17/4/17 – FN

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

Question Paper Code : 71787

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Suggest suitable drives for lifts and cranes.
2. What are the merits and demerits of D.C system of track electrification?
3. What do you understand by polar curves as applied to light source?
4. What is flood lighting where is it generally used?
5. State the properties of a heating element used in indirect resistance heating.
6. Compare A.C. and D.C. sources as source of supply for arc welding.
7. Write down the energy balance equation for solar collector.
8. What is solar constant?
9. Write down the condition for maximum power generation in wind energy conversion system.
10. List the types of wind turbines.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the factors influencing the choice of electric drives? (4)

(ii) Sketch the typical speed-time curve for Main line service and to sub-urban services in electric Traction. Find the equation for distance travelled for main line system. (12)

Or

(b) (i) State the principle of regenerative braking. Explain regenerative braking in respect of DC motors. (6)

(ii) A 250 tonnes train with 10% rotational inertia effect is started with uniform acceleration and reaches a speed of 50 km.p.h.p.s. in 25 sec. on a level road. Find the specific energy consumption if the journey is to be made according to simplified trapezoidal speed time curve, the acceleration is 2 km.p.h.p.s. Tracking retardation 3 km./hr./sec. and distance between the stations is 2.4 km. Efficiency of motors = 0.9, track resistance = 5 kg./tonne. (10)

12. (a) (i) Discuss laws of illumination and its limitations in actual practice. (6)

(ii) A drawing hall 30 * 15 meters with a ceiling height of 5 meters is to be provided with a general illumination of 120 lux. Taking a co-efficient of utilization of 0.5 and depreciation factor of 1.4, determine the number of fluorescent tubes required, their spacing mounting height and total wattage. Tasking luminous efficiency of fluorescent tube as 40 lumens/watt for 80 watt tube. (10)

Or

(b) (i) Explain the working of a sodium vapour lamp with in a neat sketch. (8)

(ii) Show different types of indoor and outdoor lighting with neat Sketches. (8)

13. (a) (i) What are the different types of resistance welding? Describe any one type. (6)

(ii) A 10 kW single phase 200 V resistance oven has a circular nickel chrome wire for its heating elements. The final temperature is to be limited to 927 C and temperature of the charge is to be 327 C. Determine the length and size of the wire required. Assume radiating efficiency = 80%, emissivity = 0.9 and specific resistance of nickel chrome = 100×10^{-6} ohm cm. (10)

Or

(b) (i) Describe the construction and operation of the coreless induction furnaces. (8)

(ii) Explain the process of dielectric heating and derive the expression for total heat energy. (8)

14. (a) (i) Explain the basic phenomenon of solar energy conversion with suitable diagram. (8)

(ii) Explain the solar radiation geometry at earth surface. (8)

Or

(b) (i) What are the main components of a flat plate solar collector, explain the function of each. (8)

(ii) What are the advantages and disadvantages of concentrating collectors over a flat plate collector? (8)

15. (a) (i) With the help of block diagram, describe the functions of various components of a WECS. (10)

(ii) Give some important factors that are considered for site selection of WECS. (6)

Or

(b) With the help of neat diagrams explain in detail about the construction and the working principle of different vertical axis wind turbines. (16)

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Question Paper Code : 41014

23/04/2018 FN

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

Eighth Semester

Electrical and Electronics Engineering

EE6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define Electrical drive.
2. Define average speed and scheduled speed.
3. State illumination law.
4. List down the drawbacks of discharge lamps.
5. Mention the applications of induction heating.
6. Define quenching.
7. Define collector efficiency.
8. What is the principle involved in generating solar power ?
9. What are the causes for aerodynamic force ?
10. List down the aspects considered for selecting the wind turbine location.

PART – B (5×16=80 Marks)

11. a) i) Explain the requirements of electric traction system. (6)

ii) Describe the mechanism of train movement with speed-time curve. (10)

(OR)

b) A train has schedule speed 60 Km/hr between stops which are 6 Kms apart. Determine the crest speed over the run. Assuming trapezoidal speed time curve. The train accelerates at 2 Km/hr/sec. The duration of stop is 60 seconds. (16)

12. a) Briefly explain the factors responsible for lighting scheme for roads. **(16)**

(OR)

b) Two street lamps are 20 m apart and are fitted with a 500 C.P. lamp at a height of 8 m above the ground each. Calculate the illumination at a point under each lamp and midway between the lamps. **(16)**

13. a) A piece of insulating material is to be heated by dielectric heating. The size is 10×10×3 cm. A frequency of 20 MHz is used and the power absorbed is 400 W. Calculate the voltage necessary for heating and current that flows in the material. The material has relative permittivity of 5 and p.f. is 0.05. **(16)**

(OR)

b) Describe briefly on electric welding and its types. **(16)**

14. a) Explain the working principle of various types of concentrating solar collectors with neat sketch. **(16)**

(OR)

b) Explain the operation of solar cell with equivalent circuit and I-V characteristics. **(16)**

