1147

Code : 15SC02M

Register Number | | | | | | | | | | |

II Semester Diploma Examination, April/May-2019

ENGG. MATHEMATICS-II

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (i) Answer any **10** questions from Section – **A**, each question carries **3** marks.

(ii) Answer any **8** questions from Section – **B**, each question carries **5** marks.

(iii) Answer any **5** questions from Section – **C**, each question carries **6** marks.

SECTION – A

1. Find the equation of the straight line passing through (3, 2) having slope 5. **3**

2. Find the equation of parabola with focus at (2, 0) and x-axis as the axis. **3**

3. Differentiate $x^4 + \log x - \tan^{-1}x$ w.r.t. x. **3**

4. Differentiate $x^2 \sin x$ w.r.t. x. **3**

5. If $x^2 + y^2 = 4$, find $\frac{dy}{dx}$. **3**

6. If $x = \cos\theta$, $y = \sin\theta$ find $\frac{dy}{dx}$. **3**

7. Find the slope of the tangent to the curve $y = x^2 + 5x - 2$ at (1, 4). **3**

8. The equation of motion of a particle is $S = 3t^2 - 4t + 5$. Find velocity after 3 seconds. 3

9. Integrate $\frac{1}{x} + \cos x + e^x$ w.r.t. x. 3

10. Evaluate : $\int (1 + \cos 2x)\, dx$. 3

11. Integrate, $\tan^2 x$ w.r.t. x. 3

12. Evaluate : $\int_0^2 (2 + x)(2 - x)\, dx$. 3

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

14. Form the differential equation by eliminating 'a' from $y = ax$. 3

SECTION – B

15. Find the equation of the line passing through the point (1, 2) and parallel to $4x - 3y + 5 = 0$. 5

16. If $y = \frac{x^2 + 1}{x^2 - 1}$, find $\frac{dy}{dx}$. 5

17. If $y = (\sin x)^x$, find $\frac{dy}{dx}$. 5

18. If $y = a\cos t + b\sin t$, prove that $\frac{d^2y}{dt^2} + y = 0$. 5

19. The volume of a sphere is increasing at the rate of 4 cm^3/s. Find the rate at which the radius is increasing when the radius is 6 cm. 5

20. Evaluate : $\int \frac{1}{1+\cos x}\,dx$. 5

21. Evaluate : $\int x \log x\,dx$. 5

22. Evaluate : $\int \sin^6 x \cos x\,dx$. 5

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

24. Find the area bounded by the curve $y = x^2 + x + 1$, the x-axis and the ordinates at $x = 0$ and $x = 2$. 5

25. Solve differential equation 5

$$\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$$

SECTION – C

26. Find the equation to the perpendicular bisector of the line joining the points (6, 8) and (4, 2). 6

27. Find eccentricity and co-ordinates of foci of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. 6

28. Differentiate $\sin x$ w.r.t. x from first principle. 6

29. If $y = \tan^{-1}x$, prove that $(1 + x^2)\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} = 0$. 6

30. Find the maximum and minimum values of the function $y = x^3 - 12x^2 + 45x + 5$. 6

31. Evaluate : $\int \sqrt{3+\tan x}.\sec^2 x \, dx$. 6

32. Evaluate : $\int_0^{\pi/2} \sin^3 x \, dx$. 6

33. Solve the differential equation $\frac{dy}{dx} + y \tan x = \cos x$. 6
