Hall Ticket Number :										

R-17

Code: 7G286

IV B.Tech. II Semester Advanced Supplementary Examinations August 2021

Reliability Engineering & Applications to Power Systems

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain about Probability density and distribution functions with an example.	7M	CO1	L1
	b)	A factory gets electric power from a generator (G) driven by a diesel engine (E). If the probability of failure of the (G) is 0.1 and that of (E) is 0.2, what is the probability of the system working satisfactorily?	7M	CO1	L3
		OR			
2.	a)	Derive the expression for mean of binominal distribution.	7M	CO1	L5
	b)	In a certain manufacturing process, one percent of the products are known to be defective. If 50 items are purchased by a customer, what is the probability of getting two or less number of defectives? Use binomial distribution.	7M	CO1	L3
		UNIT–II			
3.	a)	Explain about reliability functions R(T) and H(T) and their relationship.	7M	CO2	L2
	b)	A component with an MTTF of 100 hrs is known to have exponential distribution. Calculate the reliability of the component for a mission time of 10 hrs.	7M	CO1	L3
		OR			
4.	a)	Show that the reliability function is an exponentially decaying one with constant hazard model of the failure of the components.	7M	CO2	L2
	b)	With the help of diagram explain the concept of Bath tub curve.	7M	CO2	L4
		UNIT–III			
5.	a)	Explain two-state Markov process. (Single component with repair) and derive the equations for steady state probabilities.	6M	CO4	L2
	b)	Consider that in a system there are three states. The state transitions are:			

From State	To State	Transition State
1	2	0.2
	3	0.4
2	1	0.3
	3	0.45
3	1	0.25
	2	0.12

Find the Limiting State Probabilities of the system states. 8M CO3 L5

OR

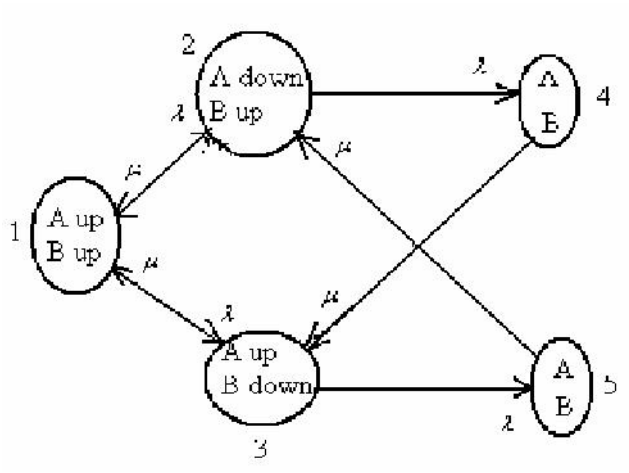
6.	a)	Explain about Time dependent Probability evaluation using necessary equations.	7M	CO5	L4
	b)	Discuss in detail about state space diagrams with an example.	7M	CO5	L4

UNIT–IV

7.	a)	Discuss about the concept of unit addition and unit removal with an example.	7M	CO3	L2
	b)	A Power System contains 3 generating units, where units 1, 2 have a capacity of 30MW and unit three has a capacity of 50 MW. The failure rate and the repair rate of each unit is 0 .7 per year and 9.1 per year respectively. Develop the combined capacity outage probability table.	7M	CO3	L3

OR

8.	a)	Discuss about the concept of frequency and duration methods.	7M	CO5	L4
	b)	A system consists of two identical components with independent failures, but only repair facility. When one component is down, if the other component fails, it may have to wait.			



Calculate the steady state probabilities for this state space diagram as shown in figure. 7M CO3 L3

UNIT–V

9.	a)	Explain the weather effects on transmission lines of bulk power system transmission.	7M	CO6	L4
	b)	A generating system consists of two 50 MW units and one 40 MW unit each having forced outage rate of 0.06. The peak load specified over a 100-hour period is 150 MW. The load duration curve for this period is a straight line from 100% to 50% load points. What is the value of LOEE for this period?	7M	CO2	L3

OR

10.	a)	Discuss about load point and system reliability indices in detail.	7M	CO4	L4
	b)	There are 4 components in a system having failure rates of 1.3, 1.4, 1.5 and 1.6 f/yr respectively and repair times of 10, 12, 14 and 16hrs respectively. Find the basic probability indices for series configuration.	7M	CO2	L3

END