Code No: 134BX

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2019
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 as sub questions.

PART – A
(25 Marks)

1.a)	What is the use of condenser in thermal power station?	[2]
b)	What is the necessity of moderator in nuclear power station?	[3]
c)	Explain selection of site for a hydroelectric power plant.	[2]
d)	What is the significance of specific speed of hydraulic turbines?	[3]
e)	Compare underground distribution with over ground distribution system.	[2]
f)	Outline the line diagram of radial distribution system.	[3]
g)	What are the limitations of Indoor substation?	[2]
h)	List different types of Gas insulated substations.	[3]
i)	What is the significance of operating reserve?	[2]
j)	Define the (i) Simple rate (ii) Flat Rate and (iii) Block-Rate.	[3]

PART – B
(50 Marks)

2. Discuss the essential components of a nuclear reactor.   [10]

OR

3.a) Explain the importance of fast breeder reactor in nuclear power station.
   b) Explain how the heat output of nuclear reactor can be controlled.   [5+5]

4. Explain the following terms with reference to water turbines. Give expression of each efficiencies.
   a) Hydraulic efficiency
   b) Mechanical efficiency and
   c) Overall efficiency.   [10]

OR

5. Francis turbine designed to develop 160 kw working under a head 10 m and running at 200 rpm. The hydraulic losses in turbine are 15% of available energy. The overall efficiency of turbine is 80%. Assume flow ratio=0.94 and speed ratio=0.25. Estimate: (a) guide blade angle and runner vane angle at inlet and (b) diameter and width at inlet.   [10]

6. Determine the cross sectional area of the d.c distribution shown. Take $\rho = 1.78 \times 10^{-8}$ Ωm. The maximum voltage drop is not to exceed 10V. The conductor is fed at A. [10]

A   40 m   C   60m   D   100m   E   50 m   F   50 m   B

30A   40A   100A   50A   50A
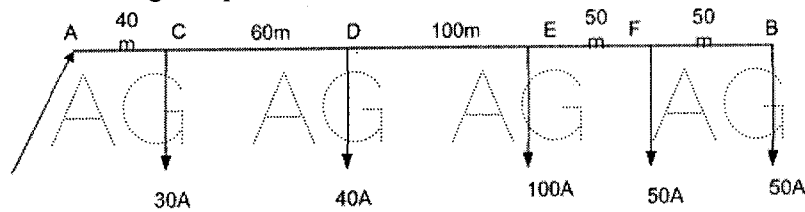
OR

7. List out the Comparisons between AC and DC distribution systems. [10]

8. a) Elaborate the doubly bus bar scheme with neat diagram.
   b) Explain Gas insulated substation with single line diagram. [5+5]

OR

9. Elaborate the following with neat diagrams:
   a) AC 3-phase, 3 wire distribution system
   b) AC 3-phase, 4 wire system. [5+5]

10. a) Discuss the division of cost of electrical energy generated and express the total cost in three part form and two part form.
    b) A system has a straight line annual load duration curve with maximum and minimum demands of 15 MW and 5 MW respectively. The annual cost characteristics of base load and peak load stations are respectively given by:
    C1 = (Rs 1,00,000 + Rs 100/KW + 6 Paise/KWhr)
    C2 = (Rs 80000 + Rs 60/KW + 8 Paise/KWhr.
    Determine the operating schedule of peak load station for minimum annual cost. Also determine the overall cost per kWhr. [5+5]

OR

11. Analyze the following terms:
    a) Different load curves
    b) Maximum demand,
    c) Average load and
    d) Diversity factor. [10]

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