	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, $C_1 = 1.6 + 15P_1 + 0.1{P_1}^2\ Rs/hr.$ $C_2 = 1.8 + 25P_2 + 0.1{P_2}^2\ Rs/hr.$ 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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