V11M

Virudhunagar District

Common Second Revision Test - 2025

Standard 11

MATHEMATICS

Time Allowed: 3.00 Hours Maximum Marks: 90

PART - A

Choose the best answer: **20×1=20**

1) The number of relations on a set containing 3 elements is

a) 9 b) 81 c) 512 d) 1024

2) If the function $f : [-3, 3] \to S$ defined by $f(x) = x^2$ is onto, then S is

a) $[-9, 9]$ b) R c) $[-3, 3]$ d) $[0, 9]$

3) The solution set of $|x-1| \geq |x-8|$ is

a) $[0, 2]$ b) $[2, \infty]$ c) $(0, 2)$ d) $(-\infty, 2)$

4) The number of roots of $(x+3)^4+(x+5)^4 = 16$ is

a) 4 b) 2 c) 3 d) 0

5) $\cos1^\circ+\cos2^\circ+\cos3^\circ+\ldots\ldots\ldots+\cos179^\circ =$

a) 0 b) 1 c) −1 d) 89

6) $\tan^{-1}\left(\frac{-1}{\sqrt{3}}\right) =$

a) $\frac{\pi}{3}$ b) $\frac{-\pi}{3}$ c) $\frac{\pi}{6}$ d) $\frac{-\pi}{6}$

7) Number of sides of a polygon having 44 diagonals is

a) 4 b) 4! c) 11 d) 22

8) $1+3+5+7+\ldots\ldots\ldots+17 =$

a) 101 b) 81 c) 71 d) 61

9) The remainder of 38^{15} is divisible by 13 is

a) 12 b) 1 c) 11 d) 5

10) The coefficient of x^5 in the series e^{-2x} is

a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $\frac{-4}{15}$ d) $\frac{4}{15}$

11) The image of the point (2, 3) in the line $y = -x$ is

a) (−3, −2) b) (−3, 2) c) (−2, −3) d) (3, 2)

12) If $A = \begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$ then for what value of λ, $A^2 = 0$?

a) 0 b) ±1 c) −1 d) 1

13) $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{DA}+\overrightarrow{CD} =$

a) $\overrightarrow{AD}$ b) $\overrightarrow{CA}$ c) $\vec{0}$ d) $-\overrightarrow{AD}$

14) If $|\vec{a}| = 13$, $|\vec{b}| = 5$ and $\vec{a}.\vec{b} = 60^\circ$ then $|\vec{a} \times \vec{b}| =$

a) 15 b) 35 c) 45 d) 25

15) $\lim_{x \to \infty} \frac{a^x - b^x}{x} =$

a) log ab b) log $\frac{a}{b}$ c) log $\frac{b}{a}$ d) $\frac{a}{b}$

16) $\lim_{x \to 4} \lfloor x \rfloor =$

a) 3 b) 4 c) infinity d) 0

17) If f(x) = x+2 then the value of f'(f(x)) at x = 4 is

a) 8 b) 1 c) 4 d) 5

18) The number of points in R, m which the function f(x) = |x−1|+|x−3|+3mx is not differentiable is

a) 3 b) 2 c) 1 d) 4

19) $\int \cos 2x \, dx =$

a) 2 sin2x+C b) −2 sin2x+C c) $\frac{\sin 2x}{2} + C$ d) $\frac{-\sin 2x}{2} + C$

20) If two events A and B are independent such that P(A) = 0.35, P(A∪B) = 0.6 then P(B) is

a) $\frac{5}{13}$ b) $\frac{1}{13}$ c) $\frac{4}{13}$ d) $\frac{7}{13}$

Part - B

i) Answer any 7 questions only. **7×2=14**

ii) Qn.No. 30 is compulsary.

21) In the set Z of integers, define mRn if m−n is divisible by 7. Prove that R is an equivalence relation.

22) Construct a quadratic equation with roots 7 and −3.

23) Find n if $(n+2)P_4 = 42 \times {}^nP_2$.

24) Find first six elements of the series if $a_n = \begin{cases} n & ; \text{ n is 1, 2 or 3} \\ a_{n-1} + a_{n-2} + a_{n-3} & ; \quad n > 3 \end{cases}$

25) Rewrite $\sqrt{3}x + y + 4 = 0$ into normal form.

