EE6801 ELECTRIC ENERGY GENERATION, UTILISATION AND CONSERVATION

TWO MARKS QUESTIONS WITH ANSWERS

UNIT I

ELECTRIC DRIVES AND TRACTION

1. What is meant by electrical drives?
2. What are the requirements of an electric drive?
3. Specify the functions of power modulator.
4. Mention the different types of drives.
5. List the different types of electrical drives.
6. What are the advantages of electric drives?
7. What are the functions performed by electric drives?
8. What are the disadvantages of electric drives?
9. What are the advantages of group drive over individual drive?
10. What the group drive is not used extensively.
11. Write short notes on individual electric drives.
12. Mention the different factors for the selection of electric drives?
13. Mention the parts of electrical drives.
14. Mention the applications of electrical drives 15.Name the systems of traction.
16. What are the advantages of direct steam engine system?
17. What are the disadvantages of direct steam engine system?
18. What are the advantages of direct internal combustion engine system?
19. What are the disadvantages of direct internal combustion engine system?
20. What are the advantages of internal combustion engine with electric drive?
21. What are the disadvantages of internal combustion engine with electric drive? 22. Mention the advantages of electrification of track.
23 Mention the disadvantages of electrification of track.
24. What are the various types of electric traction?
25. What are the various vehicles falling under electric vehicle fed from the distributed network?
26. What are tramways?
27. What are Trolley buses?
28. What are the advantages of diesel electric system?
29. How power is supplied to railway trains?
30. State any four advantages of electric traction.
31. How would you analyze the speed time curve for electric train?
32. What is crest speed?
33. What is average speed?

34. What is scheduled speed?
36. What is tractive effort?
37. Write the formula for tractive effort of an electric train.
38. Define coefficient of adhesion.
39. Why bridge transition is preferable for suburban service?
40. Define dead weight.
41. Define accelerating weight.
42. Define adhesive weight.
43. Why bridge transition is preferable for suburban service?
44. Name the advanced methods of speed control of traction motors.

UNIT II

ILLUMIINATION

1.Define light.
2. Define luminous flux.
3. Define luminous intensity.
4. Define light energy.
5. Define radiant efficiency.
6. Define luminous efficiency.
7. Define plane angle.
8. Define solid angle. 9.Define lumen.
10. Define power of candle.
11.Define illuminate.
12.Define foot candle. 13.Define lux
14.What is horizontal candle power?
15.Define spherical candle power.
16.What is hemispherical candle power?
17. Define reflection factor (or) Co efficient of reflection (or) reflection ratio.
18. Define candela.
19. Define lamp efficiency.
20. Define brightness.
21. What are the laws of illumination.
22. State Inverse square law
23. State Lambert's cosine law.
24. What are the polar curves?
25. What are the uses of Rousseau's construction?
26. Define utilization factor in the design of the lighting scheme.

27. Define depreciation factor.
28. State the different lighting schemes.

UNIT III

HEATING AND WELDING

1.Write the Stephen law of radiation.
2 What are the advantages of electric heating? 3.What are the applications if Arc furnaces? 4. What are advantages of dielectric heating? 5.Name the uses of dielectric heating. 6.Name the uses of induction heating.
7.What are the advantages of coreless induction furnaces?
8. State the difference between core type and coreless type induction furnaces.
9. What are the advantages of Ajax Wyatt furnace?
10.What is the principle of arc furnace?
11.Why Nichrome element is used as a heating element in a resistance oven?
12. Give two applications of dielectric heating.
13. What are the advantages of dielectric heating?
14. What are the methods of controlling the temperature of resistance ovens? 15.Write any two reasons for the failure of heating element.
16. Classify the methods of electric heating.
17. What is meant by indirect resistance heating?
18. What is meant by(1) infra red /radiant heating? (2)Dielectric heating? 19.What are the properties of a good heating material?
20. What is the basic principle of induction heating? 20.Name the different types of electric welding.
21. Where is spot welding employed?
22.Where is carbon arc welding employed?
23.What are the advantages of flash butt welding?
24.Distinguish between Butt welding and spot welding. 25.State different types of arc welding.
26.State different types of electric arc welding. 27.What are the two types of Butt welding?
28.What are the various types of electric resistance welding?

