



C14-M-401/C14-CHOT-401/C14-RAC-401

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BOARD DIPLOMA EXAMINATION, (C-14)

MARCH/APRIL—2017

DME—FOURTH 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. Solve :

$$(D^2 - 5D - 6)y = 0$$

2. Solve :

$$\frac{d^3y}{dx^3} - 7\frac{dy}{dx} - 6y = 0$$

3. Find the particular integral of

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = e^{4x}$$

4. Find the Laplace transform of $t^3 - 3t - 5$

5. Find the Laplace transform of $\sin 2t \cos 3t$.

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1

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6. Find *

$$L^{-1} \frac{1}{(s-2)^3}$$

7. Find the inverse Laplace transform of

$$\frac{s^2 - 3s + 4}{s^3}$$

8. Define Fourier series of a function $f(x)$ in the interval $(c, c + 2\pi)$.

9. Find the Fourier constant a_0 for $x \sin x$ in $(-\pi, \pi)$.

10. A card is drawn from the set of pack of cards. What is the probability that it is not a king?

PART—B

10×5=50

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

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

11. (a) Solve :

$$(D^2 - 1)y = \cosh 2x$$

(b) Solve :

$$(D^2 - 4)y = \sin 2x$$

12. (a) Solve :

$$(D^2 - 4D - 4)y = e^x \cos 2x$$

(b) Solve :

$$(D^2 - 4)y = x^3$$

13. (a) State 1st shift theorem and use it to find a Laplace transform of $e^{at} \cosh bt$.

(b) If $L\{f(t)\} = \frac{20 - 4s}{s^2 - 4s - 20}$, find $L\{f(3t)\}$.

14. (a) Find

$$L^{-1} \frac{2s - 3}{(s - 1)^3}$$

(b) Using convolution theorem, find $L^{-1} \frac{1}{(s - 1)(s - 3)}$.

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

16. Find a Fourier series to represent $x - x^2$ from $x = -1$ to $x = 1$.

17. Define the following :

(a) Addition theorem on probability

(b) Multiplication theorem on probability

(c) Conditional probability

18. Let A and B are two events with $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$ and $P(A \cap B) = \frac{3}{4}$.
Find $P(A \cup B)$ and $P(B \setminus A)$.
