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

4477

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  $\sin 2t \cos 3t$ .

\* 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  $P(B \setminus A)$ .

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