

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: M.Tech
BRANCH: EE**

**SEMESTER :II
SESSION : SP/22**

TIME: 2 Hrs. SUBJECT: EE565 Power System Operation and Control

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Analyze the transition in different states of the power system and estimate the conditions for re-energization process of a feeder from cold load pick-up. [5]
- Q.1(b) Differentiate the traditional and deregulated market. How the deregulated market is advantageous over the regulated market. [5]
- Q.2(a) Analyze the transfer function for speed governor for single area system. [5]
- Q.2(b) Two generating units having capacities 600 MW and 900 MW are operating at a 50 Hz supply. The system load increases by 150 MW when both the generating units are operating at about half of their capacity, which results in frequency falling by 0.5 Hz. If the generating units are to share the increased load in proportion to their rating, what should be the individual speed regulation? [5]
- Q.3(a) Defend by proper derivation how half of the added load is supplied by either of the areas in a two area system through tie-line. [5]
- Q.3(b) Two interconnected Area-1 and Area-2 have the capacity of 2000 MW and 500 MW respectively. The incremental regulation and damping torque coefficient for each area on its own base are 0.2 p.u. and 0.8 p.u. respectively. Find the steady state change in the system frequency from nominal frequency of 50 Hz and the change in steady-state tie-line power following a 750 MW change in the load of Area-1. [5]
- Q.4(a) Derive the transmission loss formula and estimate its significance in co-ordination equation of economic dispatch. [5]
- Q.4(b) A system consists of two power plants connected by a transmission line. The total load is located at plant 2. Data of evaluating the loss co-efficients consist of information that a power transfer of 100 MW from station-1 to station-2 results in a total loss of 8 MW. Find the required generation at each station and power received by the load, when λ of the system in Rs. 100/MWh. The IFCs of the two plants in Rs./MWh are :
- $$\frac{dC_1}{dPG_1} = 0.12PG_1 + 65 \qquad \frac{dC_2}{dPG_2} = 0.25PG_2 + 75$$
- Q.5(a) Write down the objective function along with all the constraints of UC problem. [5]
- Q.5(b) Analyze the process of priority list method for the solution of UC using suitable mathematical justifications. [5]

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