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C16–EC–301

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BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

DECE—THIRD SEMESTER EXAMINATION

ENGINEERING MATHEMATICS—III

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

1. Evaluate $(\sec^2 x \quad e^x \quad \sin x)\,dx$.

2. Evaluate $\sqrt{1 \quad \cos 2x}\,dx$.

3. Evaluate $\dfrac{\cos\sqrt{x}}{\sqrt{x}}\,dx$.

4. Evaluate $\dfrac{1}{\sqrt{25 \quad x^2}}\,dx$.

5. Evaluate $\int_0^1 (x^3 \quad 1)\,dx$.

6. Find the mean value of $y \quad x^2$ between $x \quad 2$ and $x \quad 3$.

7. Find the differential equation for $y \quad Ae^x \quad Be^{\ x}$, where A and B are constants.

8. Solve $\frac{dy}{dx} \quad \sqrt{\frac{1 \quad y^2}{1 \quad x^2}}$.

9. Verify that the differential equation $e^y dx \quad (xe^y \quad 2y)\,dy \quad 0$ is an exact equation.

10. Find the integrating factor of $\frac{dy}{dx} \quad y \quad e^{\ x}$.

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

11. *(a)* Evaluate $\sin 5x \cos 2x\, dx$.

(b) Evaluate $\frac{1}{x^2 \quad 8x \quad 25}\, dx$.

12. *(a)* Evaluate $\frac{x}{(x \quad 1)(x \quad 3)}\, dx$.

(b) Evaluate $x^2 e^x dx$.

13. *(a)* Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x \quad \cos x}\, dx$.

(b) Evaluate $\int_0 \frac{x}{1 \quad \sin x}\, dx$.

14. *(a)* Using method of integration, find the area bounded by the circle $x^2 \quad y^2 \quad a^2$.

(b) Find the volume of the solid obtained by revolving the curve $x^2 \quad y \quad 3$ about x-axis from $x \quad 1$ to $x \quad 3$.

15. *(a)* Find the RMS value of $\sqrt{\log x}$ over the range x 1 to x e.

(b) Obtain the value of $\int_0^6 \frac{dx}{1 \quad x^2}$ using trapezoidal rule by taking n 6.

16. *(a)* Calculate the approximate value of $\int_3^3 x^4 dx$ using Simpson's $\frac{1}{3}$rd rule by taking n 6.

(b) Solve $\frac{dy}{dx}$ $(9x \quad y \quad 1)^2$.

17. *(a)* Solve $\frac{dy}{dx}$ $\frac{y}{x}$ $\tan \frac{y}{x}$.

(b) Solve $(x^3 \quad 3xy^2)\,dx \quad (3x^2y \quad y^3)\,dy \quad 0$.

18. *(a)* Solve $\frac{dy}{dx}$ $y \cot x$ $\operatorname{cosec} x$.

(b) Solve $\frac{dy}{dx}$ xy xy^3.

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