

1542**Code : 15SC02M**Register
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II Semester Diploma Examination, Nov./Dec.-2018**ENGINEERING MATHEMATICS – II****Time : 3 Hours]****[Max. Marks : 100**

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

SECTION – A

1. Find the equation to the straight line passing through (2, 3) and having slope 5. 3
2. Find the focus and length of the latus rectum of the parabola $y^2 = 28x$. 3
3. Differentiate $x \sin x$ with respect to x . 3
4. Find $\frac{dy}{dx}$ if $x = at$, $y = at^2$. 3
5. Find $\frac{dy}{dx}$ if $y = \log(\sin x)$. 3
6. Find $\frac{dy}{dx}$ if $y = x^x$. 3
7. Find the slope of the tangent to the curve $y = x^2 - 3x + 2$ at (1, 0). 3
8. The displacement of a particle in time 't' seconds is given by $s = t^3 - 6t^2 - 8$. Find the velocity after 3 seconds. 3

9. Evaluate : $\int (x^4 + \cos 2x - \frac{1}{x}) dx$. 3
10. Evaluate : $\int \tan^2 x dx$. 3
11. Evaluate : $\int \sqrt{1 + \cos 2x} dx$. 3
12. Evaluate $\int_0^1 e^{5x+8} dx$. 3
13. Find the area bounded by the curve $y = 3x^2 + 2x$, x -axis and ordinates $x = 0$ and $x = 1$. 3
14. Form the differential equation by eliminating a and b from the equation $y = ae^x + be^{-x}$. 3

SECTION - B

15. Find the equation to the straight line passing through the point $(6, -4)$ and perpendicular to the line $7x - 6y + 3 = 0$. 5
16. Differentiate $\sin x$ with respect to x by the method of first principle. 5
17. Find $\frac{dy}{dx}$ if $y = \frac{1 - \tan x}{1 + \tan x}$. 5
18. If $y = \tan^{-1} x$, prove that $(1 + x^2) y_2 + 2xy_1 = 0$. 5

19. Find $\frac{dy}{dx}$ if $x^2 + 2xy + y^3 = 0$. 5
20. The volume of a sphere is increasing at the rate of 20 cc/s. Find the rate of increase of its radius when the radius is 4 cm. 5
21. Evaluate $\int (\sec^2 x + e^{-3x} - \frac{1}{1+x^2} + \frac{1}{x} + 5) dx$ 5
22. Evaluate $\int \frac{6x-5}{\sqrt{3x^2-5x+2}} dx$. 5
23. Evaluate $\int_0^1 (3x^2 - 6x + 2) dx$. 5
24. Find the volume of the solid generated by rotating the curve $y = x + 1$ about x -axis between $x = 0$ and $x = 2$. 5
25. Solve the differential equation $(1 + y) dx + (1 + x) dy = 0$. 5

SECTION - C

26. Find the equation to the straight line passing through the point (5, 2) and (-3, 3) and find the slope of the line. 6
27. Find the eccentricity, length of the latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. 6
28. Find $\frac{dy}{dx}$ if $x = a \cos^3 \theta$ and $y = a \sin^3 \theta$ at $\theta = \frac{\pi}{4}$. 6

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29. Find the maximum and minimum values of the function $y = 2x^3 - 3x^2 - 36x + 10$. 6
30. Find $\frac{dy}{dx}$ if $y = \tan^{-1}\left(\frac{1+x}{1-x}\right)$. 6
31. Evaluate $\int \tan^{-1}x \, dx$. 6
32. Evaluate $\int_0^{\pi/2} \sin^3x \, dx$. 6
33. Solve the differential equation $\frac{dy}{dx} + 3y = e^{2x}$. 6
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