

1348**Code : 15SC-02M**Register
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II Semester Diploma Examination, Nov./Dec. 2016**ENGINEERING MATHEMATICS – II****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any 10 questions in Section – A, 8 questions from Section – B and 5 questions from Section – C.
- (ii) Each question carries 3 marks in Section – A, 5 Marks in Section – B and 6 Marks in Section – C.

SECTION – A**(Answer any 10)**

1. Find the slope, x-intercept and y-intercept of the line $2x + 3y - 11 = 0$.
2. Find the focus, vertex and length of Latus rectum of $y^2 = 28x$.
3. If $y = \tan^{-1} x + 5 \log x - 2e^{3x}$, then find $\frac{dy}{dx}$.
4. If $y = \log \sqrt{\sin x}$, find $\frac{dy}{dx}$.
5. If $y = x^{1/x}$, find $\frac{dy}{dx}$.
6. If $x = \sin^{-1} t$, $y = \cos^{-1} t$, find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $y = 3x^2 + 4x$ at (1, 2).
8. The equation of motion is given by $S = 3t^2 + 4t + 6$, find the velocity after 2 seconds.
9. Evaluate $\int \left(x^5 + \frac{5}{x} + 4 \operatorname{cosec}^2 x \right) dx$.
10. Evaluate $\int \frac{1}{\sin^2 x \cos^2 x} dx$.



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11. Evaluate $\int \frac{\tan \sqrt{x}}{\sqrt{x}} dx$.

12. Evaluate $\int_0^4 \frac{1}{16+x^2} dx$.

13. Find the volume generated by rotating the curve $y = x + 1$ above x -axis between ordinates $x = 0$ and $x = 2$.

14. Form the differential equation from $x^2 + y^2 = a^2$, where 'a' is parameter.

Section – B
(Answer any 8)

15. Find the equation of the line passing through the midpoint of line joining the points (2, 4) & (6, 8) and having slope 2.

16. If $y = \frac{\sin hx}{1 + \sin hx}$, find $\frac{dy}{dx}$.

17. If $x = a \cos^4 \theta$, $y = b \sin^4 \theta$, find $\frac{dy}{dx}$ at $\theta = \pi/4$.

18. If $y = e^{\tan^{-1} x}$, prove that $(1+x^2) y_2 + (2x-1) y_1 = 0$.

19. The volume of a spherical ball is increasing at the rate of 36π cc/s. Find the rate at which the radius is increasing when the radius of the ball is 2 cm.

20. Evaluate $\int \sqrt{\frac{1+\cos x}{1-\cos x}} dx$.

21. Evaluate $\int \frac{(1+\log x)^2}{x} dx$.

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22. Evaluate $\int \tan^{-1} x \, dx$.

23. Evaluate $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$.

24. Find the area bounded by the curve $y = 4x - x^2 - 3$, x -axis and ordinate $x = 1$, $x = 4$.

25. Solve $\frac{dy}{dx} + y \tan x = \cos x$.

SECTION – C

(Answer any 5)

26. Find the equation to the line passing through the point $(-2, 1)$ and perpendicular to the line joining the points $(-7, 3)$ & $(2, 7)$.

27. Find the length of axis, eccentricity and foci of hyperbola $\frac{x^2}{36} - \frac{y^2}{25} = 1$.

28. Differentiate $\cos x$ w.r.t x from first principles.

29. Find $\frac{dy}{dx}$ if $x^3 + y^3 - 3xy^2 - 3y = 15$.

30. Find the maximum and minimum value of the function $2x^3 + 3x^2 - 36x + 1$.

31. Evaluate $\int \tan^4 x \, dx$.

32. Evaluate $\int_0^{\pi/2} \cos^3 x \, dx$.

33. Solve the differential equation $\frac{dy}{dx} = e^{3x+4y}$, given that $y = 0$ where $x = 0$.

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