Reg. No. : | | | | | | | | | | |

<div align="center">

Question Paper Code: 47304

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Seventh Semester

Electrical and Electronics Engineering

14UEE704 - ELECTRIC POWER UTILIZATION AND ENERGY CONSERVATION

(Regulation 2014)

</div>

Duration: Three hours   Maximum: 100 Marks

<div align="center">

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

</div>

1. Which of the following is preferred for traction work?

    (a) Universal motor   (b) DC series motor

    (c) Synchronous motor   (d) Three phase induction motor

2. The unit of luminous flux is

     (a) Steradian   (b) Candela   (c) Lumen   (d) Eddy current

3. Candela is the unit of which of the following quantity

     (a) Wave length   (b) Luminous intensity (c) Luminous flux   (d) Frequency

4. The lighting which is mainly used for indoor light decoration purpose is

    (a) Direct lighting   (b) Indirect lighting

    (c) Semi-direct lighting   (d) Semi-indirect lighting

5. The transfer of heat within a fluid by mixing of one portion of the fluid with another is called as

    (a) Convection   (b) Conduction   (c) Radiation   (d) Reflection

6. A filler metal in the form of a wire or rod used in the welding process is known as

   (a) Crater   (b) Clamp   (c) Flux   (d)Electrodes

7. Which of the following instrument is used to measure the solar radiation?

   (a) Pyranometer   (b) Anemometer   (c) radiometer   (d) Aerogenerator

8. A concentration type solar collector

   (a) First absorbs the radiation and then increases its concentration

   (b) Increases the density of solar radiation before absorbing it

   (c) Dilutes the density of solar radiation before absorbing it

   (d) Increases the intensity of solar radiation and then reflects it back

9. The range of wind speed suitable for wind power generator is

   (a) 0 to 5 m/s   (b) 5 to 25 m/s   (c) 25 to 50 m/s   (d) 50 to 75 m/s

10. The maximum available wind power is

    (a) Directly proportional to square of the wind speed

    (b) Indirectly proportional to square of the wind speed

    (c) Directly proportional to cube of the wind speed

    (d) Indirectly proportional to cube of the wind speed

PART - B (5 x 2 = 10 Marks)

11. List the various supply systems used in electric traction..

12. Define Railway Electrification.

13. Write any two advantages of electric heating.

14. Define solar constant.

15. Distinguish between horizontal axis and vertical axis wind turbines.

PART - C (5 x 16 = 80 Marks)

16. (a) What are the various types of Electric breaking used in traction? Discuss in detail.

(16)

Or

2

47304

(b) (i) The distance between two stops is 1.5 km. A schedule speed of 45 km/h is required to cover that distance. The stop is of 20 sec duration. The values of the acceleration and retardation are 2 km/h/sec and 3 km/h/sec respectively. Then, determine the maximum speed over the run. Assume a simplified trapezoidal speed–time curve. (8)

(ii) Explain the mechanism of train movement and obtain the expression for the tractive effort transferred to the driving wheel. (8)

17. (a) (i) Describe the construction and working of sodium vapour lamp. (8)

(ii) Explain how flood lighting is provided and the design considerations involved.(8)

(16)

Or

(b) (i) It is desired to illuminate a drawing hall with an average illumination of about 250 lux. The area of the hall is 30m x 20 m. The lamps are to be fitted at 5m height. Find out the number and size of incandescent lamps required for an efficiency of 12 lumens / watt. Utilization factor = 0.4 and maintenance factor = 0.85. (8)

(ii) Compare and contrast various CFL and LED lamps in-terms of cost, illumination level, rating, average life and energy efficiency. (8)

18.(a) (i)Explain the working principle of induction heating. Explain the working, advantages and drawbacks of direct core type induction furnaces. (10)

(ii) Discuss the points to be considered while selecting the frequency for dielectric heating. (6)

Or

(b) (i) Explain the method, advantages, disadvantages and applications of carbon arc welding. (8)

(ii) Draw the schematic of laser welding and explain its operation and advantages. (8)

19. (a) (i) Describe with relevant diagram, sun's altitude, zenith and azimuth angles for solar radiation analysis.. (8)

(ii) Obtain the expression for the calculation of transmissivity of cover system of flat plate collectors. (8)

Or

(b) (i) Discuss the various thermal losses occur in solar collector and also obtain the energy balance equation of a solar collector. (8)

(ii) Discuss the advantages and disadvantages of concentrating type collectors over flat-plate type solar collectors. (8)

20. (a) (i) Explain the basic components of wind energy conversion system with relevant block diagram. (10)

(ii) Discuss the factors while selecting the site for wind energy power plants. (6)

Or

(b) With the help of vector diagram of forces, illustrate the principle of aero turbine rotation by making an analysis on aerodynamic forces acting on the blades. (16)

————————————

4