CODE No.: 16BT60203 SVEC-16

Roll No. | | | | | | | | | | |

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

III B.Tech II Semester (SVEC-16) Regular/Supplementary Examinations August - 2021

DESIGN AND ESTIMATION OF ELECTRICAL SYSTEMS
[Electrical and Electronics Engineering]

Time: 3 hours **Max. Marks: 70**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

1. Estimate the quantity of material required along the cost for conduit (PVC) wiring in one room of dimensions 20 x 8 x 5 meters. The following are to be points to be fitted and draw the layout of the given system. CO3, CO4, CO7 — 14 Marks
   i) Lights points – 8 Nos x 20W ii) Fan Points – 6 Nos x 60W
   iii) Plug Points – 3 point socket type – 3 x 100W
   iv) AC - 2 x 1.5 Ton (appox. rating assume 2kW).

(OR)

2. a) Write the general rules to be considered for wiring systems and also explain the estimation of Conductor size and selection cables for a particular load (Assume necessary data for explanation) CO1, CO3 — 7 Marks
   b) Explain tin brief different types of domestic and commercial wiring systems. List out all merits and demerits. CO1, CO3 — 7 Marks

UNIT-II

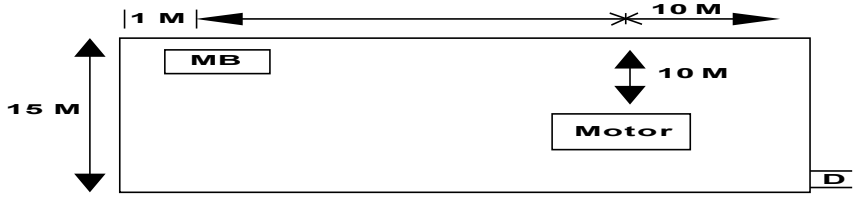
3. a) An overhead 3-phase, 415V distributor to be laid along route 450m long. The end supports are terminal poles with 60m span in between. Prepare list for laying distributor. Consider the following data: CO1, CO3 — 8 Marks
   Conductor: ACSR 6/1 x 2.11mm for phase, neutral and street light Earth wire, GI wire –6 SWG , 1.92kg /10m weight. L.T cable: 4 core, 60mm^2, 1100V grade. Distance of first terminal pole from the substation is 10m.
   b) Discuss the methods of installation of service line and overhead line. CO3 — 6 Marks

(OR)

4. a) Find the material required for 1 phase overhead service line of a house located 10 mts away from the pole, with following loads: CO1, CO3 — 7 Marks
   i) Lighting and other loads = 2.5 kW,
   ii) AC Load: 10kW (Assume safety factor = 1.66)
   b) Explain the procedure for estimation of H.T lines for distribution line. CO1, CO3 — 7 Marks

UNIT-III

5. a) A 15HP 415V 3-Phase, 50Kz squirrel cage induction motor is to be installed in a pump house, of dimensions given in below Fig. Show its wiring diagram layout and estimate the quantity of materials required and its cost. CO3. CO4 — 8 Marks



   b) Describe the selection of switch gears for 33kV/11kV substation and draw substation lay out. CO2, CO3, CO6 — 6 Marks

(OR)

6.	a)	Explain in brief selection of distribution architecture.	CO2, CO3	6 Marks
	b)	Explain the how you will calculate full load current and decide size of the conductor size for the following motor. i) DC Motor. ii) 3-phase induction motor (Assumerating of motor for explanation for both the cases).	CO3, CO4	8 Marks

UNIT-IV

7.	a)	A small area of 10 meters in diameter is to be illuminated by a lamp suspended at a height of 4.5 meters over the center of area. A lamp having an efficacy of 30 lumens per watt is fitted with a reflector which directs the light output only over the surface to be illuminated. If the utilization coefficient is 0.66 and illumination 850 lux, determine the wattage of the lamp.	CO1	7 Marks
	b)	Discuss inverse square law and cosine law of Illumination.	CO1	7 Marks

(OR)

8.	a)	A hall of dimensions 40m x 15m x 5m is to be provided with a general illumination of 150 lumens/m^2. Taking a coefficient of utilization of 0.6 and depreciation factor of 1.42, determine the number of fluorescent tubes required, their spacing, mounting height and total wattage. Taking luminous efficiency of florescent tube as 40 lumens/watt for 40W tube.	CO1	7 Marks
	b)	The candle power of a lamp is 120. A plane surface is placed at a distance of 2.5m from this lamp. Calculate the illumination on the surface when it: i) normal. ii) inclined to 45^0.	CO1	7 Marks

UNIT-V

9.	a)	A piece of an insulating material is to be heated by dielectric heating. The size of the piece is 10m x 10 cm x 3cm. A frequency of 20 MHz is used and the power absorbed is 450W. If the material has a relative permittivity of 6 and a power factor of 0.05, calculated the voltage necessary for heating and current that follows in the material.	CO1, CO4, CO5, CO7	8 Marks
	b)	Explain the classifications of resistance welding. What are its advantages and disadvantages?	CO1, CO5	6 Marks

(OR)

10.	a)	A 50 kW single phase, 220V resistance oven employees circular nichrome wire for its heating element. If the wire temperature is not to exceed 1500^0C and the temperature of the charge is to be 450^0C, calculate the size and length of wire required. Assume e = 0.95 and radiation efficiency K = 0.65. What would be the temperature of wire when the charge is cold (25^0C)?	CO1, CO4, CO7	8 Marks
	b)	Explain the reasons for considering the electric heating as superior compared to other types of heating.	CO1	6 Marks