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B.E / B.TECH. DEGREE EXAMINATIONS, MAY 2023

Sixth Semester

EE18030 – POWER SYSTEM MANAGEMENT

(Electrical and Electronics Engineering)

Regulation 2018

TIME: 3 HOURS

MAX. MARKS: 100

- CO 1 Acquire knowledge on the deregulated environment and congestion management.
- CO 2 Learn the fundamental concepts of load forecasting.
- CO 3 Study the role of planning in power system.
- CO 4 Understand the electrical system safety requirements.
- CO 5 Analyze the blackouts and cascading failures.

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

	CO	RBT LEVEL
1. Enumerate the application of Internet and GPS in Power System control.	1	2
2. How restructured power system differ from monopoly system?	1	1
3. Demonstrate the effects of load growth in Power System.	2	2
4. Identify the different methods of load forecasting.	2	2
5. Point out the equality and inequality constraints considered in the economic dispatch problem.	3	2
6. What is participation factor with respect to economic load dispatch ?	3	2
7. List the most dangerous electrical hazards in your home.	4	2
8. Distinguish between system grounding and equipment grounding	4	1
9. What is the need for energy conservation and management?	5	2
10. What is a Blackout in power system?	5	2

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PART- B (5 x 14 = 70 Marks)

	Marks	CO	RBT LEVEL
11. (a) Analyze restructuring process with a neat block diagram of various entities involved in deregulation.	(14)	1	4

(OR)

- (b) (i) Analyze the different types of transmission pricing in restructured environment in power system. (7) 1 4
- (ii) Explain in detail the need for Availability Based Tariff in restructured power systems. (7) 1 4

12. (a) A diesel station supplies the following loads to various consumers. Industry load-1100 kW, Domestic load-550 kW, Commercial load-850 kW and Domestic light-550 kW. If the maximum demand on the station is 2750 kW and the number of kWhr generated per year is 50×10^5 , determine the diversity factor and annual load factor. (14) 2 4

(OR)

- (b) The history of increase in annual load demand of a metropolitan city is tabulated below. Apply the extrapolation technique to forecast the load with a lead time of 1 year. (14) 2 4

Year	2013	2014	2015	2016	2017	2018
Demand	75.9	91.7	105.7	122.7	131.6	150.7
	MW	MW	MW	MW	MW	MW

13. (a) The fuel cost functions for three thermal plants in Rs/h are given by (14) 3 4
- $$F_1 = 0.004 P_{g1}^2 + 5.3 P_{g1} + 500$$
- $$F_2 = 0.006 P_{g2}^2 + 5.5 P_{g2} + 400$$
- $$F_3 = 0.009 P_{g3}^2 + 5.8 P_{g3} + 200$$

where P_{g1}, P_{g2}, P_{g3} are in MW. Find the optimal dispatch and the total cost when the total load is 925 MW with the following generator limits.

$$100 \text{ MW} \leq P_{g1} \leq 450 \text{ MW},$$

$$100 \text{ MW} \leq P_{g2} \leq 350 \text{ MW},$$

$$100 \text{ MW} \leq P_{g3} \leq 225 \text{ MW}.$$

(OR)

(b) The input output curve characteristics of three units are

(14) 3 4

$$F_1 = 750 + 6.49 P_{g1} + 0.0035 P_{g1}^2$$

$$F_2 = 870 + 5.75 P_{g2} + 0.0015 P_{g2}^2$$

$$F_3 = 620 + 8.56 P_{g3} + 0.001 P_{g3}^2$$

The fuel cost of unit 1 is 1.0 Rs/MBtu, 1.0 Rs/MBtu for unit 2 and 1.0 Rs/MBtu for unit 3. Total load is 800MW. Use the participation factor method to Estimate the dispatch for a load increased to 880MW?

14. (a) (i) Explain how to remove the contact between live conductor and a person undergoing electric shock. **(7) 4 3**

(ii) Describe anyone method of artificial respiration. **(7) 4 3**

(OR)

(b) (i) Explain the safety audit and its types and coverage. **(7) 4 3**

(ii) Describe the functional requirements of earthing system. **(7) 4 3**

15. (a) What is Demand Side Management? Explain in detail the benefits through energy conservation and load management. **(14) 5 3**

(OR)

(b) Explain the Prediction, Modelling and Control of Blackouts and cascading failures. **(14) 5 3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

	Marks	CO	RBT LEVEL
16. Analyze how the Transmission Congestion Management of conventional power system differ from restructured Power Systems.	(10)	1	4
