

SAMPLE PAPER (Applied Mathematics)

Class 12th

(topic wise break up)

Topic	No of 1 Mark Question	No of 2 Marks Question	No of 4 Mark Questions	No. of 6 Marks Question	Total Marks
Matrices and Determinates	x	1	2	1	16
Limits and Continuity	2	2	1	x	10
Derivative	2	1	x	1	10
Applications of derivations	2	1	1	x	08
Integrals	1	x	1	1	11
Differential equations	X	2	1	x	8
Statics	2	1	1	x	8
Dynamics	1	2	1	x	9
Total Questions	10	10	8	3	80

Note :- The sample question paper comprises of 31 questions divided into four sections A,B,C & D

Section A Comprises of 10 1 Marks Questions

Section B' ===== 10 2 Marks Questions

Section C ===== 8 4 Marks Questions

Section D ===== 3 6 Marks Questions

Subject: Applied Mathematics

Class: 12th

Max. Marks: 80

Time: 3 hours

Section A (10x1 = 10marks)

Q1. The function $f(x) = 3x + 2$ is continuous at

- a) $x=1$ b) $x=3$ c) $x=4$ d) for all real values of x

Q2. The value of $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$ is

- a) a^n b) a^{n-1} c) na^n d) na^{n-1}

Q3. If $y = c$ (constant), the $\frac{dy}{dx}$ is

- a) 1 b) 0 c) x d) None of these

Q4. The derivative of $\sin 2x$ with respect to x is

- a) $\cos 2x$ b) $2\cos 2x$ c) $2\sin 2x$ d) None of these

Q5. The integral of a function is also called as antiderivative. (True/False)

Q6. The resultant of two forces P and Q at right angles to P is $\cos^{-1}(P/Q)$ (True/False)

Q7. ABCD is a quadrilateral. Forces represented by \vec{DA} , \vec{DB} , \vec{AC} and \vec{BC} act on a particle are equivalent to

Q8. If $S = t^{1/2}$, then acceleration is proportional to

Q9. Write down the equation of a tangent to a curve at (x_1, y_1)

Q10. Define point of inflexion

Section-B (very short Answer 10x2=20 marks)

Q11 Expand the determinant $\begin{vmatrix} 4 & 6 \\ 2 & 5 \end{vmatrix}$

Q12. Evaluate $\lim_{x \rightarrow 2} \frac{(x^2 + 3x)}{x + 2}$

Q13. Find the points at which the function $f(x) = 3x + 7$ is continuous.

Q14. If $f(t) = 1 - 4t^2$, then find $f'(1)$.

- Q15. Find the rate of change of area of a circle of radius r when radius varies and $r=3\text{cm}$.
- Q16. Find the order and degree of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} + 3 = 0$
- Q17. Form a differential equation of $y=mx+c$.
- Q18. State parallelogram law of vectors.
- Q19. Prove that $V=U+at$
- Q20. A stone is thrown upwards with a velocity of 24.5m/sec . after what time will it reach the ground.

Section-C(short answer 8x4=32marks)

Q21. Find X , if $Y = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $2X+Y = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix}$

Q22. Evaluate the determinant $\begin{vmatrix} a + ib & c + id \\ -c + id & a - ib \end{vmatrix}$

Q23. Evaluate the Limit $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$

Q24. Find the maximum and minimum values of the function $f(x) = 3 - 2\sin x$

Q25. Evaluate the integral

$$\int \frac{dx}{\sqrt{a^2 - x^2}}$$

Q26. Solve the differential equation $\frac{dy}{dx} = \frac{(1 - \cos x)}{(1 + \cos x)}$

Q27. State and prove Lami's theorem.

Q28. Find the velocity and acceleration of a particle after $t=5\text{sec}$.,

if the equation of motion is $s=3t^2+6t+5$.

Section-D (Long answer 3x6=18marks)

Q29. Solve using matrix method, for x , y and z

$$2x - y - z = 7$$

$$3x + y - z = 7$$

$$x + y - z = 3$$

OR

Solve using Cramm's Rule

$$2x - y - z = 7$$

$$3x + y - z = 7$$

$$x + y - z = 3$$

Q30. Find $\frac{dy}{dx}$ if $x^y + y^x + x^x = a^b$

OR

If $x = 2\cos t - \cos 2t$ and $y = 2\sin t - \sin 2t$, find $\frac{d^2y}{dx^2}$ at $t = \pi/2$

Q31. Evaluate $\int_0^{\pi/2} \sin \phi \cos^5 \phi d\phi$

OR

Evaluate as limit of sum $\int_0^2 (x^2 + 1) dx$