Total No. of Questions : 8] *[Total No. of Printed Pages : 3*

Roll No .....

MA-220 (EX/EE/EI)

B.E., III Semester

Examination, December 2016

Choice Based Credit System (CBCS)

Mathematics - III

Time : Three Hours

Maximum Marks : 60

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. Find the Fourier series of $f(x)=\frac{1}{2}(\pi-x)$ in the interval $(0, 2\pi)$ Hence deduce that

$$\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\ldots$$

2. Find half range cosine of $f(x)=x(\pi-x)$ in the interval $(0, \pi)$ and Hence deduce that

$$\frac{\pi^2}{6}=\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\ldots$$

3. a) Solve $y'' + 9y = \cos 2t, \quad y(0) = 1$

$$y\left(\frac{\pi}{2}\right)=-1$$

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Roll No .....

MVSE-301(A)

M.E./M.Tech., III Semester

Examination, December 2016

Advance FEM and Programming (Elective-I)

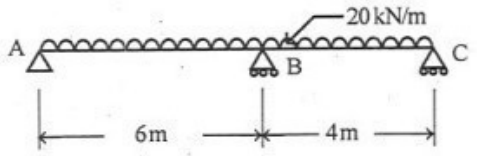
Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if necessary.

1. a) Explain briefly the various factors to be considered in the development of curved shell elements?
   b) Discuss the conforming and non-conforming rectangular plate bending analysis.

2. a) Derive the stiffness matrix for a beam element.
   b) Analyse the beam shown in figure using FEM technique. Determine the rotations at the supports Given E = 200GPa and I = $4 \times 10^6 mm^4$.



3. a) Assemble the stiffness matrix for a plane beam element oriented at angle θ to the x-axis. Explain its use in FEA.