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**Reg. No. :**

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**Question Paper Code: 97303**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Seventh Semester

Electrical and Electronics Engineering

19UEE703– ELECTRIC ENERGY UTILIZATION AND  
CONSERVATION

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- For which of the following applications DC motors are still Preferred? CO1-U  
(a) High efficiency    (b) Reversibility    (c) High starting torque    (d) All of the above
- Tractive Effort is required to CO1-U  
(a) Overcome gravity    (b) Overcome wind age  
(c) Accelerates the train    (d) Do the all above
- Candela is the unit of CO2- U  
(a) Luminous flux    (b) Luminous Intensity    (c) Wavelength    (d) Speed
- The unit of solid angle is CO2-U  
(a) Degree    (b) Radian    (c) Steradian    (d) Candela
- The welding electric circuit is CO3- U  
(a) Always earthed    (b) Never earthed  
(c) Through cables only    (d) None of the above
- The coreless induction furnace uses high-frequency electric supply in order to obtain high CO3 -U  
(a) Flux density    (b) Eddy-current loss    (c) Primary resistance    (d) Power factor

7. Which of the following is the common application of air standard refrigeration system? CO4 -U
- (a) cold storage (b) car air conditioning system  
(c) Domestic refrigerators (d) Aircraft air conditioning
8. Which of the following process is used in summer air conditioning? CO4 U
- (a) Heating and Humidification (b) Cooling and dehumidification  
(c) Humidification (d) Dehumidification
9. As per BIS norms, the meter board and the main switchboard are fitted at a height of up to ..... from the ground surface CO5 U
- (a) 2.72 (b) 2.0 (c) 1.5 (d) 2.5
10. Which of the following metals is used to make electrical wires? CO5 U
- (a) copper (b) silver (c) lead (d) Magnesium

PART – B (5 x 2= 10Marks)

11. What is meant by electric drives? CO1-U
12. List the types of lamps. CO2-U
13. Classify the methods of electric heating. CO3-U
14. Define motor efficiency CO4-U
15. List out the objectives of tariff. CO5-U

PART – C (5 x 16= 80Marks)

16. (a) Explain the factors governing the selection of motors. CO1 -U (16)
- Or
- (b) Draw the speed-time curve of train carries of the following parameters: CO1 -U (16)
1. Free running for 12 min.
  2. Uniform acceleration of 6.5 kmphp for 20s.
  3. Uniform deceleration of 6.5 kmph to stop the train.
  - 4.A stop of 7min.
17. (a) (i) Explain any three types of lamps in detail. CO2 -U (10)  
(ii) Explain the design of lighting calculation (6)

Or

- (b) (i) Explain the working of high pressure Sodium vapor Lamp with a neat sketch CO1 -U (10)  
(ii) Explain the laws of illumination briefly. (6)
18. (a) What is dielectric heating? Explain in detail with equivalent circuit and derivation. CO3 -U (16)
- Or
- (b) Explain the various types of resistance welding with neat sketch CO3 -U (16)
19. (a) The main air supply duct of an air conditioning system is 800 mm X 600mm in cross section and carries 300 m<sup>3</sup> / min of standard air. It branches into two ducts of cross section 600 mm X 500 mm and 600 mm X 400mm. If the mean velocity in the larger branch is 480 m / min.  
Find :  
(i) Mean velocity in the main duct and the smaller branch  
(ii) mean velocity pressure in each duct. CO4-App (16)
- Or
- (b) With a neat sketch, explain the air conditioning system in detail. CO4-App (16)
20. (a) Explain for the following related with power quality (i) Voltage imbalance (ii) under voltage (iii) over voltage (iv) frequency variation CO5- U (16)
- Or
- (b) A generating station has a maximum demand of 50,000 kW. Calculate the cost per unit generated from the following data : CO5- U (16)  
Capital cost = Rs 95 × 10<sup>6</sup> ;  
Annual load factor = 40%  
Annual cost of fuel and oil = Rs 9 × 10<sup>6</sup> ;  
Taxes, wages and salaries etc. = Rs 7.5 × 10<sup>6</sup>  
Interest and depreciation = 12%

