

Code No: 154BW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech II Year II Semester Examinations, August/September - 2022****POWER SYSTEM - I****(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- 1.a) Enumerate the factors affecting the site selection of hydroelectric plants.
b) Explain the working of fuel cell. [8+7]
- 2.a) Explain in detail, the working principle of a nuclear power station.
b) Discuss the function of basic components of wind energy conversion plant. [8+7]
- 3.a) A generating station supplies four feeders with the maximum demands (in MW) of 15 MW, 9 MW, 11 MW, and 6 MW. The overall maximum demand on the station is 20 MW and the annual load factor is 50%. Calculate the diversity factor and the number of units generated annually.
b) Explain the significance of daily load curve in detail. [9+6]
- 4.a) The average motor load of a consumer is 200 kW at a pf 0.85 lag. The consumer is charged electricity at the tariff of 40 Rs./kVA of maximum demand plus 10 paise per unit consumed. Determine the consumer's annual bill for a load factor of 60%.
b) Explain the differences in operations of peak load and base load stations. [9+6]
- 5.a) Explain different types of insulating materials used for insulators.
b) Each conductor of a 33 kV, 3-phase system is suspended by a string of three similar insulators, the capacitance of each disc is nine times the capacitance to ground. Calculate the voltage across each insulator. Determine the string efficiency also. [7+8]
- 6.a) Compare overhead lines and underground cables.
b) A 1-phase concentric cable 5 km long has a capacitance of 0.2 μF per km, the relative permittivity of the dielectric being 3.5. The diameter of the inner conductor is 1.5 cm and the supply voltage is 66 kV at 50 Hz. Calculate the inner diameter of the outer conductor, the rms voltage gradient at the surface of the inner conductor and the rms value of the charging current. [7+8]
- 7.a) Explain the effect of Earth on the Capacitance of Conductors.
b) A 3-phase, 50 Hz, 132 kV transmission line consists of conductors of 1.17 cm diameter and spaced equilaterally at a distance of 3 metres. The line conductors have smooth surface with value for $m = 0.96$. The barometric pressure is 72 cm of Hg and temperature of 20 $^{\circ}\text{C}$. Determine the fair and foul weather corona loss per km per phase. [6+9]
- 8.a) Discuss about the voltage drop calculations in AC distributors when the power factor is referred with respect to respective load voltages.
b) Explain in detail about the radial DC distributor. [8+7]

---ooOoo---