

**Code No: 134BX****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]

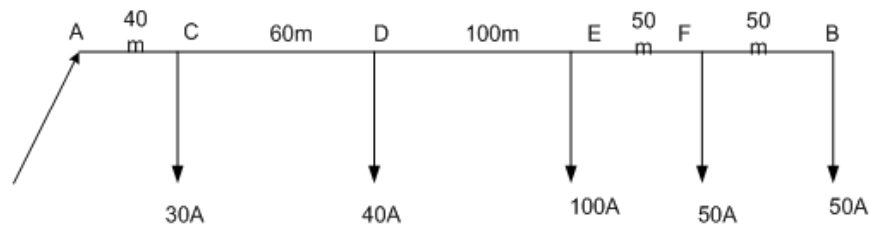
**PART – B****(50 Marks)**

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  $\rho = 1.78 \times 10^{-8} \Omega \text{m}$ . The maximum voltage drop is not to exceed 10V. The conductor is fed at A. [10]



**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:  
 $C_1 = (\text{Rs } 1,00,000 + \text{Rs } 100/\text{KW} + 6 \text{ Paise/KW hr})$   
 $C_2 = (\text{Rs } 80000 + \text{Rs } 60/\text{KW} + 8 \text{ Paise/KW hr})$   
 Determine the operating schedule of peak load station for minimum annual cost. Also determine the overall cost per kW hr. [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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