

COMMON FIRST REVISION TEST - 2023
Standard X

MATHEMATICS
Part - I

Reg.No.

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Marks: 100

14 x 1 = 14

Time: 3.00 hours

I Choose the correct answer

1. Let $n(A) = m$ and $n(B) = n$ then total number of non-empty relations that can be defined from A to B is
 - a) m^n
 - b) n^m
 - c) $2^{mn} - 1$
 - d) 2^m
2. The quotient and remainder when 21 is divided by -4 are
 - a) 5, -1
 - b) -5, 1
 - c) -5, -1
 - d) 5, 1
3. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
 - a) $\frac{1}{24}$
 - b) $\frac{1}{27}$
 - c) $\frac{2}{3}$
 - d) $\frac{1}{81}$
4. The solution of $(2x - 1)^2 = 9$ is equal to
 - a) -1
 - b) 2
 - c) -1, 2
 - d) none of these
5. Transpose of a column matrix is
 - a) unit matrix
 - b) diagonal matrix
 - c) column matrix
 - d) row matrix
6. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
 - a) 13 m
 - b) 14 m
 - c) 15 m
 - d) 12.8 m
7. The area of triangle formed by the points (0,0), (0,2) and (2,0) is
 - a) 0 sq.units
 - b) 2 sq.units
 - c) 4 sq.units
 - d) 1 sq.unit
8. When proving that a quadrilateral is a trapezium, it is necessary to show
 - a) two sides are parallel
 - b) two parallel and two non-parallel sides
 - c) opposite sides are parallel
 - d) all the sides are of equal length
9. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
 - a) $\sec\theta$
 - b) $\cot^2\theta$
 - c) $\sin\theta$
 - d) $\cot\theta$
10. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}:1$, then the angle of elevation of the sun has measure
 - a) 45°
 - b) 30°
 - c) 90°
 - d) 60°
11. The length of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
 - a) 12 cm
 - b) 10 cm
 - c) 13 cm
 - d) 5 cm
12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
 - a) 2 : 1
 - b) 1 : 2
 - c) 4 : 1
 - d) 1 : 4
13. The range of the data 8,8,8,8,..... is
 - a) 0
 - b) 1
 - c) 8
 - d) 3

14. Which of the following is incorrect? (2)

x Mark

- a) $P(A) > 1$ b) $0 < P(A) < 1$ c) $P(\emptyset) = 0$ d) $P(A) + P(A) = 1$

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory)

10 x 2 = 20

15. If $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$ then find A and B.
16. If $A = \{1,2,3\}$, $B = \{4,5,6,7\}$ and $f = \{(1,4), (2,5), (3,6)\}$ be a function from A to B. Show that f is one-one but not onto function.
17. Solve: $3x - 2 = 0 \pmod{11}$
18. In a G.P. 729, 243, 81, find t_7
19. Determine the nature of the roots for the quadratic equation $x^2 - x - 1 = 0$
20. A vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time a tower casts a shadow 28 m long. Using similarity, find the height of the tower.
21. Find the slope of a line joining the given points $(-6, 1)$ and $(-3, 2)$.
22. If the straight lines $12y = -(p+3)x + 12$, $12x - 7y = 16$ are perpendicular then find 'p'.
23. Prove that $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$
24. From the top of a rock $50\sqrt{3}$ m high, the angle of depression of a car and the ground is observed to be 30° . Find the distance of the car from the rock.
25. Find the diameter of a sphere whose surface area is 154 m^2 .
26. The volume of solid right circular cone is 11088 cm^3 . If its height is 24 cm, then find the radius of the cone.
27. Find the range and coefficient of range of the data 63, 89, 98, 125, 79, 108, 117, 68
28. If $P(A) = 0.37$, $P(B) = 0.42$, $P(A \cap B) = 0.09$, then find $P(A \cup B)$

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory)

10 x 5 = 50

29. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?
- i) $R_1 = \{(2, 1), (7, 1)\}$ ii) $R_2 = \{(-1, 1)\}$
- iii) $R_3 = \{(2, -1), (7, 7), (1, 3)\}$ iv) $R_4 = \{(7, -1), (0, 3), (3, 3), (0, 7)\}$
30. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$, prove that $(f \circ g) \circ h = f \circ (g \circ h)$
31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
32. Find the sum of n terms of the series $0.4 + 0.44 + 0.444 + \dots$ to n terms
33. There are 12 pieces of five, ten and twenty rupee currencies whose total value is ₹105. When first 2 sorts are interchanged in their numbers its value will be increase by ₹20. Find the number of currencies in each sort.
34. State and prove Basic Proportionality Theorem.
35. Find the value of k, if the area of a quadrilateral is 28 sq units, whose vertices are taken in the order $(-4, -2)$, $(-3, k)$, $(3, -2)$ and $(2, 3)$

(3)

36. Find equation of a straight line through the intersection of lines $5x - 6y = 2$, $3x + 2y = 10$ and perpendicular to the line $4x - 7y + 13 = 0$.
37. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30° . Determine the height of the tower.
38. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and base is hollowed out. Find the total surface area of the remaining solid.
39. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?
40. Find the mean and variance of the first n natural numbers.
41. Three fair coins are tossed together. Find the probability of getting
- all heads
 - at least one tail
 - atmost one head
 - at most two tails

42. if $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$, verify that $(AB)^T = B^T A^T$.

Part - IV

IV. Answer all the questions. 2 x 8 = 16

43. a) Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC.

(OR)

b) Draw a triangle ABC of base BC = 5.6 cm, $\angle A = 40^\circ$ and the bisector of $\angle A$ meets BC at D such that CD = 4 cm.

44. a) Draw the graph of $xy = 24$, $x, y > 0$ using the graph find

- y when $x = 3$ and
- x when $y = 6$

(OR)

b) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$
