B.E. (Electrical (Electronics & Power) Engineering) Fifth Semester (C.B.S.)
Utilization of Electric Energy

P. Pages : 2

Time : Three Hours

||||| |||| ||| |||| |||
0408

NRJ/KW/17/4474

Max. Marks : 80

_____

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Explain the indirect resistance heating. **6**

   b) A 2.5kW, 240V, single phase resistance over is to have nichrome wire heating elements. If the wire temperature is to be 1500ºC and that of the charge 450ºC, estimate the diameter and length of wire. The resistivity of nichrome alloy is $42.5\mu\Omega-cm$ Assume the radiating efficiency and the emissivity of the element as 1.0 and 0.9 respectively. **7**

OR

2. a) With a neat sketch, describe the working of a Ajax Wyatt core type induction furnace. **6**

   b) The power required for dielectric heating of a slab of resin 150cm^2 ºm area and 2 cm thick is 200 watts, frequency of 30MHz. The material has a relative permittivity of 5 and power factor of 0.05. Determine the voltage necessary and current flowing through the material. If the voltage is limited to 600V, What will be the value of the frequency to obtain the same heating? **7**

3. a) Describe in brief various types of electric welding. Explain Butt welding in detail. **7**

   b) Compare between resistance welding and arc welding. **7**

OR

4. a) Explain ultrasonic welding in detail with its applications. **7**

   b) Explain spot welding with a neat sketch. **7**

5. a) Define and explain the following terms. **6**

   i) Space-height Ratio.   ii) Maintenance factor.
   iii) Luminous intensity.

	b)	Two lamps are hung at a height of 9 meters from the floor level the distance between the lamps is 2 meters. Lamp one is of 500CP. If the illumination on the floor vertically below this lamp is 20 lux, find the candle power of the lamp two.	**6**

OR

6.	a)	Explain laws of illumination.	**6**
	b)	An illumination on the working plane of 75 lux is required in a room 72m✗15m in size. The lamps are required to be hung 4m above the work bench. Assuming a suitable Space-height ratio, a utilization factor of 0.5, a lamp efficiency of 14 lumens per watt and a candle power depreciation of 20%, estimate the number, rating and deposition of lamps.	**8**
7.	a)	What are different types of refrigeration. Explain Vapour Absorption refrigeration system.	**7**
	b)	Enlist the main requirements of a good refrigerant. What are the primary and secondary refrigerants? Name the refrigerants generally used.	**6**

OR

8.	a)	Explain the working of central air conditioning system.	**7**
	b)	With the help of a diagram, Explain the working of a storage type water cooler.	**6**
9.	a)	Explain different types of fans, their characteristics and typical applications.	**7**
	b)	How do you assess the performance of fans? Explain.	**6**

OR

10.	a)	Explain with a diagram the working of a centrifugal pump.	**7**
	b)	List down few energy conservation opportunities in pumping system.	**6**
11.	a)	What is a compressor? Give its classification and explain how does it work?	**7**
	b)	Explain in brief about reciprocating air compressors.	**6**

OR

12.	a)	What is a "D-G set system"? Explain the principle of a four stroke diesel engine.	**7**
	b)	Explain the factors affecting energy saving measures for DG sets.	**6**

****