

Code No: 54008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, March - 2022

POWER SYSTEMS - I

(Electrical and Electronics Engineering)

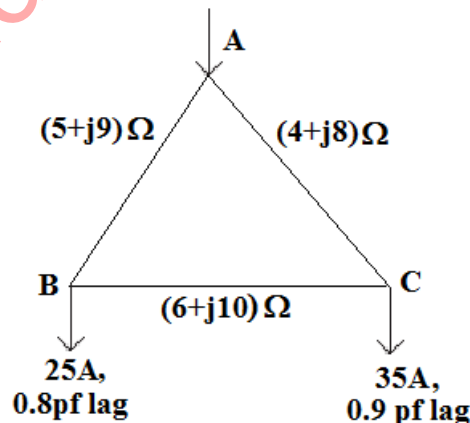
Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

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1. Draw a general layout of a modern thermal power plant and explain the working of different circuits. [15]
- 2.a) What are the functions of moderator and control rods in a nuclear power plants.
b) Draw the block diagram of Gas power station and explain each component. [7+8]
- 3.a) Discuss briefly the requirements of a distribution system.
b) A 2-wire DC ring distributor is 300m long and is fed at 240V at point A. At point B, 150m from A, a load of 120A is taken and at C, 100m in the opposite direction, a load of 80A is taken if the resistance per 100m of single conductor is 0.03, find
i) current in each section of distributor
ii) voltage at points B and C. [5+10]
4. A 3-phase distribution system is shown in figure Power is supplied at A at line voltage of 6.6 kV and loads of 25A per phase at 0.8 lagging p.f and 35A per phase at 0.9 lagging p.f are taken at B and C respectively. The impedances of the feeders are $AB = (5 + j9)$, $BC = (6 + j10)$ and $CA = (4 + j8)$. Calculate the voltage at B and C and the current in each branch p.f.'s are assumed with respect to voltage at A. [15]



- 5.a) How can substations be classified according to constructional features.
b) Describe following corresponding to gas insulated substation
(i) Current Transformer
(ii) Earth Switch. [7+8]
- 6.a) Why the improvement of power factor is very important for both consumers and generating stations? List the various causes of low power factor and explain.
b) A single-phase motor takes a current of 10 amps at a p.f. of 0.707 lagging from a 230 V, 50 Hz supply. What value must a shunting capacitor have to raise the p.f. to unity. [8+7]
- 7.a) Discuss the role of load factor on the cost of electrical energy.
b) From a load duration curve, the following data is available: the maximum demand on the system is 25 MW. The load supplied by two units is 15 MW and 12.5 MW. Unit no.1 acts as a base load unit and No.2 as a peak load unit. The base load unit works for 100% of the time and peak load unit for only 40% of time, the energy generated by unit No.1 is 1×10^8 units and that by No.2 is 1×10^7 units. Determine the load factor, plant capacity factor and plant use factor of each unit and load factor of the total plant. [7+8]
8. What are the factors influencing tariff design and explain the various types of tariffs in detail. [15]

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