Thanjavur District

Thanjavur Dt - 06.01.2020

LS

Reg.No. | | | | | | |

COMMON FIRST REVISION TEST - 2020

STANDARD - X

Time : 3.00 hrs **Mathematics** **Marks: 100**

Part - I **14 x 1 = 14**

Note : i) Answer all the 14 questions. ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer:

1. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
   a) linear b) cubic c) reciprocal d) quadratic
2. If A = {0}, find A x A
   a) ϕ b) 0 c) {(0, 0)} d) {(ϕ, ϕ)}
3. $7^{4k} \equiv$ ..... (mod 100)
   a) 1 b) 2 c) 3 d) 4
4. Find the sum of 2 + 3+4+...+15
   a) 120 b) 1 c) 225 d) 119
5. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ = ...
   a) $\frac{9y}{7}$ b) $\frac{9y^3}{(21y-21)}$ c) $\frac{21y^2-42y+21}{3y^3}$ d) $\frac{7(y^2-2y+1)}{y^2}$
6. The solution of the system x + y - 3z = -6, 7y + 7z = 7, 3z = 9 is
   a) x = 1, y = 2, z = 3 b) x = -1, y = 2, z = 3 c) x = -1, y = -2, z = 3 d) x = 1, y = 2, z = -3
7. Find the matrix X is $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
   a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$
8. A tangent is perpendicular to the radius at the
   a) centre b) point of contact c) infinity d) chord
9. The point of intersectiioin of 3x - y = 4 and x + y = 8 is
   a) (5, 3) b) (2, 4) c) (3, 5) d) (4,4)
10. If $\sin\theta = \cos\theta$, then $2\tan^2\theta + \sin^2\theta = 1$ is equal to
    a) $\frac{-3}{2}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{-2}{3}$

11. The total surface area of a cylinder whose radius is 1/3 of its height is

a) $\frac{9\pi h^2}{8}$ sq. units b) $24\pi h^2$ sq.units c) $\frac{8\pi h^2}{9}$ sq.units d) $\frac{56\pi h^2}{9}$ sq.units

12. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is

a) 1 : 2 : 3 b) 2 : 1 : 3 c) 1 : 3 : 2 d) 3 : 1 : 2

13. The range of the data 8, 8, 8, 8, 8, ... 8 is

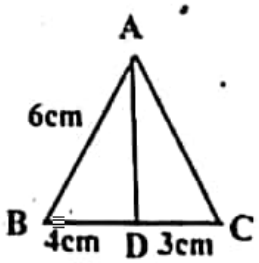
a) 0 b) 1 c) 8 d) 3

14. The probability of sure event is

a) 0 b) 1/2 c) 2 d) 1

II. Answer any 10 question. Qn.No. 28 is compulsory: **10 x 2 = 20**

15. Define a function.
16. If B x A = {(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)} find A and B.
17. If $13824 = 2^a \times 3^b$, then find 'a' and 'b'.
18. In a G.P. 729, 243, 81, ... find t_n.
19. Find the LCM of $5x - 10$, $5x^2 - 20$
20. If α, β are the roots of the equation $x^2 - 11x + 10 = 0$, find $\alpha^2 + \beta^2$.
21. If $A = \begin{pmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{pmatrix}$ then find the transpose of -A.
22. In this fig. AD is the bisector of $\angle A$. If BD = 4cm, DC = 3cm, AB = 6 cm find AC.



23. Prove : $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$.
24. A tower stands vertically on the ground. From a point on the ground, which is 48m away from the foot of the tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower.
25. If the circumference of a conical wooden piece is 484cm than find its volume when its height is 105cm.
26. Find the range and coefficient of range of 63, 89, 98, 125, 79, 108, 117, 68
27. When two dice are rolled, what is the probability of getting same number in two dice?
28. Find the equation of a line which passes through (5,7) and makes intercepts on the axes equal in magnitude but opposite in sign.

III. Answer any 10 questions. Qn.No.42 is compulsory: **10 x 5 = 50**

29. Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets. Let f : A → B be a function given by f(x) = 3x - 1. Represent this function i) by arrow diagram ii) in a table form iii) as a set of ordered pairs iv) in a graphical form

30. If $f(x) = x - 1$, $g(x) = 3x + 1$, $h(x) = x^2$, show that $(fog)oh = fo(goh)$.
31. If $s_1, s_2, s_3 \ldots s_m$ are the sums of n terms of m A.P.'s whose first terms are 1, 2, 3, ...m and whose common differences are 1, 3, 5, ... (2m-1) respectively, then show that $s_1 + s_2 + s_3 + \ldots + s_m = \frac{1}{2} mn(mn+1)$
32. Find the sum $0.4 + 0.44 + 0.444 + \ldots$ n terms.
33. Find the GCD of $6x^3 - 30x^2 + 60x - 48$ and $3x^3 - 12x^2 + 21x - 18$
34. If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$, then prove $A^2 - 4A + 5I_2 = 0$.
35. Write and prove the basic proportionality theorem.
36. Find the area of the quadrilateral whose vertices are (-9, -2), (-8, -4), (2, 2) and (1, -3)
37. A man is watching a boat speeding away from the top of a tower. The boat makes an angle of depression of 60° with the man's eye when at a distance of 200m from the tower. After 10 seconds, the angle of depression becomes 45°. What is the approximate speed of the boar (in km/hr), assuming that it is sailing in still water? ($\sqrt{3} = 1.732$)
38. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$ and also $m \neq n$, then prove that $m^2 - n^2 = 4\sqrt{mn}$
39. An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10m and 4m and whose height is 4m. Find the curved and total surface area of the bucket.
40. Find the mean and variance of the first n natural numbers.
41. Three unbiased coins are tossed once. Find the probability of getting atmost 2 tails or atleast 2 heads.
42. Using clay, a student made a right circular cone of height 48 cm and base radius 12 cm. Another students reshapes it in the form of a sphere. Find the radius of the sphere.

IV. Answer both the questions: **2 x 8 = 16**

43. a) Take a point which is 11 cm away from the centre of a circle of radius 4cm and draw the two tangents to the circle from that point.

    b) Construct a triangle PQR such that QR = 5cm, $\angle P = 30°$ and the altitude from P to QR is of length 4.2 cm.
44. a) Draw the graph and discuss the nature of solution of the quadratic euqation $x^2 + x - 12 = 0$.

    b) Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$