

Code: 19EE4601B

**III B.Tech - II Semester – Regular Examinations – JUNE 2022****INDUSTRIAL ELECTRICAL SYSTEMS  
(ELECTRICAL AND ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.  
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.  
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.  
4. All parts of Question paper must be answered in one place.
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**PART – A**

1. a) What are the main components in an electric drive?  
b) Mention different heating methods.  
c) Define Solid angle and Space height ratio with respect to illumination.  
d) What is the frequency of electric supply used in traction? Why?  
e) Define tractive effort.

**PART – B****UNIT – I**

2. a) What are the advantages of AC drives over DC drives? 6 M  
b) How are the electrical loads classified according to their duty? Explain with examples. 6 M

OR

3. a) What is the need for speed control of electric drives? Explain the scheme used for the speed control of induction motor. 6 M

- b) Compare Group and Individual drives. 6 M

### **UNIT – II**

4. a) Explain the advantages of electric heating. 6 M  
b) With a neat diagram, explain the working of metal Arc welding. 6 M

OR

5. a) State the advantages of electrically produced heat by means of arc furnaces. Distinguish between the direct and indirect type of arc furnaces. State their field of application. 8 M  
b) Explain the applications of dielectric heating. 4 M

### **UNIT-III**

6. a) Describe what do you know about arc lamps? What are their advantages and disadvantages as light sources? 6 M  
b) What is the difference between direct lighting and indirect lighting? 6 M

OR

7. a) What is the basic nature of light and state the laws of illumination? 6 M  
b) State the advantages and disadvantages of discharge lamps over the filament lamp and give their applications. 6 M

### **UNIT – IV**

8. a) Sketch the typical speed-time curves for mainline service and suburban service with electric traction. 6 M

- b) A train is required to run between stations 1.2 km apart a scheduled speed of 30 kmph, the duration of stops being 15 seconds. The braking retardation is 5 kmphps. Assuming a trapezoidal speed-time curve, calculate the acceleration, if the ratio of maximum speed to average speed is to be 1.3. 6 M

OR

9. a) State the main features for an ideal traction system. Explain the various systems of track electrification in India. 6 M
- b) An electric train has a maximum speed of 60 kmph. The scheduled speed including the station stop of 30 seconds is 40 kmph. If the acceleration is 1.5 kmphps, find the value of retardation when the average distance between the stops is 3 km. 6 M

### UNIT – V

10. An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1.7 kmphps and it is braked at 3.3 kmphps. Draw the speed time curve for the run. Estimate energy consumption at the axles of the train per tonne - km. Take the tractive resistance constant at 50 Newton per tonne and allow 10 percent for rotational inertia. 12 M

OR

11. a) What is specific energy consumption of a train? Explain various factors affecting it. 6 M
- b) Define the following Adhesive Weight, Coefficient of Adhesion and Tractive Effort. 6 M