Code No: R203202G **R20** SET -1

III B. Tech II Semester Regular Examinations, July -2023
FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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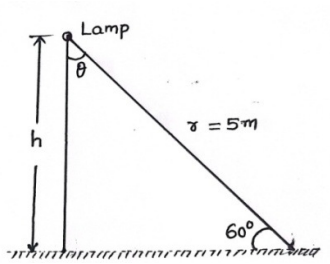
UNIT-I

1. a) Define plane angle and solid angle. What is the relationship between plane angle and solid angle? [7M]
   b) Determine the MSCP of a lamp emitting 1000 lumens. A surface inclined at an angle of 60^0 to the rays is kept 5 meters away from a 100cp lamp. Find the average intensity of illumination on the surface. [7M]



(OR)

2. a) Explain about the requirements of good lighting scheme. [7M]
   b) Explain the construction and working of Incandescent lamp. [7M]

UNIT-II

3. a) With a neat sketch, explain about direct resistance heating. [7M]
   b) What are the advantages of electric heating? [7M]

(OR)

4. a) Explain the basic principle of operation of induction heating. Write the expression for depth of penetration of induced current. [7M]
   b) Briefly explain, direct core type induction furnace. [7M]

UNIT-III

5. a) Explain the basic principle of operation of resistance welding. [7M]
   b) List the advantages, disadvantages and applications of resistance welding. [7M]

(OR)

6. a) Explain the basic principle of operation of arc welding. [7M]
   b) Write any four comparisons between AC and DC welding. [7M]

UNIT-IV

7. a) Write any four comparisons between A.C and D.C traction system. [7M]
   b) What are the special features of a traction motor, mention their advantages. [7M]

(OR)

8. a) Explain Trapezoidal Speed-Time Curve. [7M]
   b) What are the factors that affect specific energy consumption? [7M]

UNIT-V

9. a) What are the benefits of energy storage? [7M]
   b) Explain supercapacitors electrical energy storage system. [7M]

(OR)

10. a) Classify energy storage system. Explain any one of them. [7M]
    b) Explain electrochemical energy storage system with an example. [7M]

Code No: R203202G **R20** SET -2

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FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY
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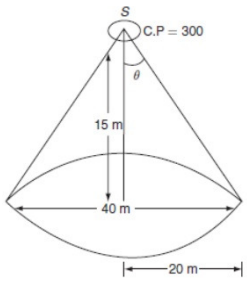
Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1. a) With a neat sketch, explain Inverse Square Law of illumination. [7M]
   b) The lamp having a candle power of 300m in all directions is provided with a reflector that directs 70% of total light uniformly on a circular area 40m diameter. The lamp hung at 15m above the area. Calculate: the (i) illumination (ii) also calculate the illumination at the center (iii) the illumination at the edge of the surface without reflection. [7M]



(OR)

2. a) Explain in detail about different types of lighting schemes. [7M]
   b) Explain the construction and working of fluorescent lamp. [7M]

UNIT-II

3. a) What are the essential requirements of good heating element? [7M]
   b) List the domestic and industrial applications of electric heating. [7M]

(OR)

4. a) Explain the basic principle of operation of dielectric heating. [7M]
   b) List the advantages and applications of dielectric heating. [7M]

UNIT-III

5. a) Explain seam welding with a neat sketch. [7M]
   b) List the advantages, drawbacks and applications of seam welding. [7M]

(OR)

6. a) Write any four comparisons between AC and DC welding. [7M]
   b) List the different types of arc welding and its applications. [7M]

UNIT-IV

7. a) Differentiate electric traction system and non electric traction system. [7M]
   b) Derive the expression for tractive effort (F_t) at the wheel. [7M]

(OR)

8. a) Explain Quadrilateral Speed-Time Curve. [7M]
   b) Define the terms i) Accelerating weight ii) Adhesive weight iii) Co-efficient of adhesion. [7M]

UNIT-V

9. a) Why do we need an energy storage system? Explain. [7M]
   b) Explain thermal energy storage system with an example. [7M]

(OR)

10. a) Explain super conducting magnetic energy storage system. [7M]
    b) Explain comparison of rated power, energy content and discharging time of different EES technologies. [7M]

Code No: R203202G **R20** SET -3

III B. Tech II Semester Regular Examinations, July -2023
FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1.	a)	Explain the laws of illumination.	[7M]
	b)	Explain all the four light control methods.	[7M]
		(OR)	
2.	a)	Explain different sources of light.	[7M]
	b)	Explain about flood lighting and LED lighting.	[7M]

UNIT-II

3.	a)	Explain direct resistance heating.	[7M]
	b)	Explain the properties that a material which is used as a heating element must possess.	[7M]
		(OR)	
4.	a)	Explain in brief the causes of failure of heating elements.	[7M]
	b)	Explain direct core type induction furnace.	[7M]

UNIT-III

5.	a)	Explain metal arc welding.	[7M]
	b)	Explain about dc welding sets.	[7M]
		(OR)	
6.	a)	Compare resistance welding and arc welding.	[7M]
	b)	Explain spot welding.	[7M]

UNIT-IV

7.	a)	What are the various traction systems in practice in India?	[7M]
	b)	Discuss the factors which affect the schedule speed of a train.	[7M]
		(OR)	
8.	a)	Describe the procedure of calculating the specific energy consumption of an electric train.	[7M]
	b)	A train with an electric locomotive weighing 300 tons is to be accelerated up a gradient of 1 in 30 at an acceleration of 1 km phps. If the train resistance, coefficient of adhesion and effect of rotational inertia are 80 N/ton, 0.25 and 12.5 percent of the dead weight respectively, determine the minimum adhesive weight of the locomotive.	[7M]

UNIT-V

9.	a)	What is the need for energy storage?	[7M]
	b)	Write about chemical storage systems.	[7M]
		(OR)	
10.	a)	Give the applications of storage systems.	[7M]
	b)	Write about thermal storage systems.	[7M]

Code No: R203202F **R20** SET -4

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Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1.	a)	Describe the construction and working of a filament lamp.	[7M]
	b)	Compare the above with fluorescent lamp.	[7M]
		(OR)	
2.	a)	What are the requirements of good lighting? Explain in detail.	[7M]
	b)	Explain how flood lighting is provided and the design considerations involved.	[7M]

UNIT-II

3.	a)	What are the advantages of electric heating?	[7M]
	b)	Give the classification of electric heating methods.	[7M]
		(OR)	
4.	a)	Derive the design of heating element to produce the given temperature.	[7M]
	b)	Explain the process of dielectric heating.	[7M]

UNIT-III

5.	a)	Explain carbon arc welding.	[7M]
	b)	Explain about ac welding sets.	[7M]
		(OR)	
6.	a)	Compare dc welding and ac welding.	[7M]
	b)	Explain projection welding.	[7M]

UNIT-IV

7.	a)	Discuss briefly different systems of traction.	[7M]
	b)	What is a speed-time curve? Discuss briefly the different periods in a typical speed-time curve of a train running on main line.	[7M]
		(OR)	
8.	a)	What are the factors affecting energy consumption in propelling a train?	[7M]
	b)	A 500 ton goods train is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1.2 kmphps. Coefficient of adhesion is 25%, track resistance 40 N/ton and effecting rotating masses 10% of dead weight. Find the weight of the locomotive and number of axles if the axle load is not to exceed 20 tons.	[7M]

UNIT-V

9.	a)	What are the characteristics of energy storage techniques?	[7M]
	b)	Write about magnetic storage systems.	[7M]
		(OR)	
10.	a)	Compare the energy storage technologies.	[7M]
	b)	Write about electrical storage systems.	[7M]