15. a) Explain the construction and operation of VAWT with its advantages and disadvantages. **(16)**

(OR)

b) Describe the functions of various blocks of a WECS and the power generated from WECS. **(16)**

29/4/19

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

Question Paper Code : 52967

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 — ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulation 2013)

(Also Common to : PTEE 6801 – Electric Energy Generation Utilization and Conservation for B.E. (Part-Time) – Seventh Semester – Electrical and Electronics Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the factors to be considered for the selection of electric drives.
2. What are the various speed control methods of three phase induction motor?
3. State the laws of illumination.
4. Write the various factors for designing the lighting scheme.
5. Classify the methods of electric heating.
6. What is meant by arc welding and list its types?
7. What are the different losses occur in solar collector?
8. State: Snell's law.
9. Give the expression for available wind power.
10. What are the factors affects the nature of the wind in earth surface?

PART B — (5 × 13 = 65 marks)

11. (a) What are the various types of electric braking used in traction? Discuss any two types in detail. (13)

Or

(b) Write the technical notes on recent trends in electric traction. (13)

12. (a) Explain about the following lamps with neat diagrams.

(i) Incandescent lamp. (6)

(ii) Sodium Vapour Lamp. (7)

Or

(b) (i) Describe the detail about the Road Lighting with neat diagram. (6)

(ii) Compare the output lumen of LED, CFL and Incandescent wattage. (7)

13. (a) Explain the Resistance heating methods with neat schematic diagrams. (13)

Or

(b) (i) What are the types of heating? Explain about the Induction heating. (6)

(ii) What are the types of electric welding? Explain the Butt welding with neat diagram. (7)

14. (a) Explain the parabolic concentrating solar collector and performance analysis with neat sketch. (13)

Or

(b) (i) Explain about grid tied inverter for solar PV system. (8)

(ii) What are the advantages and disadvantages of Concentrating Collectors. (5)

15. (a) Derive the expression for power from the Wind and hence deduce the condition for maximum power from wind. (13)

Or

(b) Draw the simple structure of horizontal axis wind turbine and explain its working in detail. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the different arc welding methods with neat schematic diagrams.

Or

(b) Explain the following :

(i) factory lighting. (5)

(ii) flood lighting. (5)

(iii) street lighting. (5)

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Question Paper Code : 50496

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Eighth Semester
Electrical and Electronics Engineering
EE 6801 : ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List the advantages and disadvantages of electric traction.
2. Define gear ratio.
3. Why tungsten is selected as the filament material ?
4. Define the term MSCP and lamp efficiency.
5. State the requirements of a good heating material.
6. Differentiate between core type and coreless type induction furnace.
7. Define collector efficiency.
8. List the advantage of solar concentrators.
9. What are the causes of aerodynamic force ?
10. List the factors responsible for distribution of wind energy on the surface of earth.

PART – B (5×16=80 Marks)

11. a) i) Describe the mechanism of train movement with the aid of transmission of tractive effort. (8)

ii) Discuss in detail about series-parallel control of electric traction motor with example. (8)

(OR)

b) Explain in detail about different methods of traction motor control. (16)

12. a) i) Explain in detail the principle of operation of fluorescent lamp. (8)

ii) Describe and prove laws of illumination. (8)

(OR)

b) Two street lamps are 20m apart and are fitted with a 500 C.P. lamp at a height of 8m above the ground each. Calculate the illumination at a point under each lamp and midway between the lamps. (16)

13. a) i) Describe the construction and working principle of dielectric heating. (8)

ii) Explain the principle and working of welding transformer. (8)

(OR)

b) Describe different types of arc welding with neat diagram. (16)

14. a) Explain the operation of solar cell using equivalent circuit and I-V characteristics. (16)

(OR)

b) Discuss in detail about the performance of cylindrical and parabolic concentrating collector. (16)

15. a) Explain the construction and operation of VAWT with its advantages and disadvantages. (16)

(OR)

b) Describe the functions of various blocks of a WECS with the help of block diagram. (16)

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

Question Paper Code : 20469

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations – 2013)

(Common to PTEE 6801 — Electric Energy Generation, Utilization and Conservation for B.E. Part-time – Seventh Semester – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the different types of electric drives.
2. Mention the pantograph current collector.
3. Define luminous flux.
4. List some of the energy saving lighting.
5. Write down the methods of electric heating.
6. Mention the advantages of coreless induction furnace.
7. Define solar constant.
8. List the factors affecting solar irradiance.
9. Classify different types of wind turbines.
10. Mention the aspects considered for selecting wind turbine location.

