Register Number

II Semester Diploma Examination, Nov./Dec. 2017

# **ENGINEERING MATHEMATICS – II**

Time: 3 Hours |

[ Max. Marks : 100

(i) Answer any 10 questions from Section A, 8 questions from Section B and Note: 5 questions from Section C,

(ii) Each question carries 3 marks in section - A, 5 marks in section - B & 6 marks in section - C.

## SECTION - A

1. inclination 135°.

Find the focus and equation to directrix of the parabola  $y^2 = 40x$ .

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3. If  $y = (x^2 + 5x) \cdot \log x$ . Find  $\frac{dy}{dx}$ .



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4. If  $y = (3x^3 - 4x + 5)^6$ . Find  $\frac{dy}{dx}$ .

3

Find  $\frac{dy}{dx}$ , if  $x^2 + y^2 = a^2$ .

3

If  $x = a \tan \theta$ ,  $y = a \sec \theta$ . Find  $\frac{dy}{dx}$  at  $\theta = \frac{\pi}{4}$ .

3

Find the equation to the tangent to the curve  $y = x^2 + 1$  at (1, 2). 7.

3

- 8. The displacement of a particle S meters, moving along a straight line is  $S = 4t^3 2t^2 + t$ . Find velocity when t = 2 secs.
- 9. Evaluate  $\int (x^5 + 3e^{2x} + 4\sin 3x) dx$ .
- 10. Evaluate  $\int \frac{1}{1+\sin x} dx$ .
- 11. Evaluate  $\int (x^2 + 5x + 7)^5 (2x + 5) dx$ .
- 12. Evaluate  $\int_{0}^{1} (x+2)(x-5) dx$ .
- 13. Find the area bounded by the curve y = 3x, the x-axis and the ordinates between x = 1 & x = 2.
- 14. Form the differential equation from  $y = ae^x + be^{-x}$  by eliminating a & b.





## SECTION - B

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5

- 15. Find the equation to the straight line passing through the point and parallel to the line 3x + 5y 3 = 0.
- 16. If  $y = \frac{1-x^2}{1+x^2}$  find  $\frac{dy}{dx}$ . Since addition in Figure 2. Since  $\frac{dy}{dx}$  is the first of the first of
- 17. If  $y = \tan^{-1} x$ , show that  $(1 + x^2) y_2 + 2xy_1 = 0$ .
- 18. If  $y = (\sec x)^x$  find  $\frac{dy}{dx}$ .

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19. The radius of a sphere is increasing at the rate of 2 cm/sec. Find the rate of increase of the volume when the radius is 6 cm.

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20. Evaluate  $\int \sin^3 x \, dx$ .

E

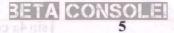
21. Evaluate  $\int \frac{(\tan^{-1} x)^{10}}{1+x^2} dx$ .

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22. Evaluate  $\int x \cos 2x \, dx$ .

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23. Evaluate  $\int_{-\pi/4}^{\pi/4} \cot^2 x \, dx.$ 



Diploma - [All Branches]

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24. Find the volume generated by rotating the curve y = x + 2 about x-axis between x = 0.

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25. Solve the differential equation  $\frac{dy}{dx} = 3x^2 - 2x + 5$ .



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when x = 1, y = 2.

#### SECTION - C

26. Find the equation to the straight line passing through the point (4, -3) & (2, 1). Also find the slope and the y-intercept of the line.

5

27. Find the eccentricity foci and equation to directrix for the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$ .

28. Differentiate sin x w.r.t. x from first principles.

Turn over

- 29. If  $y = e^{m \sin^{-1} x}$  prove that  $(1 x^2) y_2 xy_1 m^2 y = 0$ .

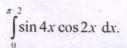
Find the maximum and minimum value of the function 30.

$$x^3 - 6x^2 - 15x + 5$$

31. Evaluate

$$\int \left( \frac{4}{x} - \frac{3}{\sqrt{1 - x^2}} + 3\tan x - 3\csc^2 x + \frac{1}{\sqrt{x}} - 5 \right) dx.$$

32. Evaluate:



Diploma - [All Branches]





33. Solve the differential equation

$$\frac{\mathrm{d}y}{\mathrm{d}x} + y \tan x = \sec x.$$



Diploma Question Papers [2015-

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