TVL10M

Tirunelveli District Common Examinations
First Revision Test - January 2023

Standard 10

MATHEMATICS

Time: 3.00 Hrs. Marks: 100

PART - I

I. Choose the correct answer: **14×1=14**

1) If f : A→B is a bijective function and if n(B) = 7, then n(A) is equal to _____.
   a) 7 b) 49 c) 1 d) 14
2) The order pairs of (a−11, 6) (−5, 3a−b) are equal then (a, b) is _____.
   a) (6, −12) b) (−6, −12) c) (6, 12) d) (−6, 12)
3) Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1}+F_{n-2}$ then F_5 is _____.
   a) 3 b) 5 c) 8 d) 11
4) The value of $(1^3+2^3+3^3+.....+15^3) - (1+2+3+.....+15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520
5) Graph of a linear equation is a _____.
   a) straight line b) circle c) parabola d) hyperbola
6) If α and β are the zeros of the polynomial x^2-5x+6 then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to _____.
   a) $\frac{-5}{6}$ b) $\frac{-6}{5}$ c) $\frac{6}{5}$ d) $\frac{5}{6}$
7) If in ΔABC, DE || BC. AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is
   a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm
8) A tangent is perpendicular to the radius at the _____.
   a) centre b) point of contact c) infinity d) chord
9) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is _____.
   a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) 0
10) $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to _____.
   a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$
11) 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 sum has measure.
   a) 45° b) 30° c) 90° d) 60°
12) The total surface area of a hemi-sphere is how much times the square of its radius
   a) π b) 4π c) 3π d) 2π
13) The range of the data 8, 8, 8, 8, 8, ... 8 is
   a) 0 b) 1 c) 8 d) 3
14) Which of the following is incorrect?
   a) P(A) > 1 b) $0 \le P(A) \le 1$ c) $P(\phi) = 0$ d) $P(A)+P(\bar{A}) = 1$

PART - II

II. Answer any ten questions. Question No. 28 is compulsory: **10×2=20**

15) Let A = {1, 2, 3} and B = {x/x is a prime number less than 10}. Find A×B and B×A.
16) Find k if fof(k) = 5 where f(k) = 2k−1.
17) Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
18) Find the sum $3+1+\frac{1}{3}+.....\infty$.
19) Simplify: $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$
20) Find the value of a, b, c, d from the equation $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$.
21) The length of the tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle?
22) i) What is the slope of a line whose inclination is 30°?
    ii) What is the inclination of a line whose slope is $\sqrt{3}$?

23) Prove that $\frac{\sec\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} = \cot\theta$.

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

25) The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of the cylinder.

26) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

27) What is the probability of drawing either a king or queen in a single draw from a well shuffled pack of 52 cards?

28) Show that the straight lines $x-2y+3 = 0$ and $6x+3y+8 = 0$ are perpendicular.

PART - III

III. Answer any ten questions. Question No. 42 is compulsory: **10×5=50**

29) Let $A = \{x \in W / x<2\}$, $B = \{x \in N / 1<x\leq 4\}$ and $C = \{3, 5\}$. Verify that $A\times(B\cap C) = (A\times B)\cap(A\times C)$.

30) If the function $f : R\to R$ is defined by $f(x) = \begin{cases} 2x+7; & x<-2 \\ x^2-2; & -2\leq x<3 \\ 3x-2; & x\geq 3 \end{cases}$, then find the values of (i) f(4) (ii) f(−2) (iii) f(4)+2f(1) (iv) $\frac{f(1)-3f(4)}{f(-3)}$.

31) Find the HCF of 396, 504, 636.

32) In a G.P the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is 57/2. Find the three terms.

33) If $A = \frac{2x+1}{2x-1}$, $B = \frac{2x-1}{2x+1}$ find $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$.

34) If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2-5A+7I_2 = 0$.

35) State and prove Pythagoras theorem.

36) Find the value of k, if the area of a quadrilateral is 28 sq.units. Whose vertices are taken in the order (−4, −2), $(-\frac{7}{4}k)$, (3, −2) and (2, 3).

37) If $\frac{\cos\theta}{1+\sin\theta} = \frac{1}{a}$, then prove that $\frac{a^2-1}{a^2+1} = \sin\theta$.

38) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60°. If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.

39) 4 persons live in a conical tent whose slant height is 19m. If each person require 22m^2 of the floor area, then find the height of the tent.

40) Marks of the students in a particular subject of a class are given below. Find its standard deviation.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	8	12	17	14	9	7	4

41) Two unbiased dice are rolled once. Find the probability of getting.
(i) a doublet (ii) the product as a prime number (iii) the sum as a prime number (iv) the sum as 1.

42) 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?

PART - IV

IV. Answer all the questions: **2×8=16**

43) a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4}>1$).

(OR)

b) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

44) a) Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find (i) y when $x = 3$ and (ii) x when $y = 6$.

(OR)

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