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

CLASS: M.Tech **SEMESTER: II**
BRANCH: EEE **SESSION: SP/19**

SUBJECT: EE565 POWER SYSTEM OPERATION AND CONTROL

TIME: 3 Hours **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.

Q.1(a) Analyze the functioning of Independent system operator in restructured electricity market. [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 non-reheat type steam turbine. How will it be different in case of reheat type steam turbine? [5]

Q.2(b) A 500 MW generator has a speed regulation of 4%. If the frequency drops by 0.12 Hz with an unchanged reference, determine the increase in turbine power. Also find by how much the reference power setting should be changed if the turbine power remains unchanged. [5]

Q.3(a) Defend by proper derivation how if the load disturbance occurs in only one of the area in a two area system, the change in frequency is only half of the steady state error. [5]

Q.3(b) Two control areas have the following characteristics: [5]
Area -1 : Speed Regulation = 0.02 p.u., Damping Coefficient = 0.8 p.u., Rated MVA =1500
Area -2 : Speed Regulation = 0.025 p.u., Damping Coefficient = 0.9 p.u., Rated MVA =500
Determine the steady-state frequency change and the changed frequency following a load change of 1200 MW, which occurs in Area -1. Also find the tie-line power flow change.

Q.4(a) Construct the co-ordination equation of economic dispatch neglecting transmission losses. [5]

Q.4(b) Determine the economic operation schedule of a two-plant system to meet a load demand of 160 MW. [5]
Incremental fuel cost in Rs/ MWh and loss coefficients in /MW of the two plant are given below:

$$\frac{dC_1}{dPG_1} = 0.01PG_1 + 2.0 \qquad \frac{dC_2}{dPG_2} = 0.01PG_2 + 1.5$$

B_{11}=0.0015, B_{12}=B_{21}= -0.0005, B_{22}=0.0025

Q.5(a) Analyze the steady state performance of a speed governor. [5]

Q.5(b) Mention the steps of priority method for the solution of UC problem. Mention the disadvantages of the method. [5]

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