A   Reg. No. :

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A load curve is a plot of   CO1- U

    (a) Load versus generation capacity   (b) Load versus current

    (c) Load versus time   (d) Load versus cost of power

2. Load factor during a period is   CO1- U

    (a) Average Load / Installed Capacity   (b) Average Load / Maximum Load

    (c) Maximum Load / Average Load   (d) Maximum Load / Installed Capacity

3. Plant or generation control related to   CO2-U

    (a) HVDC   (b) SVR &SVC   (c) EDC & UC   (d) LFC & AVR

4. The units of speed regulation of governor are   CO2-U

    (a) Hz   (b) Hz per MVA   (c) Hz per MW   (d) None of the Above

5. The operation of OLTC does   CO3-U

    (a) improve voltage stability   (b) improve system stability

    (c) improve power factor   (d) all of the above

6. The permissible voltage variation in transmission and distribution system is   CO3- U

    (a) ± 0.1%   (b) ± 1%   (c) ±10%   (d) ± 25%.

7. The units for heat rate are   CO4- U

    (a) kcal / kWh   (b) kWh / k cal   (c) kcal / h   (d) kW

8. In economic dispatch including transmission losses, the effect of increased penalty is to   CO4- U

(a) increased load on that generator   (b) decreased load on that generator

(c) keep the load on that generator constant   (d) either (a) or (b)

9. Three major function of power system security   CO5- U

(a) Economical operation, Economical Dispatch, Load scheduling

(b) State Estimation, Economical Dispatch, Generation Scheduling

(c) System Monitoring, Contingency analysis, Security constrained OPF

(d) all of the above

10. Power system monitoring is usually done by   CO5- U

(a) ETAP   (b) SCADA   (c) Matlab   (d) PSPM

PART – B (5 x 2= 10 Marks)

11. Define diversity factor.   CO1- U

12. Identify the advantages of pool operation?   CO2- U

13. List out the Methods of Voltage Control?   CO3 -U

14. Draw the incremental fuel cost curve for a thermal power plant   CO4 -U

15. Define state estimation.   CO5 -U

PART – C (5 x 16= 80Marks)

16. (a) A generating station has the following daily loads: CO1- U   (16)

0 – 6 hrs	4500 kW
6 – 8 hrs	3500 kW
8 – 12 hrs	7500 kW
12 – 14 hrs	2000 kW
14 – 18 hrs	8000 kW
18 – 20 hrs	2500 kW
20 – 24 hrs	5000 kW

Sketch the load duration curve and determine the load factor and plant capacity factor, if the capacity of the plant is 12 MW.

Or

(b) Explain an overview of power system operation and control and the role of computer in the implementation with help of block diagram.   CO1- U   (16)

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17. (a) Two synchronous machines with the following data are operating in parallel to feed a common load of 300 MW.   CO2- U   (16)
Machine I: Governor speed droop: 4%
Speed changer set to give 75% rated load at rated speed.
Machine II: Governor speed droop: 3%
Speed changer set to give 50% rated load at rated speed.
The nominal frequency of operation of the set is 50 Hz. Determine the load taken by each machine and frequency of operation.

Or

(b) Two 750 kW alternators operate in parallel. The speed regulation of one set is 100% to 103% for full load to no load and that of other is 100% to 104%. How will the two alternators share a load of 1000 kW? What will be the system frequency at this load? Assume free governor action.   CO2- U   (16)

18. (a) Mention the different methods of voltage control employed in power system. Explain any one of them.   CO3- U   (16)

Or

(b) Draw the circuit diagram for a typical excitation system and discuss.   CO3- U   (16)

19. (a) Derive the co-ordination equation, conditions and inequalities for the economic dispatch problem with losses.   CO4- U   (16)

Or

(b) The selected sample system is consisting of 3 generating units. The cost functions of the units are   CO4- U   (16)
$F1 = 0.001562\ P1^2 + 7.92\ P1 + 651$ \$/hr
$F2 = 0.010940\ P2^2 + 7.85\ P2 + 310$ \$/hr
$F3 = 0.004820\ P3^2 + 7.97\ P3 + 78$ \$/hr
Maximum and minimum limits of generations are

$$150\ \text{MW} \ < \ P1 \ < 600\ \text{MW}$$
$$100\ \text{MW} \ < \ P2 \ < 400\ \text{MW}$$
$$50\ \text{MW} \ \ \ < \ P3 \ < 20\ \text{MW}$$

20. (a) Draw the block diagram to show the hardware components of a SCADA system for a power system and explain the application of SCADA in monitoring and control of power system.   CO5- U   (16)

Or

(b) With a neat State transition diagram, Explain the operating states of a power system in the security perspective with an example.   CO5- U   (16)

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