UNIT IV
SOLAR RADIATION AND SOLAR ENERGY COLLECTORS

1. What is meant by Solar Energy?
2. List the drawbacks of Solar Energy.
3. Define solar constant.
4. Define solar time.
5. What is meant by solar collector? Mention its types.
6. Mention the ways of solar energy can be utilized.
7. What are the indirect forms of solar Energy?
8. What are the performance indices of a solar collector? 9.Name the basic design of solar cookers
10. List out the advantages and disadvantages of air flat plate collector
11. What is meant by solar pond?
12. What is meant by solar photo voltaic? 13.List the application of solar PV system.
14. What are the advantages & disadvantages of PV solar energy conversion system?
15. What are the advantages & disadvantages of concentrating collectors over flat plate type collectors?
16. Name the types of concentrating collectors. 17What are the zones in solar pond?

UNIT-V
WIND ENERGY

1. List out the factor led to accelerated development of wind power.
2. What are the features prefer for the wind turbine site?
3. What are the merits and demerits of three blade rotor over two blade rotors?
4. Draw the power Vs wind speed characteristics.
5. Draw the block diagram of WECS.
6. What are the types of generator drive for the operation of WECS?
7. Define gusts
8. What are the features of VAWT?
9. Define power coefficient
10. List out the merits of WECS
11. List out the demerits of WECS
12. What are the components of wind turbine generator units?
13. Classify the schemes available for electric generation.
14. Define wind turbine.

16 Mark Questions

EE6801 ELECTRIC ENERGY GENERATION, UTILISATION AND CONSERVATION

UNIT I

ELECTRIC DRIVES AND TRACTION

1. Write the advantages and disadvantages of electric drives
2. Write about of choice of electrical drives
3. Write the advantages of electric traction systems and mention the requirements of electric traction systems
4. Decribe the supply system used in electric traction systems.
5. Define coefficient of adhesion. Derive an expression for the tractive effort for the propelling a train.
6. Write in detail about mechanics of train movement
7. Derive the expression for specific energy output
8. Write about the various methods of traction motor control
9. Explain briefly the recent trends in electric traction.
10. Explain series - parallel control of dc motors with relevant diagrams
11. A locomotive accelerates a 350 tonne train up a gradient of 1 in 100 at 0.8 kmphps. Assuming the coefficient of adhesion to be 0.25, determine the minimum adhesive weight of the locomotive . Assume train resistance 45 N per tonne and allow 10% for the effect of rotational inertia.
12. An electric locomotive is required to accelerate a train weighing 100 tonnes up a gradient of 1 in 200 at an acceleration of 1.5 km per hour per second. Assuming coefficient of adhesion as 10%, train resistance as 30 N/tonne and effect of rotation inertia as 15%, determine the tractive effort required in newtons.
13. Explain about multiple unit control and braking of traction motor
14. An electric train is required to be driven up an inclined plane having a gradient of 0.5% at a speed of 40 Kmph.The train resistance is 40 N per tonne. If the power taken by the

motor from the traction network is 200Kw, compute the maximum permissible weight of the train. The combined efficiency of the motor and the gearing system is 75.

15.Explain shunt transition and bridge transition methods of series-parallel starting of series motors. State the advantage of bridge transition over shunt transition method. .Derive the expression for energy output from driving axles.

16. A train runs with an average speed of 40Kmph. Distance between stations is 2 km.Values of acceleration and retardation are 1.5 Kmphps and 2.5 Kmphps respectively. Find the maximum speed of train assuming trapezoidal speed time curve.

UNIT II
ILLUMIINATION

1.i) State the types of electric lamps used for illumination in different applications.

ii) Draw the circuit diagram of low-pressure discharge tube used as light source. Explain the operating principle of this device.

