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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)

JUNE—2019

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 $(D^2 - 5D + 4)y = 0$.
2. Solve $(D^3 - 6D^2 + 11D - 6)y = 0$.
3. Find the particular integral of $(D^2 + 2D + 1)y = e^{4x}$.
4. Find the Laplace transform of $5e^{2t} + 3t^4 + 6$.
5. Find the Laplace transform of $e^{2t} \cos 4t$.
6. Find the Laplace transform of $t \sin t$.

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7. Find the inverse Laplace transform of $\frac{1}{s^2 + 4s + 20}$.
8. Write down the formulae for finding Fourier constants for $f(x)$ in $(-\pi, \pi)$.
9. Write the Dirichlet's conditions for the existence of Fourier series of a function $f(x)$ in the interval $(c, c + 2\pi)$.
10. Find the probability that a non-leap year contains 53 Wednesdays.

PART—B

10×5=50

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

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

11. (a) Solve $(D^2 - D - 20)y = e^{4x}$.
(b) Solve $(D^2 + 9)y = \sin 3x$.
12. (a) Solve $(D^2 + D + 1)y = e^x + \cos 2x$.
(b) Solve $(D^2 + 3D + 2)y = x^2 + 1$.

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13. (a) Find the Laplace transform of $te^{2t} \cos 4t$.
(b) Find the Laplace transform of $\frac{1 - e^t}{t}$.

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14. (a) Evaluate :

$$L\left\{\int_0^t te^t \sin t dt\right\}$$

(b) Find $L^{-1}\left\{\frac{1}{s(s-3)}\right\}$.

15. Write down the Fourier series for $f(x) = x$ in the interval $0 < x < 2\pi$.

16. Express $f(x) = x^2$ as a half range cosine series in the interval $(0, 1)$.

17. (a) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that 2 balls drawn are white and blue?

- (b) One card is drawn from standard pack of 52 cards. What is the chance that it is either a king or a queen?

18. (a) When two dice are thrown, find the probability of getting the sum 8 or 9.

(b) If $P(A) = \frac{3}{4}$, $P(B) = \frac{2}{5}$ and $P(A \cup B) = \frac{9}{10}$, find $P(A \cap B)$.

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