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Code: 15SC-02M

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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)

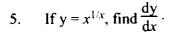
- 1. Find the slope, x-intercept and y-intercept of the line 2x + 3y 11 = 0. TA CONSOLE!
- 2. Find the focus, vertex and length of Latus rectum of $y^2 = 28x$.
- 3. If $y = \tan^{-1} x + 5 \log x 2e^{3x}$, then find $\frac{dy}{dx}$.



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4. If $y = \log \sqrt{\sin x}$, find $\frac{dy}{dx}$.





Diploma Question Papers [2015-19]

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- 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 $\int \left(x^5 + \frac{5}{x} + 4 \csc^2 x\right) dx.$
- 10. Evaluate $\int \frac{1}{\sin^2 x \cos^2 x} dx.$

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[Turn over

- 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)

BETA CONSOLE!

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

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



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- 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 $(1 + x^2) y_2 + (2x 1) y_1 = 0$.



Diploma Question Papers [2015-19]

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- 19. The volume of a spherical ball is increasing at the rate of 36 π 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 $\int \frac{(1 + \log x)^2}{x} dx.$

- 22. Evaluate $\int \tan^{-1} x \, dx$.
- 23. Evaluate $\int_{0}^{\pi/2} \cos 5x \cos 3x \, dx.$
- Find the area bounded by the curve $y = 4x x^2 3$, x-axis and ordinate x = 1, x = 4. 24.
- 25. Solve $\frac{dy}{dx} + y \tan x = \cos x$.

SECTION - C (Answer any 5)

- Find the equation to the line passing through the point (-2, 1) and perpendicular to 26. the line joining the points (-7, 3) & (2, 7).
- Find the length of axis, eccentricity and foci of hyperbola $\frac{x^2}{36} \frac{y^2}{25} = 1$.

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

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

Find the maximum and minimum value of the function $2x^3 + 3x^2$



- 31. Evaluate $\int \tan^4 x \, dx$.
- 32. Evaluate $\int_{0}^{\pi/2} \cos^3 x \, dx.$
- Solve the differential equation $\frac{dy}{dx} = e^{3x+4y}$, given that y = 0 where x = 0.