Roll No .....

MMTP-301(B)

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

Examination, December 2014

Engine System Modelling and Analysis

(Elective-I)

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All questions carry equal marks.

1. What is simulation? What are various types of applications? Where it is useful. Discuss the advantages and disadvantages of simulation.

2. a) Differentiate between static and dynamic model with examples.
   b) Describe the major steps taken in a simulation study.

3. a) Discuss the stochastic variable concept in simulation.
   b) What is the use of random numbers in simulation. How are they generated.

4. Simulate the working of a 4 stroke diesel engine. How work output is calculated.

5. The level of impurity in the output of a chemical process in a random variable with following Probability Density Function(pdf)

   $f(x) = k\,x^2\,(3-x)$ for $0 < x < 3$

   $= 0$, otherwise

   i) Find k for $f(x)$ to be valid pdf
   ii) Find the mean and variance of impurity level
   iii) Find the cumulative distribution function
   iv) What is the probability that impurity level is less than the mean?

6. What is carburetion. Discuss the salient features of simulation of carburetion process in an internal combustion engine.

7. How do you measure the performance of a simulation model and discuss their estimations.

8. Write short notes on any two:
   i) Dynamic system modelling
   ii) Modelling input data
   iii) Continuous probability function
   iv) Animation in simulation

******