2. i) Explain the operating principle of anyone type of photometer.

iii) Draw the circuit diagram of high - pressure neon lamp and describe its operating principle.

3. Explain the construction and working of

i) Carban arc lamp

ii) Flame arc lamp

iii) Magnetic arc lamp.

4. i) Define MSCP and luminous efficiency.

ii)When a 250 V lamp takes a current of 0.8A,it produces a total flux of 3260 lumens . Calculate a) MSCP of the lamp b)efficiency of the lamp. 5.i) What are the various types of lighting scheme?

ii) Enumerate the various factors, which have to be considered while designing lighting scheme.

6.i) Define candle power and lux.

ii) A workshop measuring 15m X 25m.,is lighted by 30 lamps of 200W, each having an efficiency of 15 lumens/watt. Assuming utilization factor of 0.5 and depreciation factor of 0.75. Find the illumination on the working plane.

7. Describe the salient features of

a) Street lighting

b) Flood lighting

8. A corridor is lighted by lamps spaces 9.15m apart and suspended at a height of 4.575m above the centerlines of the floor. If each lamp gives 100 candle power in all directions below the horizontal. Find the maximum and minimum value of the illumination on the floor along the centerline.

9. A hall 30 metre long and 12 metre wide is to be illuminated and illumination required is 50

meter candles. compute the number, wattage, location and mounting height of lamps.

Depreciation factor = 1.3 and utilization coefficient = 0.5. Light output of different lamps are given below.

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

10. i) Explain the construction and working of a sodium vapour lamp

ii) A lamp giving out 1200 lumens in all directions is suspended 8m above the working plane. Calculate the illumination at a point on the working plane 6m away from the foot of the lamp.

11. i) Write short note on flood lighting.

ii) It is required to provide an illumination of 100m. Candle in a factory hall 40m X 10m. Assume the depreciation factor as 0.8 and co efficient of utilization as 0.4 and efficiency of lamp as 14 lumens per watt. Calculate the number of lamps and their disposition.

12.i) A 250V lamp takes a current of 1A and produces a total flux of 4000 lumens. Determine the MSCP of the lamp and the efficiency of the lamp.

ii) Enumerate the various factors to be considered in designing a flood lighting installation.

13. Describe with a simple sketch the construction, operation and applications of sodium vapour lamp.

14. Draw schematic diagram of low pressure mercury vapour fluorescent lamp and explain the operation of the lamp. State the relative merits of this lamp.

15. A room measuring 10m X 10m is to be illuminated by 5 lamps. The average illumination required is 40 lumens per square metre. Utilization factor = 0.5 and depreciation factor = 1.2. Compute MSCP OF EACH lamp.

16. A lamp of 300 CP is hung at the center of a room 8m X 6m at a height of 3m from the floor. Calculate the maximum and minimum illumination produced and mention the places where it occurs.(April/May 2008)(May/ June 2009)

17. i) State the laws of illumination.

ii) It is required to provide an illumination of 100 lumen/m^{2} in a workshop hall 40m X 10m. Assume that efficiency of lamp is 14 lumens/watt, coefficient of utilization is 0.4 and depreciation factor as 0.8. Calculate the number and rating of lamps and their positions when trusses are provided at mutual distance of 5m.

18. Draw the connection diagram of fluorescent tube. Explain the working principle. What are the advantages of fluorescent tube over the incandescent lamp?

19. Explain with a neat diagram the principle and operation of sodium vapour lamp.

Mention its uses.

20. It is required to provide illumination of 100 lux in a workshop hall 40m X 10m and efficiency of lamp is 14 lumens per watt. Calculate the number and rating of lamps and their positions when seven trusses are provided at mutual distance of 5 meters. Take coefficient of utilization as 0.4 and depreciation factor as 0.8.

UNIT III

IHEATING AND WELDING

1. Mention the requirement of heating element. Explain the types of resistance heating.

2. Describe the operation and characteristics of welding generator sets (both AC and DC).

3. Explain the welding transformer and its characteristics

4. Explain the working of core type induction furnace with a neat sketch.

5. What is dielectric heating? How is this different? Explain the Explain the construction and working principle of dielectric heating.

