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C14-A-AA-AEI-CH-CHST-IT-MET-MNG-PKG-
TT-C-CM-EC-EE-M-401

4401

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2021

FOURTH SEMESTER (COMMON) EXAMINATION

ENGINEERING MATHEMATICS - III

Time : 3 hours]

[Total Marks : 80

PART—A

4×5=20

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **four** marks.
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Solve $(D^2 - 6D + 8)y = 0$.

2. Solve $(D^3 - 4D^2 + D + 6)y = 0$.

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

4. Find the Laplace transformation of $5e^{3t} + 2t^3 + 6\sin 3t + 5\cos 3t$.

5. Find $L(t \sin 5t)$.

6. Evaluate $\int_0^{\infty} te^{-2t} dt$.

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

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8. Find the value of a_0 in the Fourier series expansion of $f(x) = x$, in $(-\pi, \pi)$.
9. Find the half-range Sine series of $f(x) = x - 1$ in $(0, \pi)$.
10. Find the probability that exactly one head appear in a single throw of two fair coins.

PART—B

15×4=60

- Instructions :**
- (1) Answer *any four* questions.
 - (2) Each question carries **fifteen** marks.
 - (3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. Solve $(D^2 + 2D + 1)y = 4 + \sin x$.

12. Solve $(D^2 + D - 2)y = x^2$.

13. Find $L \left\{ \frac{1 - \cos t}{t} \right\}$.

14. Find $L^{-1} \left\{ \frac{1}{(s-1)(s+2)} \right\}$ using convolution theorem.

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15. Expand $f(x) = x \cos x$ as Fourier series in $0 < x < 2\pi$.

16. Find the half-range Cosine series for the function $f(x) = x^2$ in the interval $(0, \pi)$.

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17. The probabilities of solving specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, then find the probability that (a) problem is solved, (b) exactly one of them solve the problem.
18. One card is drawn from a well-shuffled pack of 52 cards. Find the probability that the card drawn is (a) a club, (b) a non-club, (c) a red, (d) a non-red and (e) a red ace.
