PART I - Answer all the questions   14 x 1 = 14
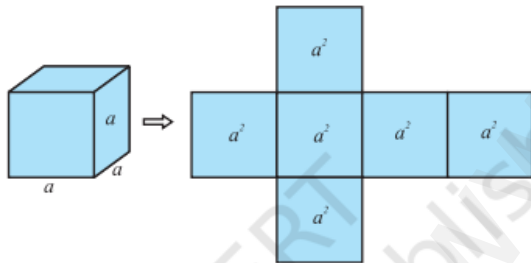
1. For C = {12, 14,18, 20},   18 ∈ C is   (a) true (b) false

2. Convert 2.176 to the form of $\frac{q}{p}$, where p and q are integers and q ≠ 0
   (a) 7/20   (b) 272/125   (c) 125/272

3. $a^4 – b^4$ = ?   (i) $(a+b)^2 + (a – b)^2$ (ii) 4ab
   (iii) $a(a^2+b^2)$ (iv) $(a^2+b^2)(a+b)(a-b)$

4. The diagonals of a parallelogram do not bisect each other.
   (a) True   (b) False

5. The "straight line distance" is usually called "as the crow flies". This is to mean that we don't worry about any obstacles and routes on the ground, but how we would get from A to B if we could fly. No bird ever flies on straight lines, though. (a) True
         (b) False

6. The ratio in which the x-axis divides the line segment joining the points (6,4) and (1, −7) is (a) 2:3 (b) 3:4 (c) 4:7 (d) 4:3

7. $(\sin θ)^2$ is not written as $\sin θ^2$, because it may mean as $\sin (θ × θ)$
   (a) True   (b) False

8. If the length, breadth and height of the cuboid are l, b and h respectively, then Total Surface Area (TSA) =
   (a)   a(l+b)h sq.units
                                           (b) a(lb+bh+lh) sq.units.
                                           (c)
   $6a^2$ (d)
   $4a^2$

9. What does this diagram represent?
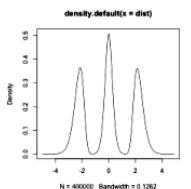   (a) Surface area of a cuboid
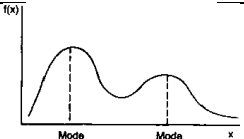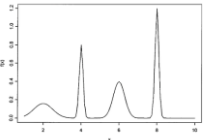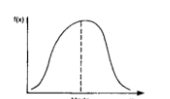   (b) Surface area of a cube
   (c) CSA of cylinder
   (d) CSA of cuboid

10. The most frequently occurring observation is
    (a) Mean   (b) Median   (c) Mode

11. The median is a good measure of the average value when the data include extremely high or low values, because these have little influence on the outcome. (a) True   (b) False

12. For which set of numbers do the mean, median and mode all have the same values? (1) 2,2,2,4 (2) 1,3,3,3,5 (3) 1,1,2,5,6 (4) 1,1,2,1,5.

