

**007/2024**

**Total Number of Questions: 48**

**Max. Marks: 200**

**Time: 3.00 Hours**

1. Find the LCM and GCD of the numbers 1092 and 2730. (3 marks)
2. Find the degree of the polynomial  $p(x) = (3x^2 - 2x + 1)(x - 1) - 3x^3 + 5x^2 - x + 1$ . (3 marks)
3. Find the nature of roots of the equation  $2x^2 - 3x + 1 = 0$  and find the roots. (3 marks)
4. Using substitution method solve  $x + y = 5$  and  $2x - 5y = 3$ . (3 marks)
5. Find the smallest number by which 1323 may be multiplied so that the product is a perfect cube. Also find the cube root of the product. (3 marks)
6. Examine whether -150 is a term of the arithmetic progression 20, 17, 14, ..... (3 marks)
7. The total cost of 40 books is equal to the selling price of certain books. If the profit is 20% what is the number of books sold? (3 marks)
8. If  $a:b = 3:4$ ,  $b:c = 5:3$ ,  $c:d = 1:2$  find  $a:b:c:d$  (3 marks)
9. There are two numbers. 40% of the larger is equal to 60% of the smaller. Their sum is 250. What are the numbers? (3 marks)
10. An amount of rupees 3600 becomes Rs. 4500 after 10 years at simple interest. What is the rate of interest? (3 marks)
11. Write three differences between bar diagram and histogram. (3 marks)
12. Explain the mechanism of online share trading in India. (3 marks)
13. A tangent from a point A meet a circle with center B at C.  $AB = 25$  cm,  $BC = 24$  cm. Find the radius of the circle. (3 marks)
14. Which of the following triangles is a right angled triangle?  
(a)  $\triangle ABC$ ,  $AB = 3$   $BC = 4$   $AC = 6$   
(b)  $\triangle PQR$ ,  $PQ = 6$   $QR = 8$   $RP = 10$ . (3 marks)
15. A metallic solid sphere of radius 9 cm is melted to form a solid cylinder with radius 6 cm. What is the height of the cylinder? (3 marks)
16. In  $\triangle XYZ$ ,  $\angle X = 65^\circ$ ,  $\angle Y = 70^\circ$ . In  $\triangle LMN$ ,  $\angle L = 70^\circ$ ,  $\angle M = 45^\circ$ . Explain whether both the triangles are similar. (3 marks)

17.  $\cot A = \frac{4}{3}$  show that  $\frac{1 - \tan^2 A}{1 + \tan^2 A} = \cos^2 A - \sin^2 A$ . (3 marks)
18. Find the ratio in which the line segment joining the points (-6, 5) and (6, -3) is divided by the y-axis and find the point of division. (3 marks)
19. Distance between two cities A and B is 600 km. A train starts from city A at 8 am and travels towards B at 60 km/hr. Another train starts from city B at 9 am and travels towards city A at 75 km/hr. When will they meet each other? (3 marks)
20. If  $A = \{1,2,3,4\}$ ,  $B = \{3,5,8\}$ ,  $C = \{4,5,7,8\}$  verify that  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ . (3 Marks)
21. Express 21.3243243 ..... in  $\frac{p}{q}$  form where  $p$  and  $q$  are integers. (5 Marks)
22. Show that  $\sqrt{3}$  is irrational. (5 Marks)
23. Find all the zeros of the polynomial  $p(x) = x^4 + x^3 - 4x^2 - 2x + 4$  of which  $\sqrt{2}$  is a zero of  $p(x)$ . (5 Marks)
24. The sum of reciprocal of Ninu's age 5 years ago and three years from now is  $\frac{1}{3}$ . Find the present age of Ninu. (5 marks)
25. The cost of a pen is Rs. 25 and a book is Rs. 50. In the month of May 2000 units of pen and book together sold in a shop and get Rs. 70,000. Find the number of pen and number of book sold in May. (5 marks)
26. A farmer has 2000 saplings of plantain to plant in his field, in such a way that the number of plantain in each row and columns should be same. Find the minimum number of plantains he needs more to plant in this manner. (5 marks)
27. The sum of third and seventh terms of an arithmetic progression is 22 and their product is 85. Find the sum of first 10 terms. (5 marks)
28. Mr. Jain buys a bicycle for Rs. 4,300. He spends Rs. 500 for its repairing. If he sells the bicycle for a profit of 10% what is the selling price of the bicycle. (5 marks)
29. A Computer shopkeeper purchases computers for Rs. 30,000 per unit and decided to gain a profit of 10%. He announced a discount of 15% in the selling price of the computer. What was the price he charged on a computer before discount? (5 marks)
30. If  $6:7 = 12:x$  and  $x+y:y = 6:5$ . Find the values of  $x$  and  $y$  (5 marks)
31. 16% of 40% of the price of a fan is Rs. 72 less than 10% of its price. What is the price of the fan? (5 marks)
32. Two students appeared for a competitive examination. One of them scored 9 marks more than the other and his mark was 56% of the sum of their marks. What are the marks of the students? (5 marks)

33. An amount of money deposited for compound interest becomes doubles in 15 years. When will it become 8 times? (5 marks)
34. Ram invested  $\frac{1}{3}$  of his capital for 7%,  $\frac{1}{4}$  for 8% and the remaining for 10%. If he earn annually Rs. 561 as interest what is his capital? (5 marks)
35. Show that the sum of the deviations of the observations from their arithmetic mean is zero. (5 marks)
36. The mean wages of 40 workers was Rs. 750. Later it was found that the wages of two workers were wrongly entered as Rs. 650 and Rs. 730 in place of Rs.630 and Rs.790. What is the corrected mean wages. (5 marks)
37. What do you mean by VAT? What are the different type and objectives of VAT in India? (5 marks)
38. A small circle of radius 3 cm is drawn inside a larger circle with common center. A chord of length 8 cm of the larger circle touches the smaller circle. Find the radius of the larger circle. (5 marks)
39. The perimeter of a circle is  $8\pi$  cm. What is the area and length of arc of the sector which make an angle  $45^\circ$  at the center. (5 marks)
40. Show that the ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides. (5 marks)
41. Find the area of the triangle with sides having length 4 cm, 6 cm and 8 cm. (5 marks)
42. A conical shaped vessel of circular base with radius 6 cm has height 20 cm cut at 10 cm from its base to form a frustum. What is the volume of the frustum? (5 marks)
43. Vimal, 145 cm tall boy is walking away from a lamp placed atop a pole. When he was 300 cm away from the bottom of the pole his shadow is 60 cm long. What is the height of the pole? (5 marks)
44. Show that  $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta \operatorname{cosec}\theta$ . (5 marks)
45. Find the center of the circle passing through the points (0,0), (3,-2) and (3,3). (5 marks)
46. Mr. Jain travels half of his journey by train at the speed of 120 km/hr and the rest of the distance by car at a speed of 80 km/hr. Find the average speed of Jain in his entire journey. (5 marks)
47. 6 workers can pack 1500 boxes in 4 days. How many boxes can pack 8 workers in 10 days? (5 marks)

**48. In a group of 70 people, 40 likes coffee and 15 like coffee and tea. How many of them like tea? How many of them like tea only and not coffee? How many of them like coffee only but not tea? (5 marks)**