Tvl10M

Tirunelveli District

Common Quarterly Examination - September 2024

Standard 10

MATHEMATICS

Time: 3.00 Hrs Marks: 100

PART - I

Answer all the questions. **14x1=14**

1) If n(A×B) = 6 and A = {1, 3} then n(B) is
   a) 1 b) 2 c) 3 d) 6

2) Let A = {1, 2, 3, 4} and B = {4, 8, 9, 10}. A function f:A→B given by f = {(1, 4) (2, 8) (3, 9) (4, 10)} is a
   a) Many one function b) Identity function
   c) One to - one function d) Into function

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 next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots\ldots$ is
   a) $1/24$ b) $1/27$ c) $2/3$ d) $1/81$

5) The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to
   a) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ b) $16\left|\frac{y^2}{x^2z^4}\right|$ c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

6) $\sqrt{a^2x^2 + 2abx + b^2}$ square root
   a) |ax−b| b) |ax+b| c) |ab+x| d) |ab−x|

7) If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm, then AB is
   a) 2.5 cm b) 5 cm c) 10 cm d) $5\sqrt{2}$ cm

8) The slope of the line which is perpendicular to a line joining the pts (0, 0) and (−8, 8) is
   a) −1 b) 1 c) $1/3$ d) −8

9) If $(\sin\alpha + \operatorname{cosec}\alpha)^2 + (\cos\alpha + \sec\alpha)^2 = K + \tan^2\alpha + \cot^2\alpha$, then the value of K is equal to
   a) 9 b) 7 c) 5 d) 3

10) If x = a tan θ and y = b sec θ then
   a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$

11) In ΔLMN, ∠L = 60°, ∠m = 50°. If ΔLMN ~ Δ PQR then the value of ∠R is
   a) 40° b) 70° c) 30° d) 110°

12) If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar when
   a) ∠B = ∠E b) ∠A = ∠D c) ∠B = ∠D d) ∠A = ∠F

13) If $3\sqrt{x} = 9$ find the value of 'x'
   a) 3 b) 9 c) 27 d) $\sqrt{3}$

14) $\sqrt{3}\sin\theta - \cos\theta = 0$ then find the value of 'θ'

a) 0° (b) 30° c) 45° d) 60°

PART - II

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

15) Define function.

16) A = {0, 1}, B = {0, 1}, C = {0, 1} then find (A×B)×C

17) Find f.g. and g.f when f(x) = 2x+1 and g(x) = x^2-2

18) Find the sum $3+1+\frac{1}{3}+\ldots\ldots\ldots^{\infty}$

19) Solve: x+y = 1, x−y = 3.

20) The perimeters of two similar triangles ABC and PQR are respectively 36 cm and 24 cm. If PQ = 10 cm, find AB.

21) Find the distance between from the points (3, 4) (5, 5)

22) Find the equation of a line which passes through (5, 7) and makes intercepts on the axes equal in magnitude but opposite in sign.

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

24) If the Highest Common Factor of 210 and 55 is expressible in the form 55x−325 find x.

25) If the first term of an infinite G.P. is 8 and its sum to infinity is $\frac{32}{3}$ then find the common ratio.

26) If $\Delta ABC \sim \Delta DEF$ such that area of ΔABC is 9 cm^2 and the area of ΔDEF is 16 cm^2 and BC = 2.1 cms. Find the length of EF.

27) Find the square root $361x^4y^2$

28) Area of a rectangle $\frac{(x-4)(x+3)}{3x-12}$ km^2, length $\frac{x-3}{3}$ km then find breath.

PART - III

III. Answer any 10 questions. Q.No. 42 is compulsory. **10×5=50**

29) A function 'f' is defined by f(x) = 2x−3

(i) find $\frac{f(0)+f(1)}{2}$

(ii) find x such that f(x) = 0

(iii) find x such that f(x) = x

(iv) find x such that f(x) = f(1−x)

30) f(x) = x^2, g(x) = 2x and h(x) = x+4 prove that fo(goh) = (fog)oh

31) If the function f:R→R is defined by $f(x) = \begin{cases} 2x+7 & x < -2 \\ x^2-2 & -2 \le x < 3 \\ 3x-2 & x \ge 3 \end{cases}$ then find the value of (i) f(4) (ii) f(−2) (iii) f(4)+2f(1) (iv) $\frac{f(1)-3f(4)}{f(-3)}$

32) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.