B.Tech. SEM -VII Electrical 2014 Course (CBCS) : WINTER - 2018

SUBJECT : OPERATION & CONTROL OF POWER SYSTEM

W-2018-2545

Day : Monday | Time : 02.30 PM TO 05.30 PM

Date : 26/11/2018 | Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data, if necessary.

Q. 1 Classify power system stability and derive the swing equation describing the rotor dynamics of synchronous machine. **(10)**

OR

a) Explain the terms of steady state stability, dynamic stability and transient stability of power system. **(05)**

b) Derive equal area criteria for stability study of one machine infinite bus problem. **(05)**

Q. 2 Explain the concept of economic load dispatch in short and derive the condition for economic load dispatch neglecting transmission losses. **(10)**

OR

Assume that the fuel input in Btu per hour for units 1 and 2 are given by: **(10)**

$F_1 = \left(8P_1 + 0.024P_1^2 + 80\right)10^6$

$F_2 = \left(6P_2 + 0.04P_2^2 + 120\right)10^6$

The maximum and minimum loads on the units are 100 MW and 10 MW respectively. Determine the minimum cost of generation when the following load (fig. 2.1) is supplied. The cost of fuel is Rs. 2 per million Btu

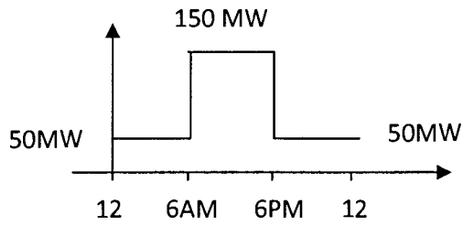

Fig. 2.1

Q. 3 What is Automatic Generation Control (AGC)? Explain with block diagram the working of proportional plus integral load frequency controller for an isolated power system. **(10)**

OR

a) What is speed governor dead band? How does it affect the dynamic response of AGC? **(05)**

b) Sketch the complete block diagram representation of load frequency control of an isolated power system. **(05)**

P. T. O.

Q. 4 Explain reactive power generation by synchronous machine and loading capability curve of synchronous generator. **(10)**

OR

a) What are the advantages of line compensation in power system? Compare series and shunt compensation using capacitors and reactors. **(05)**

b) What are the causes of sub-synchronous resonance? How it can be avoided? **(05)**

Q. 5 Explain various types of FACTs controllers used for reactive power control. **(10)**

OR

Write principles of operation, characteristic and applications of: **(10)**

a) TCSC

b) SSSC

Q. 6 Write short note on: **(10)**

a) Power pools

b) Interchange evaluation with unit commitment

OR

Explain following types of power interchange: **(10)**

a) Energy banking

b) Emergency power interchange

c) Capacity interchange

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