6. Explain coreless type induction furnace?

7. Describe the operation of vertical core type or Ajax Wyatt induction furnace.

8. A 5KW, 440volts, 3 phase resistance oven is to have a 3star connected nichrome strip of 0.3mm thick heating element. If the wire temperature is to be 1500°c and that of the charge 1000°c, estimate the suitable width of the strip. Resistively of nichrome alloy is $1.016X10^{-6}$ Assume the radiating efficiency and emissivity of the element as 0.6 and 0.91respectively. 9. A laminated plywood board 40cm x 25 cm x 1.8 cm is to be heated from 25º C to 160º C in 12 minutes, using 25 MHz supply, specific heat of wood is to be taken as 0.32, density is 0.6 g / cm 3 , relative permittivity of wood is 6 and power factor 0.05. Find the supply voltage, power required and current drawn. Take the efficiency of the process as 75%

10. Calculate the energy required to melt one metric ton of brass in a single – phase Induction furnace. If the time taken is 1.5 hr, find the power input to the furnace. Specific heat of brass = 0.094 Latent heat of fusion of brass = 38 kcal / kg Melting point of brass = 920º C Furnace efficiency = 80%, Temperature of charge = 20º C (8)

11. A 105 KVA of tin is to be melt during an hour in a melting furnace. Determine a suitable rating of the furnace if melting temperature of tin is 240˚ C. Take initial temperature of metal as 35˚ C. Specific heat = 0.055 Kcal/kg ˚ C Latent heat of liquid = 13.3 Kcal/kg

UNIT IV
SOLAR RADIATION AND SOLAR ENERGY COLLECTORS

1. Explain in detail how solar energy can be effectively utilized in day-to-day life.

2. Draw illustrative diagram showing all the important components of solar heating and solar cooling unit. Explain the working principles of these devices.

3. Explain with necessary diagram the construction, principles of operation and applications of solar collector.

4. Explain with neat diagram solar space cooling and solar pond electric power plant.

5. Write short notes on:

a)Solar pumping
b) Solar desalination

6. Describe the photovoltaic principles of solar power generation. Compare the different types of solar cells with respect to power output and efficiency.

7. Write briefly about characteristics and principles of any three different types of solar collectors. Draw diagrams illustrating the constructional features of these collectors.

8. Draw and explain different types of solar cookers.

9. Explain with neat diagram about solar pond and its characteristics

10. Discuss briefly about a) Solar drying b) solar cells

11.Draw schematic diagram of solar thermal power plant used for power production and explain the operation of this system in detail.

12.a) Give merits and demerits on solar energy. b) State some important the applications of PV

UNIT-V
WIND ENERGY

1. Is wind energy a better alternative source of energy for Indian demand? Explain in detail how wind energy is produced.

2. Explain in detail about the performance and efficiency of different types of wind mills.

3. Describe with a neat sketch the working of a wind energy conversion system (WECS) with its main components

4.a) What is the origin of wind and what are the various factors which govern wind energy and direction? b) determine the overall power coefficient for a wind turbine with a rated power of 3 MW, speed 18m/s and blade diameter 40 metre.

5. Explain the preliminary design of wind electric system.

6. Explain the working of a horizontal axis wind turbine driven generator with a diagram. Show the mechanism for the automatic reorientation of the turbine axis along the wind direction.

7.a) Explain the principle of electric power generation from wind mill. b) Discuss its types and components. Also indicate the best site for locating them.

8. Explain the principle of operation of any two types of wind mill with neat diagram and discuss its characteristics and constraints if any.

9. Discuss briefly about a) Performance of wind mills b) Wind power generation in India.

10. Describe the saronious type of rotor in wind mill.

11. Compare the performance of horizontal and vertical axis wind mills.

12. How wind energy conversion systems are classified? Discuss in brief. What are its advantages and disadvantages?

13. Explain the safety and environmental aspects of wind energy