B.Tech. (Electrical Engineering) 8th Semester

G-Scheme Examination, May-2025

SPECIAL ELECTRICAL MACHINES

Paper - PEC-EE-402-G

Time allowed : 3 hours] *[Maximum marks : 75*

*Note : **Question No.-1 is compulsory** and attempt **four** questions by selecting **one** question from each unit. All questions carry equal marks.*

1. (a) List the applications of three Phase IM.

   (b) What is static slip power recovery control scheme ?

   (c) Define Torque constant of a stepper motor.

   (d) What is stepper motor ?

   (e) List the permanent materials use in PMBLDC motor.

   (f) Comment on demagnetization in PMBLDC motor.

Unit-I

2. (a) Describe construction of double cage 3 phase IM.
   (b) Explain about IM as Induction generator.

3. What is function of control scheme in three Phase IM ? Explain in detail.

Unit-II

4. Explain construction working of different types of IM with suitable schematic diagram.

5. (a) Explain any one type of single phase commutator motors.
   (b) Differentiate between single Phase IM and three phase IM

Unit-III

6. Describe in detail the construction and working of variable reluctance stepper motor.

7. (a) Explain torque speed characteristics of switched reluctance motor.

   (b) Derive the expressions for voltage and torque switched reluctance motor.

Unit-IV

8. Explain the construction of PMBLDC, also compare conventional DC motor and PMBLDC motor.

9. Write Technical notes on :
   (a) PCB motor
   (b) Hysteresis motor

B.Tech Electrical Engineering 8th Sem. G-Scheme

Examination, May - 2025

SOLAR THERMAL APPLICATIONS

Paper - OEC-EE-402G/OEC-EE-406G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any **five** questions in all. **Question No. 1 is compulsory** and attempt one question from each section. All questions carry equal marks.*

1. (a) Define solar radiation and explain its siginificance in renewable energy systems. 2.5

   (b) What are empirical equations for predicting the availability of solar radiation? 2.5

   (c) How does heat transfer play a crucial role in solar energy systems? Provide examples. 2.5

   (d) Outline the components and working principle of liquid flat-plate solar collectors. 2.5

   (e) Describe different types of thermal energy storage systems used in solar energy. 2.5

   (f) How do solar air heaters contribute to greenhouse drying systems? Discuss their performance analysis. 2.5

Section - A

2. Explain the difference between solar radiation outside the Earth's atmosphere and at the Earth's surface. How do these difference affect the design and performance of solar energy systems? Provide examples. 15

3. Outline the factors influencing the collection of solar radiation data. How does accurate data enhance solar energy system efficiency? Provide examples. 15

Section - B

4. Explain the design and performance analysis of liquid flat-plate solar collectors, focusing on factor like transmissivity and absorptivity. Provide examples. 15

5. Explain the significance of collector efficiency factor and collector heat-removal factor in assessing the performance of solar collectors. Describe methods for transient analysis and testing procedures for solar collectors with examples illustrating their importance. 15

Section - C

6. Explain sensible heat, latent heat, and thermochemical storage in solar energy systems. Compare their effectiveness and limitations. Provide examples. 15

7. Elaborate on thermochemical storage principles and mechanisms in solar energy. Evaluate their potential benefits and challenges. 15

Section - D

8. Describe alternative types of air heaters in solar energy systems, highlighting their advantages and limitations compared to conventional air heaters. 15

9. Explore the greenhouse effect in solar drying systems and its efficiency compared to conventional drying methods. 15

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B.Tech (Electrical Engineering) 8th Sem. G-Scheme

Examination, May - 2025

SOLAR ENGERGY APPLIANCES

Paper - OEC-EE-408-G/OEC-EE-418-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in all, selecting **one** question from each unit. **Question No. 1 is compulsory**. All questions carry equal marks.*

1. (a) List the applications of solar cooking.

   (b) State the necessity of desalination.

   (c) List types of solar dryers.

   (d) Distinguish between conventional and solar desalination.

   (e) Define solar cell.

   (f) State the basics of solar still. 6×2.5

Unit - I

2. (a) Explain the working principle of solar cell in detail. 7.5

   (b) Discuss the solar street lighting system in detail. 7.5

3. Discuss in detail the rural electrification process. Support your answer with few case studies. 15

Unit - II

4. (a) Explain box type solar cookers in detail. 7.5

   (b) State the advantages and disadvantages of solar cookers. 7.5

5. Discuss the performance evaluation of solar cookers in detail. 15

Unit - III

6. (a) Explain direct type solar dryer in detail. 7.5

   (b) Discuss hybrid type solar dryer in detail. 7.5

7. (a) Discuss forced circulation type dryers in detail. 7.5

   (b) Explain mixed mode type solar dryer in detail. 7.5

Unit - IV

8. Discuss solar disinfection and its methods in detail. 15

9. (a) Discuss material problems in solar still in detail. 7.5

   (b) Write a note on simple solar still. 7.5