Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Modelling and Simulation of Digital Systems **Semester: II**
Program: M.Tech. CSE **Time: 03 hrs.**
Course Code:CSEG7005 **Max. Marks: 100**

Instructions: Attempt all the questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss the continuous systems with suitable example.	**4**	**CO1**
Q 2	Discuss the drawbacks of actor based model.	**4**	**CO2**
Q 3	Differentiate between reneging and jockeying behavior in queueing system.	**4**	**CO3**
Q 4	Differentiate between mesh based simulation and hybrid simulation.	**4**	**CO4**
Q 5	Discuss the concept of K-Means Clustering algorithm.	**4**	**CO1**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Differentiate between single server queueing model and multi-sever queueing model with suitable example.	**10**	**CO2**
Q 7	Explain the Weibull distribution process. Write down the pdf, cdf, mean, and variance for the same. Or Explain the Gamma distribution process. Write down the pdf, cdf, mean, and variance for the same.	**10**	**CO3**
Q 8	Discuss the mixed congruential method. Take a suitable example and generate ten random numbers.	**10**	**CO4**
Q 9	Explain the concept of density based clustering and distribution based clustering with suitable examples.	**10**	**CO2**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Discuss the random number testing methods with suitable example. Or Discuss the following in detail: a) Normal Distribution Process	**20**	**CO4**

<table>
<tr><td></td><td>b) Uniform Distribution Process</td><td></td><td></td></tr>
<tr><td>Q 11</td><td>Nick is a dentist who schedules the appointments for his patients and on avergae gives 30 minutes to each patient. Some patients takes more than 30 minutes and some takes less than 30 minutes during their treatment. The related summary is given as:
<table>
<tr><th>S.No.</th><th>Category</th><th>Time Required (in Minutes)</th><th>No. of Patients</th></tr>
<tr><td>1</td><td>Filling</td><td>45</td><td>40</td></tr>
<tr><td>2</td><td>Crowning</td><td>60</td><td>15</td></tr>
<tr><td>3</td><td>Cleaning</td><td>15</td><td>15</td></tr>
<tr><td>4</td><td>Extracting</td><td>45</td><td>10</td></tr>
<tr><td>5</td><td>Check-up</td><td>15</td><td>20</td></tr>
</table>
Find out the
a) Probablity distribution
b) Cumulative Probability Distribution
c) Random Number intervals
Further, suppose the given random numbers are : 40, 82, 11, 34, 25, 66, 17, and 79.
Assume that all patients show up at the clinic at exactly their scheduled time. Arrival time is 8:00 AM.
Therefore, simulate the above given problem for four hours and find out the average waiting time for the patients and idleness of the doctor.</td><td>20</td><td>CO1</td></tr>
</table>