26) Find the area of the triangle whose vertices are (−2, −3), (3, 2) and (−1, −8).

27) Find the area of the parallelogram if two its adjacent sides one $\vec{a} = 3(\hat{i} + \hat{j} + 4\hat{k})$ and $\vec{b} = \hat{i} - \hat{j} + \hat{k}$.

28) Find f(x) if f'(x) = 4x−5 and f(2) = 1.

29) An integer is chosen at random from the first 100 positive integers what is the probability that the integer chosen is a prime or multiple of 8?

30) Find the positive integer n if $\lim_{x\to 3}\frac{x^n-3^n}{x-3}=27$.

Part - C

i) Answer any 7 questions only. **7×3=21**

ii) Qn.No. 40 is compulsary.

31) From the curve $y=|x|$, draw (i) $y=|x-1|+1$ (ii) $y=|x+1|-1$ (iii) $y=|x+2|-3$.

32) Resolve into partial fractions: $\frac{3x+1}{(x-2)(x+1)}$

33) If $A+B=45^\circ$, show that $(1+\tan A)(1+\tan B)=2$.

34) If the letters of the word IITJEE are permuted in all possible ways and the strings thus formed one arranged in the lexicographic order, find the rank of the word IITJEE.

35) Find $\sqrt[3]{65}$.

36) The slope of one of the straight lines $ax^2+2hxy+by^2=0$ is twice that of the other, show that $8h^2=9ab$.

37) Prove that the points whose position vectors $2\hat{i}+4\hat{j}+3\hat{k}$, $4\hat{i}+\hat{j}+9\hat{k}$, $10\hat{i}-\hat{j}+6\hat{k}$ form a right angled triangle.

38) Evaluate (i) $\int a^x e^x\,dx$ (ii) $\int e^{x\log 2}e^x\,dx$.

39) If $P(A)=0.6$, $P(B)=0.5$, $P(A\cap B)=0.2$ find (i) $P(A/B)$ (ii) $P(\bar{A}/B)$ (iii) $P(A/\bar{B})$.

40) If $y=\tan^{-1}\left(\frac{1+x}{1-x}\right)$, find y'.

Part - D

Answer all the questions: **7×5=35**

41) If $f: R\to R$ is defined by $f(x)=2x-3$. Prove that f is a bijection and find its inverse.

(OR)

Prove that (i) $\lim_{\theta\to 0}\frac{\sin\theta}{\theta}=1$ (ii) $\lim_{\theta\to 0}\frac{1-\cos\theta}{\theta}=0$.

42) Solve: $\frac{x^2-4}{x^2-2x-15}\le 0$

(OR)

Prove that $\log 2+16\log\frac{16}{15}+12\log\frac{25}{24}+7\log\frac{81}{80}=1$.

43) State and prove Napier's formula.

(OR)

If $y=e^{\tan^{-1}x}$, prove that $(1+x^2)y''+(2x-1)y'=0$.

44) Prove for all $n \geq 1$, $3^{2n+2} - 8n - 9$ is divisible by 8.

(OR)

Evaluate: $\int \frac{3x+5}{x^2+4x+7}\,dx$

45) If x is so large, prove that $\sqrt[3]{x^3+6} - \sqrt{x^3+3} = \frac{1}{x^2}$ approximately.

(OR)

Show that $9x^2 - 24xy + 16y^2 - 12x + 16y - 12 = 0$ is a pair of parallel straight lines also find the distance between them.

46) Show that the medians of a triangle are concurrent.

(OR)

Show that the points with one position vectors $4\hat{i}+5\hat{j}+\hat{k}$, $-\hat{j}-\hat{k}$, $3\hat{i}+9\hat{j}+4\hat{k}$ and $-4\hat{i}+4\hat{j}+4\hat{k}$ are coplanar.

47) Prove that $|A| = \begin{vmatrix} (z+r)^2 & p^2 & p^2 \\ q^2 & (r+p)^2 & q^2 \\ r^2 & r^2 & (p+q)^2 \end{vmatrix} = 2pqr\,(p+q+r)^2$.

(OR)

A problem in mathematics is given to three students whose chances if solve it are $\frac{1}{3}, \frac{1}{4}$ and $\frac{1}{5}$.

i) What is the probability that the problem is solved?

ii) What is the probability that exactly one of them will solve it?
