

PCDS322 -Elective-III : Modelling and Simulation

P. Pages : 1

GUG/W/18/11040

Time : Three Hours



Max. Marks : 70

- Notes :
1. All questions carry equal marks.
 2. Answer **any five** questions.
 3. Assume suitable data wherever necessary.
 4. Use of calculator is permitted.

1. a) What is modelling? Explain with neat sketch various types of models. **6**
 b) In a spring dash pot mechanism spring constant $k = 1.5 \text{ kgf/cm}$, damping $= 0.7 \text{ kgf-s/cm}$ and mass $m = 3 \text{ kg}$. This is acted upon by force.
 $F = 1 + 0.5t$ ($0 \leq t \leq 1$) and $F = 1.5 - (t - 1).t$ ($1 < t \leq 2$)
 Find the position vector x and acceleration of mass at $t = 1.3$ using simulation time of 0.1. **7**
2. a) What should be the considerations while modelling inventory system if an inventory? **5**
 b) What is empirical relationship? In which situation is it used as a model? **4**
 c) Explain cellular manufacturing. **5**
3. a) Using self congruential method, generate 15 random numbers. Evaluate whether these numbers are uniform and independent. **7**
 b) What do you understand by direct transformation? When and how is it used? **7**
4. Thirty observations for repairing, similar type of machines were made and time to repair is given below : **14**
 $6, 8, 10, 12, 15, 19, 25, 30, 35, 40$
 $7, 8, 9, 10, 13, 15, 17, 20, 24, 27$
 Using location factor 3, scaling 20 and form factor 1.5, check suitability of weibul distribution for this data.
5. a) In a sheet metal industry blanking, forming and shearing machine are working in line. Probability of failure of these machines is 0.01, 0.05, 0.005%. Once the machine has failed, it takes 10 to 20 minutes distributed uniformly to restart. The part at that time should be rejected. It takes 0.8 min (fixed) for operation on each machine. Develop simulation strategy to find percentage rejection of production system. **10**
 b) How has internet influenced simulation? **4**
6. a) Write a program to insert, delete and find data related to event from doubly linked list? Every member of this list has 3 components namely event code, event name, early time. **10**
 b) What is system model? Explain the type of model. **4**
7. Pressure drop after ventury is measured using U-tube manometer is partly filled with mercury, diameter of U tube is 10 mm. Pressure acting two limbs are 1.25 and 1.05 kg/cm^2 . If h_m is manometric head then $V = \text{sqrt} \{2g [(1.25 - 1.05.t) - h_m]\}$ At $t = 0$, $h_m = 0$. Find the reading indicating by manometer at 1 sec, using fixed time advancement of 0.1 sec. **14**
8. a) What are the components of material handling system? Suggest possible events and step in simulation of such system. **7**
