Code No: 134BX **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, April - 2018
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)	List out various important parts of a gas turbine plant.	[2]
b)	What are the different types of pulverized fuel burners?	[3]
c)	Define cavitation. What is its effect on turbine?	[3]
d)	Briefly explain about run-off.	[2]
e)	Draw AC 3 phase 3 wire distribution system.	[2]
f)	Distinguish between a feeder and a distributor.	[3]
g)	How sub-stations are classified?	[2]
h)	State any two advantages of Gas insulated substations.	[3]
i)	Define spinning reserve.	[2]
j)	Differentiate between fixed and operating costs of power plants.	[3]

PART-B

(50 Marks)

2.a) What are the functions of economizer and superheater in a thermal power plant?
b) List out main parts of a reactor and briefly state their functions. [5+5]

OR

3.a) What are the different types of steam turbines? Briefly discuss about their use and characteristics.
b) Explain about open cycle and closed cycle gas turbine plants. [5+5]

4.a) Classify water turbines and describe them briefly.
b) It has been assessed in a hydel plant that a minimum run-off of $95m^3$/sec. will be available with a head of 40 mt. Find out the firm capacity and yearly gross output. [5+5]

OR

5.a) What are the characteristics of a water turbine? Explain.
b) A turbine in a hydel plant develops 500 lit/sec and the available head is 100mt. will it be advisable to use a Pelton wheel running at 500 rpm? Assume machine efficiency to be 90%. [5+5]

6.a) Draw the phasor diagrams of A.C. distributor with concentrated loads for power factors with respect to respective load points.

b) An 800m distributor fed from both ends A and B is loaded uniformly at the rate of 1.2A/m run, the resistance of each conductor being 0.05 ohm per/km. Determine the minimum voltage and the point where it occurs if feeding points A and B are maintained at 255 V and 250 V respectively. Find also the current supplied from feeding point A and B. [5+5]

OR

7.a) Explain the method of voltage drop calculations in A.C. distributor.

b) A single phase two wire feeder, 1500m long, supplies a load of 60A at 0.8 p.f, 40A at 0.85 p.f and 50A at 0.88 p.f lagging at distances of 600, 1200 and 1500 meters respectively from the feeding point. The resistance and reactance of the feeder per Km length are 0.06 and 0.1 ohms respectively. If the voltage at the far end is to be maintained at 220V. Calculate the voltage at the sending end and its phase angle with respect to the receiving end voltage. [5+5]

8.a) Draw the single line diagram, show the location of substation equipment for the following bus bar arrangements.
i) Single bus bar and
ii) Main and transfer bus bar.

b) Draw the layout of a typical 11 KV / 400 V indoor substation and explain the equipment in detail. [5+5]

OR

9.a) State the advantages of outdoor substations over indoor sub stations.

b) Discuss about the various bus bar arrangements in a substation. [5+5]

10.a) What is the significance of load factor and diversity factor in the cost of the supply of electrical energy?

b) A consumer has the following connected loads: 10 lamps of 60 W each and two heaters of 1000 W each. His maximum demand is 1500 W. On the average he uses 8 lamps 5 hours a day and each heater for 3 hours a day. Find his average load, monthly energy consumption and load factor. [5+5]

OR

11. What type of tariff is employed for domestic consumers? Why this tariff is not employed for bulk consumers? [10]

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