PART B — (5 × 16 = 80 marks)

11. (a) A train weighing 200 tonnes uses regenerative braking on a down gradient of 2% when the speed is changed from 60 Kmph to 20 Kmph over a distance of 4 kms. Determine the electrical energy and average power returned to the supply system. Assume tractive resistance of 40 N/ tone, rotational inertia of 10% and efficiency of conversion of 75%. If the regenerative braking does not change the speed down the gradient, determine the power fed into the supply system. (16)

Or

(b) Explain the mechanism of train movement with its speed time curve. (16)

12. (a) (i) Describe the factors responsible for lighting scheme for roads. (10)

(ii) Draw the fluorescent lamp circuit. (6)

Or

(b) A 200 c.p. amp is hung 4 metres above the centre of a circular area of 5 metre diameter. Determine the illumination at the (i) Centre of area (ii) Periphery of the area (iii) Average illumination. Also determine the average illumination if reflector of 80% efficiency is used. (16)

13. (a) (i) Discuss the requirements of the good heating materials. (8)

(ii) Demonstrate the steps to be used for designing a heating element. (8)

Or

(b) Describe the working principle and types of electric arc welding. (16)

14. (a) (i) List the advantages and disadvantages of concentrating collectors. (10)

(ii) Discuss about solar radiation geometry. (6)

Or

(b) Describe the principles of conversion of solar radiation into heat energy. (16)

15. (a) Describe the various components of a WECS and the power generated from WECS. (16)

Or

(b) Illustrate the basic theory of wind turbine blade aerodynamics. (16)

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Reg. No. :

Question Paper Code : 91502

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Eighth Semester

Electrical and Electronics Engineering

EE 6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations 2013)

(Common to PTEE 6801 – Electric Energy Generation, Utilization and Conservation for B.E. Part-Time – Seventh Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Highlight the merits of electric traction.
2. Describe tractive effort.
3. Define space height ratio.
4. What is stroboscopic effect of fluorescent tubes ?
5. Enumerate the causes for failure of heating elements.
6. Write down the different types of resistance welding.
7. List any four applications of solar collectors.
8. Define transmissivity.
9. Determine the power in the wind if the wind speed is 20 m/s and blade length is 50 m. Assume $\rho = 1.23$ kg/m.
10. List the factors responsible for distribution of wind energy on the surface of earth.

PART – B (5×13=65 Marks)

11. a) The distance between two stations is 1.6 kms and the average speed of the train is 40 km/h. The acceleration, retardation during coasting and braking are 2 km/h/s, 0.16 km/h/s and 3.2 km/h/s respectively. Assume quadrilateral approximation of speed time curve. Determine the duration of the accelerating, coasting and braking periods and distance covered during these periods. (13)

(OR)

b) i) Define specific energy consumption and discuss the factors which affect the specific energy consumptions of trains operating at a given scheduled speed. (7)

ii) A motor coach bogie having two series motors is accelerated uniformly to a speed of 45 km/h in 25 sec. with the help of a series-parallel controller. If the average tractive effort per motor is 12750 N, calculate the approximate loss of energy in the starting rheostats. (6)

12. a) i) Draw and explain the working of LED lamp. (6)

ii) A filament lamp of 500 W is suspended at a height of 4.5 m above the working plane and gives uniform illumination over an area of 6 m diameter. Assuming an efficiency of the reflector as 70% and efficiency of lamp as 0.8 watt per candle power, determine the illumination on the working plane. (7)

(OR)

b) i) State the laws of illumination. (4)

ii) It is desired to illuminate a drawing hall with an average illumination of about 250 lux. The area of the hall is 30 m × 20 m. The lamps are to be fitted at 5 m 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. (9)

13. a) A 20 kW single phase, 220 V resistance oven employs circular nichrome wire for its heating element. If the wire temperature is not to exceed 1127°C and the temperature of the charge is to be 427°C, calculate the size and length of the wire required. Assume e = 0.9 and the radiation efficiency K = 0.6. What would be the temperature of wire when the charge is cold ? (13)

(OR)

b) i) Explain the process of dielectric heating and mention its applications. (6)

ii) List the methods for arc welding and explain any one method in detail. (7)

14. a) i) Describe the energy balance equation and collector efficiency for a flat plate collector. (7)

ii) Discuss in brief on solar radiation geometry. (6)

(OR)

b) i) Mention the merits and demerits of concentrating collectors. (6)

ii) Write a brief note on cylindrical-parabolic concentrating collector. (7)

15. a) With the neat diagram, explain in detail about the construction and the working principle of a horizontal axis wind turbine. (13)

(OR)

b) Present a detailed analysis on the aerodynamic forces acting on a blade. (13)

PART – C (1×15=15 Marks)

16. a) A piece of insulating material is to be heated by dielectric heating. The size is 10 × 10 × 3 cm. A frequency of 20 MHz is used and power absorbed is 400 W. Calculate the voltage necessary for heating and current that flows in the material. The material has relative permittivity of 5 and p.f is 0.05. (15)

(OR)

b) A building frontage 50 m × 16 m is to illuminated by flood lighting projectors situated 25 m away. If the illumination is 100 lux, coefficient of utilization is 0.5, depreciation factor 1.5, waste light factor 1.2. Estimate the number and size of projectors. Sketch the projectors recommended indicating the usual adjustments provided. (15)