NTK/KW/15/7422

Faculty of Engineering and Technology

Fifth Semester B.E. (Electrical Engg.)
(C.B.S.) Examination

UTILIZATION OF ELECTRIC ENERGY

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Illustrate your answers wherever necessary with the help of neat sketches.

(5) Use of slide rule, Logarithmic tables, Non-programmable calculator, Drawing instruments is permitted.

1. (a) What are the advantages of Electric heating ? Give classification of various Electric heating methods. 7

(b) Discuss the desirable properties of materials used for heating elements. 6

OR

2. (a) What are the factors which decide the frequency and voltage of dielectric heating ? Derive an expression for the heat produced in a dielectric material. 7

(b) Describe complete arrangement of centrally air conditioning system. 7

9. (a) Explain the constructional parts and working of ceiling fan. 7

(b) Explain fan construction used in combustion process. 7

OR

10. (a) What are different types of pump curves ? Explain any two of them in detail. 7

(b) What is reciprocating pump ? Enlist the classification of reciprocating pump. 7

11. (a) What are the different types of compressor ? Explain the classification in brief. 7

(b) Define and explain :

(i) Compressor efficiency 3

(ii) Compressed air system. 3

OR

12. (a) Explain the principle of a four stroke diesel engine. 5

(b) List the energy saving opportunities in an industrial DG Set Plant. 4

(c) What are the components of a DG Set System ? 4

(b) Describe the construction and operation of an electric arc furnace. 6

3. (a) Describe with neat sketches the various methods of electric resistance welding. 7

(b) Describe classification, advantages and disadvantages of electric welding. 6

OR

4. (a) Compare carbon arc and metal arc welding. 5

(b) Discuss in detail the principle of operation of ultrasonic welding and laser welding. 8

5. (a) State and explain Laws of illumination. 6

(b) Define and explain following terms :

(i) Luminous intensity 2

(ii) Illumination 2

(iii) Luminance 2

(iv) Space height Ratio. 2

OR

6. (a) Write short notes on the following (any **THREE**) : 9

(i) Polar Curves

(ii) Colour Rendering Index (CRI)

(iii) Indoor and Outdoor lighting system.

(iv) Energy saving in lighting system.

(b) A hall 30 m long and 12 m wide is to be illuminated and illumination required is 50 meter-candles. Five types of lamps having lumen outputs are given below :

Watt	Lumens
100	1615
200	3650
300	4700
500	9950
1000	21500

Taking depreciation factor of 1.3 and utilisation coefficient of 0.5, calculate no. of lamps needed in each case to produce required illumination. Out of above types of lamps, select most suitable type and design a suitable scheme and make a sketch showing location of lamps. Assume a suitable mounting height and calculate space height ratio. 5

7. (a) Enumerate the successive operations to be performed on a refrigerant in compression system. 6

(b) Enlist the main requirements of a good refrigerant. What are primary and secondary refrigerants ? Name the refrigerants generally used. 7

OR

8. (a) State and explain the factors involved in air conditioning. 6