

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE Winter Examination – 2022 Course: B. Tech. Branch : Electrical Semester : VII Subject Code & Name: BTEEC701 Power System Operation & Control Max Marks: 60 Date: 27-01-2023 Duration: 3 Hr.			
Instructions to the Students: 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	Define per unit value. Write any two advantages of per unit representation. A three-phase star-connected, 75MVA, 25kV synchronous generator has a synchronous reactance of 9 ohm per phase. Using rated MVA and voltage as base values, determine the per-unit reactance.	Application	6
B)	Write a short note on the On-load tap changing transformer and the regulating transformer.	Understand	6
C)	With the help of power triangle & equations describe the concept of real power, reactive power, and complex power.	Understand	6
Q.2	Solve Any Two of the following.		12
A)	Briefly explain the Park’s transformation i.e. dq0 transformation.	Understand	6
B)	With neat diagrams explain the different types of excitation systems of an alternator.	Understand	6
C)	With a neat block diagram explain the load frequency control of the synchronous machine.	Understand	6
Q. 3	Solve Any Two of the following.		12
A)	Explain the modeling of the generator, load, and governor system in the case of a thermal power plant.	Understand	6
B)	With a neat diagram explain the equal area criteria for assessing transient stability.	Understand	6
C)	Derive the swing equation of the synchronous Machine.	Application	6

Q.4	Solve Any Two of the following.		12
A)	With a neat diagram describe the point-by-point method of solving the Swing equation.	Understand	6
B)	The fuel costs of two generators are given by, $C_1 = 1.6 + 15P_1 + 0.1P_1^2$ Rs/hr. $C_2 = 1.8 + 25P_2 + 0.1P_2^2$ Rs/hr. If the total demand for the generators is 250MW find the economic loading of two generators.	Application	6
C)	Derive the condition for economic load dispatch when transmission losses are neglected.	Application	6
Q. 5	Solve Any Two of the following.		12
A)	Derive the expression for transmission line losses in terms of power plant generation when two units are supplying the load. Also, write the equations of loss coefficients.	Application	6
B)	With a neat diagram explain the operation of a synchronous condenser.	Understand	6
C)	Explain the reactive power compensation by the capacitor and derive the expression for the reactive power supplied by the capacitor.	Application	6
	*** End ***		

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