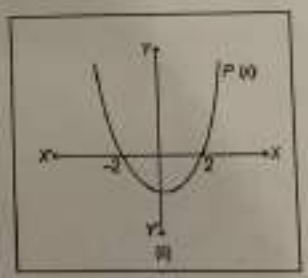
Or Draw the graph of the two equations that are formed. (2)

37. A teacher of class X draw the three graphs of a quadratic polynomials on the board as shown below.

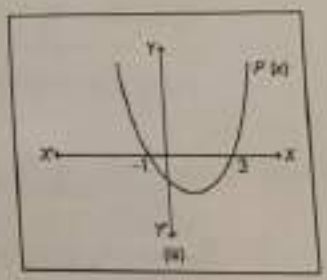
I.



II.



III.



Answer the following questions which are based on the above graphs.

(i) Write the zeroes of polynomial P(x) in graph I. (1)

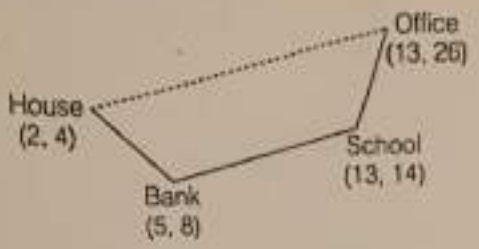
(ii) Write zeroes of polynomial P(x) in graph II. (1) x^2+4x+3

(iii) Write the polynomial P(x) for graph (I). (2)

Or Find the value of (a + b) for which $p(x) = x^2 + ax - b$ in graph (III). (2)

38. Walking is a good habit for human beings to improve health and stamina. In this order Ayush starts walking from his house to office. Instead of going to the office directly he goes to

bank first, from there he leaves his daughter to school and then reaches the office, [assume that all distances covered are in straight lines] if the house is situated at (2, 4), bank at (5, 8), school at (13, 14) and office at (13, 26) and the coordinates are in kilometer.



On the basis of above information, answer the following questions.

(i) Find the distance between bank and office. (1) $2\sqrt{97}$

(ii) Find the shortest distance between house and office. (1) $11\sqrt{5}$

(iii) Find the extra distance travelled by Ayush in reaching his office. (2)

Or

If on the shortest path from house to office, a point divides the path in the ratio 4:3. Find the coordinates of that point. (2) $\left(\frac{58}{7}, \frac{116}{7}\right)$

Q32
Q38
Q30
Q29