13. The probability of an event cannot be (1) Equal to zero (2) Greater than zero (3) Equal to one (4) Less than zero

14. If $P(E)$ = 0.37, then P(not E) will be
    (a) 0.37   (b) 0.63   (c) 0.57   (d) None of these

PART II

Answer any 10 questions. Q.No.28 is compulsory.
**   (10x2=20)**

15. Are A = {x : x ! N , 4 ≤ x ≤ 8} and B = { 4, 5, 6, 7, 8} equal sets?

16. Represent the following irrational numbers on the number line.
    (i) √3 (ii) √47

17. Find the 5ᵗʰ root of 100000.

18. Factorise: $l^3 – 8m^3 – 27n^3 – 18\,lmn$

19. Solve 4a + 3b = 65 and a + 2b = 35 by elimination method.

20. The lengths of the diagonals of a Rhombus are 12 cm and 16 cm . Find the side of the rhombus.

21. In what ratio does the point P (2, −5) divide the line segment joining A(-3, 5) and B(4,-9).

22. Find the area of a right triangle whose hypotenuse is 10cm and one of the acute angle is 24º24'

23. Prove that $(\sin^4 θ – \cos^4 θ +1) \csc^2 θ = 2$

24. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm

25. In a parallelogram ABCD , P and Q are the points on line DB such that PD = BQ show that APCQ is a parallelogram.

26. Find the median of the given values : 47, 53, 62, 71, 83, 21, 43, 47, 41.
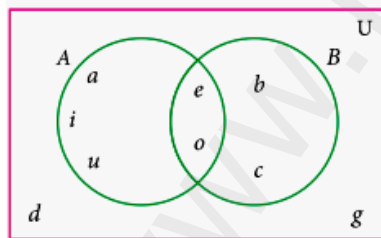
27. Match the following:

(a) Unimodal distribution	
(b) Bimodal distribution	
(c) Trimodal distribution	
(d) Multimodal distribution	

28. For a question on probability the student's answer was 3/2 . The teacher told that the answer was wrong. Why?

PART III

Answer any 10 questions. Q.No.42 is compulsory. (10x5=50)

29. From the given Venn diagram, write the elements of (i) A (ii) B (iii) A–B (iv) B–A (v) A' (vi) B' (vii) U

30. Rationalise the denominator of $\frac{5+\sqrt{3}}{5-\sqrt{3}}$

31. Find quotient and the remainder when f(x) is divided by g(x)

f(x) = (8x3 –6x2 +15x–7),   g(x) = 2x+1

32. Write about the angle Subtended by Chord at the Centre.

33. Plot the following points in the coordinate system and identify the quadrants P(–7,6), Q(7,–2), R(–6,–7), S(3,5) and T(3,9)

34. If $\sin \theta = \frac{a}{\sqrt{a^2+b^2}}$, then show that $b \sin\theta = a \cos\theta$

35. Verify $\cos 3A = 4 \cos^3 A - 3 \cos A$, when A = 30°

36. The length, breadth and height of a chocolate box are in the ratio 5:4:3. If its volume is 7500 cm3, then find its dimensions

37. In which quadrant or on which axis do each of the points (– 2, 4), (3, -1), (– 1, 0), (1, 2) and (– 3, – 5) lie? Verify your answer by locating them on the Cartesian plane.

38. Without actual division , prove that f(x) = $2x^4-6x^3+3x^2+3x-2$ is exactly divisible by $x^2 -3x + 2$

39. Find the volume of a cuboid whose dimensions are length = 12 cm, breadth = 8 cm, height = 6 cm

40. Write the steps in calculating $\bar{x}$ by direct method **(OR)**

In a class test in mathematics, 10 students scored 75 marks, 12 students scored 60 marks, 8 students scored 40 marks and 3 students scored 30 marks. Find the mean of their score.

41. In a survey of 400 youngsters aged 16-20 years, it was found that 191 have their voter ID card. If a youngster is selected at random, find the probability that the youngster does not have their voter ID card.

42. Complete the table of multiplication:

x		3.04	-7.11	- 180	9302	-3.2
40						
25	30					

PART IV

Answer the following questions: (8+8=16)

43. Construct the centroid of DPQR whose sides are PQ = 8cm; QR = 6cm; RP = 7cm   **(OR)**

The mid-points of the sides of a triangle are (a_1=5, b_1=1), (a_2=3, b_2=-5) and (a_3=-5,b_3=-1). Find the value of (a_1+a_3-a_2, b_1+b_3-b_2), (a_1+a_2-a_3, b_1+b_2-b_3) and (a_2+a_3-a_1, b_2+b_3-b_1). Compare the results. What do you observe? Give reason for your result.

44. Draw a triangle ABC, where AB = 8 cm, BC = 6 cm and +B = 700 and locate its circumcentre and draw the circumcircle   **(OR)**

Construct DABC in which AB = BC = 6cm and ∠ = B 80°. Locate its
incentre and draw the incircle.

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