



# SHRI KRISHNA ACADEMY

NEET, JEE AND BOARD EXAM COACHING CENTRE  
SBM SCHOOL CAMPUS, TRICHY MAIN ROAD, NAMAKKAL

CELL: 9965531727-9443231727

CLASS : X

**MATHEMATICS**

MARKS : 100

DATE :  
Hrs

FULL TEST - I

TIME : 2:30

## PART - I

I. Answer all the 14 questions.

14x1=14

1. If there are 1024 relations from a set  $A = \{1, 2, 3, 4, 5\}$  to a set  $B$ , then the number of elements in  $B$  is

- (1) 3                      (2) 2                      (3) 4                      (4) 8

2.  $f(x) = (x+1)^3 - (x-1)^3$  represents a function which is

- (1) linear                      (2) cubic                      (3) reciprocal                      (4) quadratic

3. Two APs have same common difference. If the difference between their 100<sup>th</sup> terms is 111222333 then the difference between their millionth terms is

- (1) 123                      (2) 112233                      (3) 111222333                      (4) 112333

4. The sum of the exponents of the prime factors in the prime factorization of 1729 is

- (1) 1                      (2) 2                      (3) 3                      (4) 4

5. The solution of the system  $x+y-3z=-6$ ,  $-7y+7z=7$ ,  $3z=9$  is

- (1)  $x=1, y=2, z=3$                       (2)  $x=-1, y=2, z=3$   
(3)  $x=-1, y=-2, z=3$                       (4)  $x=1, y=2, z=-3$

6. The square root of  $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$  is equal to

- (1)  $\frac{16}{5} \left| \frac{x^2z^4}{y^2} \right|$                       (2)  $16 \left| \frac{y^2}{x^2z^4} \right|$                       (3)  $\frac{16}{5} \left| \frac{y}{xz^2} \right|$                       (4)  $\frac{16}{5} \left| \frac{xz^2}{y} \right|$

7. If four sides of a quadrilateral ABCD are tangential to a circle, then

- (1)  $AC+AD=BD+CD$                       (2)  $AB+CD=BC+AD$   
(3)  $AB+CD=AC+BC$                       (4)  $AC+AD=BC+DB$

8. If in triangles  $ABC$  and  $EDF$ ,  $\frac{AB}{DE} = \frac{BC}{FD}$  then they will be similar, when

- (1)  $\angle B = \angle E$                       (2)  $\angle A = \angle D$                       (3)  $\angle B = \angle D$                       (4)  $\angle A = \angle F$

9. If  $(-2, 1)$  is the centroid of a triangle having its vertices are  $(x, 2), (10, -2), (-8, y)$ , then  $x$  and  $y$  satisfy the relation

- (1)  $3x+8y=0$                       (2)  $3x-8y=0$   
(3)  $8x+3y=0$                       (4)  $8x=3y$

10. The value of  $\sin^2 \theta + \frac{1}{1 + \tan^2 \theta}$  is equal to  
 (1)  $\tan^2 \theta$  (2) 1 (3)  $\cot^2 \theta$  (4) 0
11. The angle of depression of the top and bottom of 20 m tall building from the top of a multistoried building are  $30^\circ$  and  $60^\circ$  respectively. The height of the multistoried building and the distance between two buildings (in metres) is  
 (1)  $20, 10\sqrt{3}$  (2)  $30, 5\sqrt{3}$  (3) 20, 10 (4)  $30, 10\sqrt{3}$
12. A cylindrical vessel 32cm high and 18 cm as the radius of the base, filled with sand. This bucket is emptied on then ground and a conical heap of sand is formed. If the height of the conical vessel is 24cm, the radius of its base is  
 (1) 12cm (2) 24cm (3) 36cm (4) 48cm
13. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is  
 (1) 3 (2) 15 (3) 5 (4) 225
14. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is  $\frac{1}{9}$ , then the number of tickets bought by Kamalam is  
 (1) 5 (2) 10 (3) 15 (4) 20

### PART – II

**II. Answer 10 questions. Question number 28 is compulsory.**

**10x2=20**

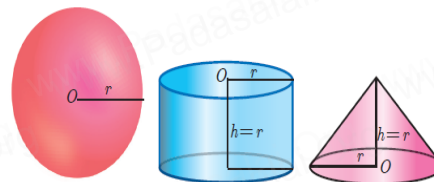
15. Let  $A = \{1, 2, 3\}$  and  $B = \{x | x \text{ is a prime number less than } 10\}$ . Find  $A \times B$  and  $B \times A$ .
16. Find  $f \circ g$  and  $g \circ f$  when  $f(x) = 2x + 1$  and  $g(x) = x^2 - 2$
17. Which of the following is true?  
 (i)  $444 \equiv 276 \pmod{7}$  (ii)  $793 \equiv 682 \pmod{9}$  (iii)  $269 \equiv 413 \pmod{12}$  (iv)  $473 \equiv 369 \pmod{26}$
18. Find the 8<sup>th</sup> term of the G.P. 9, 3, 1, ...
19. Discuss the nature of solutions of the following system of equations  

