

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - III ELECTRICAL : WINTER- 2022
SUBJECT : POWER SYSTEM ENGINEERING

Day : Friday

Time : 10:00 AM-01:00 PM

Date : 09-12-2022

W-25317-2022

Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat labelled diagrams **WHEREVER** necessary.
- 4) Use of non- programmable **CALCULATOR** is allowed.

- Q.1** a) What are the different types of turbine used in case of hydro power stations? (05)
b) With neat block diagram explain the functioning of nuclear power plant. (05)

OR

- Q.1** a) Explain the functioning of hydro power plant with neat block diagram. (05)
b) What are the various factors to be considered while selecting the site for nuclear power station? (05)

- Q.2** a) What are the different types of generators used in case of wind power plant? Explain in brief. (05)
b) With neat block diagram explain the working of biogas power plant. (05)

OR

- Q.2** a) Compare between conventional and non-conventional power plant. (05)
b) With neat block diagram explain the working of solar PV power plant. (05)

- Q.3** a) Define the following terms: (05)
i) Connect load ii) Firm power iii) Cold reserves
iv) Hot reserves v) Spinning reserve

- b) The maximum demand of a consumer is 25A at 220V and his total energy consumption is 9750 kWh. If energy is charged at a rate of 300 paise per kWh for 500hrs. Use at maximum demand per month plus 350 paise per unit for all additional units. Estimate annual bill. (05)

OR

- Q.3** a) What is mean by load curve? What information is extracted from the load curve? (05)

- b) A generating station has connected load of 50MW and a maximum demand of 35MW. The units generated being 65×10^6 per annum. Calculate: i) Demand factor ii) Load factor (05)

P. T. O.

- Q.4 a) Explain the skin effect and proximity effect occurring on transmission line conductors. (05)
- b) Each line of a 3 phase system is suspended by a string of 3 similar insulators. (05)
If the voltage across the line unit is 18kV, calculate the line to neutral voltage. The shunt capacitance between each insulator and earth is $1/9^{\text{th}}$ of the capacitance of the insulator itself. Find the string efficiency.

OR

- Q.4 a) What are the different methods used to equalize the potential across the string of insulators? (05)
- b) Two towers of height 40m and 30m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 300m. If the tension in the conductor is 1590 kg. Find the clearance of the conductor at lower point. Weight of conductor is 0.8 kg/m. Assume bases of the tower at equal levels. (05)

- Q.5 a) What is the effect of Load Power Factor on Performance of Transmission Line? (05)
- b) What is mean by surge impedance loading? What is its significance? (05)

OR

- Q.5 a) An 11 kV three phase transmission line has a resistance of 1.5 ohm and reactance of 4 ohm per phase. Calculate the percentage regulation and efficiency of the line when total load of 5000 kVA at 0.8p.f. lagging is supplied at 11kV at the distance end. (05)
- b) Represent the medium transmission line considering nominal pi method. (05)

- Q.6 a) What are the different methods of laying of underground cable? (05)
- b) A single phase A.C distributor AB 400 meters long is fed from end A and loaded as under: (05)
i) 200 A at 0.78 p.f. lagging 200 m from point A.
ii) 300A at 0.85 p.f. lagging 400 m from point A.
The load resistance and reactance's of distributor is 0.2Ω per kilometer. Calculate the total voltage drop in the distributor.

OR

- Q.6 a) A single core cable has 1.5 cm diameter conductor and the thickness of insulation is 2.2 cm. the resistivity of insulating material is 9.2×10^{12} ohm-m. Determine the insulation resistance per km length of the cable. If the working voltage of the conductor is 1100V, what is the leakage current per km length of the cable? (05)
- b) What are the various design consideration for feeder? (05)

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