Paper Code: EE-031/EEE-031	**Roll No.**										

B.TECH
(SEM.VII) ODD SEMESTER EXAMINATION 2016-17
POWER SYSTEM OPERATION AND CONTROL

[Time: 3 Hours] **[Max. Marks-100]**
Note- Attempt all questions. All question carry equal marks.

1. Attempt any **FIVE** of the following:- **(5*4=20)**

(a) What do you understand by load forecasting and load shedding?
(b) What are the problems associated with the interconnected power system?
(c) What do you understand by islanding in power systems?
(d) Why the frequency and voltage are to be regulated in power system?
(e) What do you understand by spinning reserve?
(f) What happens to frequency if the load on generator increases?

2. Attempt any **TWO** of the following **:-** **(2*10=20)**

(a) Derive coordination equation for economic dispatch including losses, in the power system. Give steps for economic dispatch calculation neglecting losses.
(b) Explain briefly the constraints on Unit Commitment problem. Enlist methods for solution of Unit Commitment problem.
(c) Consider following three units:
$I_{c1}=7.92+0.003124\ P_{G1}$
$I_{c2}=7.85+0.00388\ P_{G2}$
$I_{c3}=7.97+0.00964\ P_{G3}$
$P_{G1}=392.2$ MW, $P_{G2}=334.6$ MW, $P_{G3}=122.2$ MW
Determine the optimum schedule if the load is increased to 900 MW by using Participation factor method.

3. Attempt any **TWO** of the following**:-** **(2*10=20)**

(a) Draw the transfer function block diagram for a two area system provided with governor control and obtain the steady state frequency error following a step load change in both the areas.
(b) Explain the advantages of multi area operation in detail.
(c) A two area system connected by a tie-line has the following parameters:

AREA	1	2
Turbine output power (MW)	4000	2000
Nominal frequency (Hz)	50	50
Inertia Constant speed regulation	4%	5%
Power System Gain (k_p)	50	125
Governor time constant	0.2	0.1
Turbine time constant	0.3	0.25

A load change of 80 MW occurs in area 1. Determine the steady state frequency and the change in the tie line flow.

4. Attempt any **TWO** of the following **:-** **(2*10=20)**

(a) Enlist different types of excitation systems. Explain any one along with its controller.
(b) Write a short note on voltage control by tap changing transformers.
(c) Differentiate between series compensation and shunt compensation.

5. Attempt any **TWO** of the following **:-** **(2*10=20)**

(a) Explain why Flexible A.C Transmission systems are of great importance in power systems?
(b) Explain the working of SVC in detail. Also discuss its characteristics.
(c) Explain the working of SSSC in detail. Also discuss its characteristics.