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C14-A-401/C14-AA-401/
C14-AEI-401-C14-CH-401
C14-CHST-401/C14-MET-401
C14-MNG-401/C14-TT-401/
C14-BM-401

4401

BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2018

FOURTH SEMESTER (COMMON) 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. Solve $(D^2+3D+2)y=0$

2. Solve $(D^3-D^2-D+1)y=0$

3. Find the particular integral of $(D^2+4)y = \sin 2x$

4. Find $L\{3\cosh 5t-4\sinh 5t\}$

5. Find $L\{\cos 4t \sin 2t\}$

6. Find $L\{t^3 e^{-3t}\}$

7. Find $L^{-1}\left\{\frac{s^2+4}{s^3}\right\}$

8. Write the Dirichlet's conditions for the existence of Laplace transform of a function.

9. Find the value of a_0 for the function $f(x) = e^{ax}$ in the interval $(0, 2\pi)$ of Fourier series.

10. Let A and B be two events with $P(A)=\frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B)=\frac{1}{4}$. Find $P(A/B)$.

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.
(2) Each question carries **ten** marks.

11. *(a)* Solve $(D^2+D-6)y=e^{3x}$

(b) Solve $(D^2-4D+4)y=\cos 2x$

12. *(a)* Solve $(D^2-4D+3)y=e^{2x}-\sin 3x$

(b) Solve $(D^2-3D+2)y=5x^2$

13. *(a)* Find $L\{e^{4t}\sin 2t\cos t\}$

(b) Find $L\left\{\frac{\sin 3t\cos t}{t}\right\}$

14. *(a)* Show that $L^{-1}\left\{\frac{1}{s\left(s^2+a^2\right)}\right\}=\frac{1-\cos at}{a^2}$

(b) Using convolution theorem, find the inverse Laplace transform of $\frac{1}{(s+1)(s+2)}$

15. Expand the function $f(x)=x^2$ as a Fourier series in the interval $(-\pi, \pi)$.

16. Expand the function $f(x)=x+x^2$ as a Fourier series in the interval $(-1,1)$.

17. *(a)* State and prove addition theorem.

(b) Three balls are drawn at random from a bag containing six blue and four red balls. What is the chance that two balls are blue and one is red?

18. Let A and B be two events with $P(A)=\frac{1}{5}$, $P(B)=\frac{2}{3}$ and $P(A\cap B)=\frac{1}{15}$. Find *(i)* $P(A\cup B)$, *(ii)* $P(A^C\cap B^C)$, *(iii)* $P(A^C\cup B^C)$ *(iv)* $P(A^C\cap B)$, *(v)* $P(A\cap B^C)$.

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