**SUBJECT CODE NO: E-50**
**FACULTY OF ENGINEERING AND TECHNOLOGY**
**B.E.(EEP/EE/EEE) Examination Nov/Dec 2017**
**Power System Operation & Control**
**(REVISED)**

[Time: Three Hours]                                                                    [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Solve any two questions from remaining questions in each section.
3. Assume suitable data wherever necessary.

## Section A

Q.1     Solve **any five** questions.                                                          10
   a) Define d, q, o axis components
   b) Define inertia constant and kinetic energy stored by alternator rotor.
   c) What is meant by the synchronous impedance of an alternator?
   d) What is meant by infinite bus bar?
   e) Define small signal stability.
   f) What is brushless excitation system?
   g) What is the role of governor in power system operation and control?

Q.2     a) Derive the expression for swing equation.                                       08
        b) Explain classical transfer function of hydraulic turbine with its speed characteristics.    07

Q.3     a) Explain with block diagram the governor with transient droop compensation.      08
        b) State and explain the elements of an excitation system.                         07

Q.4     a) Explain in detail the three basic functions of steam turbine controls.          08
        b) What is power system stability? Explain types of power system stability in detail.    07

Q.5     Write short notes on:
        a) State space representation                                                      05
        b) SMIB configuration                                                              05
        c) Automatic voltage regulator                                                     05

## Section B

Q.6     Solve **any five**:                                                                10
        a) What is incremental cost
        b) How shunt capacitors provide reactive power for voltage control.
        c) What is static VAR system
        d) What is AGC
        e) What is the function of economic load dispatch
        f) What is SCADA
        g) What is different types of reactive power compensation.

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| Q.7 | a) | Explain production and absorption of reactive power in power system equipment's. | 08 |
|---|---|---|---|
| | b) | Explain any three methods of voltage control with schematic diagram in detail. | 07 |
| Q.8 | a) | Explain the roles of SCADA system in energy management system. | 08 |
| | b) | Explain the application of shunt capacitors to distribution system. | 07 |
| Q.9 | a) | Explain in detail the energy management system and its implementation steps. | 08 |
| | b) | Derive the expression for short term hydro thermal scheduling problem. | 07 |

Q.10      Write short notes on:

| | | |
|---|---|---|
| a) | ULTC transformer | 05 |
| b) | Synchronous condensers | 05 |
| c) | Maintenance scheduling | 05 |