CI6–EC–301/C16–CHPC–301/C16–PCT–**301**

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BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
DCE—THIRD SEMESTER EXAMINATION

ENGINEERING MATHEMATICS-II

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

PART—A   3×10=30

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

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

1. Evaluate $\int (ax - \frac{b}{x} - c\sqrt{x})dx$.

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

3. Find the value of $\int_{-1}^{1} \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$.

4. Find the area bounded by the parabola $y = x^2$ and the line $x = 2$.

5. Find $L(t^3 - 3e^{-t} \cosh 2t)$.

6. Find $L^{-1} \dfrac{s}{(s-2)^2}$.

7. Define the Fourier coefficient a_1 for the function $f(x) = k$, constant, in the interval $(0, 2\pi)$.

8. Find the differential equation corresponding to $y = mx + 1$, eliminating the parameter m.

9. Solve $(x-1)dy + (y-1)dx = 0$.

10. Solve $(D^2 - D - 12)y = 0$.

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PART—B   10×5=50

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

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

11. Find the following :

(a) $\displaystyle \int \dfrac{\cos x}{1 - \sin^2 x} dx$

(b) $\displaystyle \int \dfrac{1}{5 - 4\cos x} dx$

12. (a) Evaluate $\displaystyle \int \sin^2 x \cos^3 x \, dx$.

(b) Evaluate $\displaystyle \int_0^1 \dfrac{1}{(x-1)(x-2)} dx$.

13. *(a)* Find the RMS value of $3\sqrt{16-x^2}$ from $x=-3$ to $x=2$.

(b) Find the volume of the solid obtained by revolving the ellipse $\dfrac{x^2}{64}+\dfrac{y^2}{16}=1$ about x-axis.

14. *(a)* Evaluate $\displaystyle\int_{0}^{1}\dfrac{1}{1+x^2}\,dx$ using Simpson's rule taking six equal intervals.

(b) Find $L(t\cos 2t)$.

15. *(a)* Find $L^{-1}\left[\dfrac{s+2}{(s+1)(s+3)}\right]$.

(b) Using convolution theorem, find

$$L^{-1}\left[\dfrac{s}{(s^2+4)(s^2+1)}\right]$$

16. Find the Fourier coefficients of the function x^2+x in the interval $(-\pi,\pi)$.

17. Solve the following :

(a) $\dfrac{dy}{dx}=\dfrac{y+x}{y-x}$

(b) $\dfrac{dy}{dx}+2y=e^{-x}$

18. Solve completely $(4D^2+4D+1)y=e^{-x}+\cos x+x$.

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