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NMAM INSTITUTE OF TECHNOLOGY, NITTE*(An Autonomous Institution affiliated to VTU, Belagavi)***II Sem B.E. (Credit System) Mid Semester Examinations - II, March 2017****16MA201 – ENGINEERING MATHEMATICS – II**

Duration: 1 Hour

Max. Marks: 20

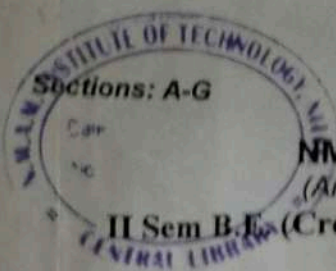
*Note: Answer any One full question from each Unit.***Unit – I****Marks BT***

1. a) Solve $\frac{d^2 y}{dx^2} + 4y = x^2 + \cos 2x$ 5 L*1
- b) By using the method of variation of parameters solve, $(D^2 - 4D + 4)y = \frac{e^{2x}}{x}$ 5 L4
2. a) Solve $(D^2 + 1)y = 2\cos x$, by the method of undetermined coefficients. 5 L3
- b) Solve $x^2 y'' - 2xy' - 4y = x^4 + \frac{1}{x}$ 5 L2

Unit – II

3. a) Rewrite the following using unit step function and find their Laplace transforms
$$f(t) = \begin{cases} t - 1, & 0 \leq t < 2 \\ 3 - t, & 2 \leq t < 3 \\ 0, & t \geq 3 \end{cases}$$
 4 L3
- b) Solve the following differential equation using Laplace transform
$$x''(t) + 4x(t) = 2t - 8, \quad x(0) = 1, \quad x'(0) = 0$$
 6 L4
4. a) Find $L^{-1} \left\{ \frac{s+2}{s^2 - 4s + 13} \right\}$ 3 L4
- b) Using convolution theorem, find
$$L^{-1} \left\{ \frac{1}{(s^2 + 1)(s + 1)} \right\}$$
 4 L2
- c) Find $L^{-1} \left\{ \frac{3}{s} - \frac{4e^{-s}}{s^2} + \frac{4e^{-3s}}{s^2} \right\}$ 3 L3

BT* Bloom's Taxonomy, L* Level



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II Sem B.E. (Credit System) Mid Semester Examinations - I, February 2017

16MA201 – ENGINEERING MATHEMATICS – II

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Note: Answer any **One** full question from **each Unit**.

Unit – I

Marks BT*

1. a) Solve $(x^2 + y^2)dx - 2xy dy = 0$ 5 L*3
 b) If a body originally is at $80^{\circ}C$ cools down to $60^{\circ}C$ in 20 minutes, the temperature of the air being $40^{\circ}C$. Find the temperature of the body after 40 minutes from the original. 5 L3
2. a) Determine the orthogonal trajectory of the family of curves $r^2 = a^2 \cos 2\theta$. 5 L3
 b) Solve $\frac{dy}{dx} - \frac{dx}{dy} = \frac{x}{y} - \frac{y}{x}$ 5 L4

Unit – II

3. a) (i) Find $L \{ \cos 6t \cos 4t + 2 \sin^3 3t + t e^{5t-9} \}$
 (ii) Find $L \left\{ \int_0^t e^{-t} \cos^2 3t dt \right\}$ 6 L3
 b) If $L \{ f(t) \} = F(s)$, prove that $L \left\{ \frac{f(t)}{t} \right\} = \int_s^{\infty} F(s) ds$ 4 L4
4. a) (i) Find $L \left\{ \int_0^t \frac{e^{5t} \sin t}{t} dt \right\}$, (ii) Find $L \{ t^2 \sin 3t + 17t \cos 5t \}$ 6 L3
 b) Find the Laplace Transform of

$$f(t) = t \quad ; \quad 0 < t < c$$

$$= 2c - t \quad ; \quad c < t < 2c \text{ and } f(t+2c) = f(t)$$
 4 L4

BT* Bloom's Taxonomy, L* Level
