R13

Code No: 114AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2016
POWER SYSTEMS-I
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a) Write a short note on super heater. [2]
b) What are the main parts of Nuclear reactor and their functions? [3]
c) What are the advantages of Ring Main Distribution systems? [2]
d) Compare DC distribution with AC distribution system. [3]
e) What are the advantages of Outdoor substation over indoor substation? [2]
f) What are the types of Bus Bar arrangements and explain single bus bar system? [3]
g) What are the effects of low power factor? [2]
h) Explain how power factor can improve by using Synchronous condenser. [3]
i) Define Load curve and load duration curve. [2]
j) What is meant by Two Part Tariff? [3]

PART-B **(50 Marks)**

2 .a) Explain the operation of Thermal Power Station with a neat line diagram.
b) Explain the procedure of nuclear waste disposal mechanism in a nuclear power plant. [5+5]

OR

3.a) Explain the principle of operation of nuclear reactor with neat diagram.
b) What are the types of steam turbines and explain with neat diagram? [5+5]

4.a) Explain the design features of A.C distributed systems.
b) The load on a DC three wire system employing a rotator balanced set with 440V between outers consists of lightening loads of 210 A on the positive side and 337 A on the negative side. Power loads taking 400 A connected across the outers. Calculate the loading KV on the main generators and on each of the balancer machines. Assume a loss of 1.5 KW in each balancer machine. [5+5]

OR

5.a) What are the advantages of Doubly Fed distributor over Singly Fed Distributor?
b) A two wire distributors are fed at F_1 and F_2 at 230 V and 220 V respectively. Loads of 150 A and 100 A are taken at points P and Q. Resistance of both the conductors between F_1 P is 0.03 Ω, between PQ is 0.05 Ω and between QF_2 is 0.02 Ω. Determine the current in each section of the distributor and voltage at each load point. [5+5]

6.a) Describe the Doubly bus bar scheme with neat diagram.
b) Explain GIS with a single line diagram. [5+5]

OR

7.a) Draw the symbols for important equipment(at least eight)in substation and explain briefly.
b) Give the compression between Air insulated substation and Gas insulated substation. [5+5]

8.a) Derive the expression for most economical power factor.
b) What are the methods of voltage control and explain shunt capacitor briefly?[5+5]

OR

9.a) Explain the method of power factor improvement using phase advancer and discuss the advantages and disadvantages of this method.
b) A fluorescent lamp takes a current of 0.75 A when connected across a 240 V, 50 Hz A.C supply. The power consumed by the lamp is 80W. Calculate the value of the capacitance to be connected in parallel with the lamp to improve the power factor to a) unity b) 0.95 lagging. [5+5]

10.a) Discuss the objectives and requirements of tariff methods.
b) 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 of p.f. is raised to unity? [5+5]

OR

11.a) Define the following with respect to the economic aspects power generation:
i) Connected load
ii) Plant capacity factor.
b) Calculate the generating cost per kWH, delivered from a generating station from the following data. Plant capacity 500 MW; annual load factor 45 %; capital cost Rs.1200×10^6; annual cost of fuel etc Rs.160×10^6, interest 9.2 % per annum of initial value. [5+5]

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