PSG POLYTECHNIC COLLEGE, COIMBATORE - 641 004

DIPLOMA ODD SEMESTER EXAMINATIONS – 2014

E12502 POWER SYSTEMS

Time : 3 Hours   **Max.Marks: 100**

Instructions:

1. **Group A** and **Group B** questions should be answered in the Main Answer book.
2. Answer any **TEN** questions in **Group A**. Each question carries three marks.
3. Answer **ALL** questions either **(a)** subdivision or **(b)** subdivision in **Group B**. Each question carries 14 marks.

Group – A   **Marks: 10 x 3 = 30**

1. List out the sources of energy available for electrical energy generation.

2. The maximum demand on a power station is 100MW. Calculate the total energy generated in a year for annual load factor of 40%.

3. State the purpose of graphite in nuclear reactor.

4. List out the commonly used conducting material for over head transmission line.

5. Compare indoor and outdoor sub-station.

6. List out the equipments used in sub-stations.

7. State the causes for low power factor.

8. List out the causes for low power factor.

9. Compare off-load and on-load tap-changing transformer.

10. Define a protective relay.

11. Compare lighting arrester and surge absorber.

12. List out the different types of circuit breakers available for power systems protection.

13. Compare Domestic tariff and industrial tariff.

14. State the significance of energy auditing.

15. A consumer has a maximum demand of 200 kW at 40% load factor. Calculate the overall Cost per kWh, if annual charge was Rs 90,080.

Group– B   **Marks: 5 x 14 = 70**

16. a)i] Discuss about the operation of nuclear reactor in nuclear power plant. [4]
    ii] Illustrate with a neat sketch about wind power generation plant. [10]

(OR)

  b)i] Discuss about the different types of loads connected to electric power system. [4]
    ii] A generating station has the following daily load cycle: [10]

Time (Hours)	0-6	6-10	10-12	12-16	16-20	20-24
Load (MW)	40	50	60	50	70	40

    Draw the load curve and find (1) maximum demand (2) units generated per day (3) Average load (4) load factor.

17.a)i] Illustrate with a neat sketch about suspension type insulator. [4]
    ii] A single phase motor connected to 400V, 50Hz supply takes 32A at a power factor of 0.7 Lagging. Calculate the capacitance required in parallel with the motor to raise the power factor to 0.9 lagging. [10]

(OR)

b)i] Discuss about the Bus-Bar arrangements in Sub-station.   [4]

ii] Design a key diagram of 11kV / 400V Indoor Sub-station.   [10]

18.a)i] State the disadvantages of low power factor.   [4]

ii] Discuss in detail about power factor improvement equipments.   [10]

(OR)

b)i] State the significances of Voltage control at the consumer premises.   [4]

ii] Illustrate with a neat sketch about tap-changing transformer.   [10]

19.a)Discuss in detail about Induction type directional overcurrent relay.

(OR)

b) Illustrate with a neat sketch about SF_6 Circuit Breaker.

20.a)i] The following two tariff are offered:

(1) Rs 100 plus 15 paisa per unit.

(2) A flat rate of 30 paisa per unit.

At what consumption is first tariff economical?   [4]

ii] A Consumer has a maximum demand of 200 kW at 40% load factor. If the tariff
is Rs 100 per kW of maximum demand plus 10 paisa per kWh.Find the overall
cost per kWh.   [10]

(OR)

b)i] Calculate annual bill of a consumer whose maximum demand is 100kW,p.f=0.8
lagging and load factor=60%. The tariff used is Rs 75 per kVA of maximum demand
plus 15 paisa per kWh consumed.   [4]

[ii] A factory has a maximum load of 240 kW at 0.8 p.f. lagging with an annual
Consumption of 50,000 units. The tariff is Rs 50 per kVA of maximum demand plus
10 paisa per unit.Calculate the flat rate of energy consumption. What will be annual
saving if p.f. is raised to unity?   [10]

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