$$2y + z = 3(-x + 1); \quad -x + 3y - z = -4; \quad 3x + 2y + z = -\frac{1}{2}$$
20. Determine the quadratic equations, whose sum and product of roots are  $-\frac{3}{2}$ ,  $-1$
21. Solve :  $\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$
22. If the area of the triangle formed by the vertices  $A(-1, 2)$ ,  $B(k, -2)$ , and  $C(7, 4)$  (taken in order) is 22 sq. units, find the value of  $k$ .
23. If  $m$  is the slope of the line perpendicular to  $2x - 4y + 7 = 0$ , then find the value of  $16m^2$ .
24. Prove that :  $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \operatorname{cosec} \theta + \cot \theta$

25. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height  $10\sqrt{3}$  m.

26. A sphere, a cylinder and a cone are of the same radius, where as cone and cylinder are of same height.

Find the ratio of their curved surface areas.



27. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.

28. Two tangents TP and TQ are drawn to a circle with centre O from the external point T.

Prove that  $\angle PTQ = 2\angle OPQ$ .

### PART – III

**III. Answer 10 questions. Question number 42 is compulsory.**

**10x5=50**

29. Forensic scientists can determine the height (in cms) of a person based on the length of their thigh bone. They usually do so using the function  $h(b) = 2.47b + 54.10$ , where  $b$  is the length of the thigh bone.

(i) Check if the function  $h$  is one – one

(ii) Also find the height of a person if the length of his thigh bone is 50 cms.

(iii) Find the length of the thigh bone if the height of a person is 147.96 cms.

30. Find  $x$  if  $gff(x) = fgg(x)$ , given  $f(x) = 3x + 1$  and  $g(x) = x + 3$ .

31. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4.

32. Find the sum of the series to  $(2^3 - 1) + (4^3 - 3^3) + (6^3 - 5^3) + \dots$  to

(i)  $n$  terms (ii) 8 terms

33. Find the GCD of  $24x^4 - 2x^3 - 60x^2 - 32x$  and  $18x^4 - 6x^3 - 39x^2 - 18x$

34. Find the square root of the expression  $\frac{x^2}{y^2} - \frac{10x}{y} + 27 - \frac{10y}{x} + \frac{y^2}{x^2}$

35. Solve for  $x, y$ :  $\begin{pmatrix} x^2 \\ y^2 \end{pmatrix} + 2 \begin{pmatrix} -2x \\ -y \end{pmatrix} = \begin{pmatrix} -5 \\ 8 \end{pmatrix}$

36.  $P$  and  $Q$  are the mid-points of the sides  $CA$  and  $CB$  respectively of a  $\Delta ABC$ , right angled at  $C$ .

Prove that  $4(AQ^2 + BP^2) = 5AB^2$ .

37. Find the equation of the perpendicular bisector of the line joining the points  $A(-4, 2)$  and  $B(6, -4)$ .

38. A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is  $60^\circ$  and the angle of depression to the point 'A' from the top of the tower is  $45^\circ$ . Find the height of the tower. ( $\sqrt{3}=1.732$ )

39. A funnel consists of a frustum of a cone attached to a cylindrical portion 12 cm long attached at the bottom. If the total height be 20 cm, diameter of the cylindrical portion be 12 cm and the diameter of the top of the funnel be 24 cm. Find the outer surface area of the funnel.

40. The following are marks obtained by two students in six tests conducted for 100 marks.

<b>A</b>	58	64	60	65	76	52
<b>B</b>	56	87	89	48	93	65

Find who is more consistent in his performance.

41. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 8.

42. An overhead tank has been constructed to supply water to a village with a population of 3140 at the rate of 25 litres per head per day. Water is pumped into it through a pipe of 10cm diameter, the rate of flow being 4m per sec. How long will it take to fill the tank every morning?

#### PART-IV

**IV. Answer both the questions.**

**2x8=16**

43. Construct a  $\Delta ABC$  such that  $AB = 5.5$  cm,  $\angle C = 25^\circ$  and the altitude from C to AB is 4 cm.

**(OR)**

AB is a diameter of a circle. P is point on a semi-circle APB. AH and BK are perpendiculars from A and B respectively to the tangent at P. Prove that  $AH + BK = AB$ .

44. Draw the graph of  $y = x^2 - 4x + 3$  and use it to solve  $x^2 - 6x + 9 = 0$  **(OR)**

What 3 masons earn in a day is earned by 4 male workers in a day. The daily wages of 4 male workers is equal to the total daily wages of one mason and 4 female workers. If one mason, 2 male workers and 5 female workers are engaged for a day, the total wages to be paid is ₹ 500. Find the daily wages of a mason, a male worker and a female worker.

## **SHRI KRISHNA ACADEMY**

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