R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Supplementary Examinations August-2021
POWER SYSTEMS - I
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

PART-A
(Answer all the Questions 5 x 2 = 10 Marks)

1	a	Describe the significance of surge tank in hydro power plant.	**2M**
	b	Define demand factor and load factor.	**2M**
	c	Define transmission efficiency.	**2M**
	d	Define string efficiency.	**2M**
	e	Classify the cables based on voltage and type of insulating materials used in them.	**2M**

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2 Draw the schematic diagram of a modern steam power station and explain its operation in detail. **10M**

OR

3 Draw the block diagram of thermal power station (TPS) showing paths of coal, steam,water,air,ash and flue gases and explain principle of operation briefly. **10M**

UNIT-II

4 Explain the principle of operation and working of Geo-thermal power generating system. **10M**

OR

5 The maximum demand of a consumer is 20A at 220V and his total energy consumption is 8760kWh. If the energy charges at the rate of 20 paise per unit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional units. Calculate (i) annual bill (ii) equivalent flat rate. **10M**

UNIT-III

6 Derive expression for voltage regulation of medium transmission lines using nominal -T method with equivalent circuit and necessary phasor diagram. **10M**

OR

7 A 3-phase, 50Hz, 150km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1 ohm, 0.5ohm and 3×10^{-6} siemen per km per phase. If the line delivers 50MW at 110kV and 0.8 p.f. lagging. Determine the (i) Sending end Voltage (ii) voltage regulation (iii) sending end current. Use nominal-Π method for this problem. **10M**

UNIT-IV

8 i) Explain various types of insulators with neat diagrams and compare them **10M**
ii) A three phase overhead line is suspended by a suspension type insulator, which Consists of three units. The potential across top unit and middle unit are 12 kv and 18 kv Respectively. Calculate: (i) the ratio of capacitance between pin and earth to the self-Capacitance of each unit (ii).The line voltage and (iii) String efficiency.

OR

9 (i) What are the factors affecting corona? And derive the expressions for critical disruptive   **10M**
   and visual critical voltage
   (ii) Determine the corona characteristics of a 3-phase line 160km long, conductor diameter
   1.036cm, 2.44m delta spacing, air temperature 26.67oC, altitude 2440m, corresponding to
   an approximate barometric pressure of 73.15cm of Mercury, operating voltage 110kv at
   50Hz. Assume data if required.(irregularity factor etc.)

UNIT-V

10 Derive the following   **10M**
   (i) Insulation resistance of a cable
   (ii) Capacitance of a single core cable

OR

11 Write short notes on: (i) Intersheath grading (ii) capacitance grading   **10M**

END