Code: R7220204

R7

B.Tech II Year II Semester (R07) Supplementary Examinations, April/May 2013
POWER SYSTEMS - I
(Electrical and Electronics Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1   Explain the functions of economizer and super-heater in a thermal power plant with neat diagrams.

2   Describe working of PWR (pressurized water reactor). What are its advantages and disadvantages?

3   A distributor is fed at both ends at same voltage of 230 V. the total length of the feeder PQ is 300 m
        and the loads are tapped as follows: 50 A at 60 m from P, 40 A at 100 m from P, 35 A at 120 m from
        P and 25 A at 200 m from P. Calculate the following
        (i) The current in each section.
        (ii) The point of minimum potential.
        (iii) The voltage at minimum potential.
        The resistance per km of the conductor for go and return is 0.8 Ω

4   A 2 wire feeder RST has a load of 110 A at S, 60 A at T both at 0.8 p.f lag. The impedance of RS is
        (0.04 + j0.05) Ω and that of ST is (0.08 + j0.15) Ω. If the voltage at the far end T is to be maintained
        400 V. Calculate the voltage at S and R.

5   What are the functions of a substation? What are the different types of substations? Write short notes
        on each of them.

6   A 37.3 KW induction motor has power factor 0.9 and efficiency 0.9 at full load, power factor 0.6 and
        efficiency 0.7 at half-load. At no-load, the current is 25% of the full load current and power factor 0.1.
        Capacitors are supplied to make the line power factor 0.8 at half-load. With these capacitors in
        circuit, find the line power factor at (i) Full load and. (ii) No-load.

7   A generating station supplied the following loads: 175 MW, 100 MW, 80 MW, 50 MW and 4 MW. The
        station has a maximum demand of 225 MW. The annual load factor of the station is 45%. Calculate:
        (i) the number of units supplied annually. (ii) the diversity factor and (iii) the demand factor.

8 (a) Discuss the flat rate and block rate tariffs.
   (b) A power station has an installed capacity of 20,000 KW. The cost of the station is Rs. 1,200/KW. The
        fixed costs are 13% of the cost of investment on full load at 100% load factor, the variable costs of
        the station per year is 1.5 times the fixed costs. Assume that there is no reserve capacity of the plant
        and that are variable costs and proportional to energy production. Find the cost of generation per
        KWh at load factor of 100% and 20%. Comment on the results.

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