HASMUKH GOSWAMI COLLEGE OF ENGINEERING, VAHELAL
RIMIDIAL EXAMINATION, OCTOMBER-2016

Subject Code: 2130002   **Date:17/10/2016**
Subject Name: AEM   **Sem: 3RD (All Branch)**
Time: 10:00 TO 11:00   **Total Marks: 20**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

QUE.1 **(A)** (i) Find general solution of $y^{(v)} + 4y''' + 6y'' + 4y' + y = 0$ **3**
(ii) Solve Differential equation $y'' - 4y = 0$ $y(0) = y'(0) = 0$
(iii) Find $L[t\, sin(2t)\sin(t)]$

(B) Find Laplace transform of $L[t^2 e^{-2t} sin^3(t)]$ **3**

QUE.2 **(A)** Find its Fourier series for the function f$(x) = x^2$, $-\pi \leq x \leq \pi$ where f(x+2 π)=f(x).   **3**
Hence Deduce that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots = \frac{\pi^2}{6}$

(B) For the function$f(x) = \begin{cases} x + 4 & -4 < x < 0 \\ x - 4 & 0 < x < 4 \end{cases}$, find its Fourier series. Where f(x+8)=f(x).   **4**

OR

(B) Find the Fourier cosine series for $f(x) = cx - x^2$
in interval (0,c)   **4**

QUE.3 **(A)** Find Laplace transform of f(t) where $f(t) = \begin{cases} 0 & 0 < t < 3 \\ 4 & t \geq 3 \end{cases}$ **3**

(B) Solve: $(D^2 + 1)^3 y = \cos(x) + e^{-x}$ **4**

OR

(A) Find $L\left[e^t \left(\frac{(t+\sin{(t)})}{t}\right)\right]$ **3**

(B) Using Fourier Integral, Show that $\int_0^\infty \frac{\cos \lambda x + \lambda \sin \lambda x}{\lambda^2 + 1} d\lambda = \begin{cases} 0 & x < 0 \\ \frac{\pi}{2} & x = 0 \\ \pi e^{-x} & x > 0 \end{cases}$ **4**

***************************** **ALL THE BEST** *****************************