

3732

**B. Tech. 8th Semester (Electrical Engg.)
Examination – May 2023**

SPECIAL ELECTRICAL MACHINES

Paper : PEC-EE-402-G

Time : Three hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

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

1. (i) Define step angle.
- (ii) Why rotor position sensor is essential for the operation of switched reluctance motor ?
- (iii) Illustrate the different modes of operation of switched reluctance motor.
- (iv) List different types of linear motor.
- (v) Why rotor bars are skewed in an induction motor.

3732- 350-(P-3)(Q-9)(23)

P. T. O.

- (vi) Draw the block diagram of drive system of a stepping motor. $2.5 \times 6 = 15$

UNIT - I

2. (a) Derive an expression for rotating magnetic field in three-phase induction motor. 8
(b) Explain the Static Scherbius scheme of speed control of three-phase induction motor. 7
3. (a) Explain the torque-slip characteristics of 3-phase induction motor. 7
(b) Describe the role of induction motor as an induction generator. 8

UNIT - II

4. (a) Explain the equivalent circuit of 1-phase induction motor when motor is at (i) Standstill and (ii) when motor is Running. 8
(b) Explain construction and working principle of repulsion induction motor. 7
5. (a) Explain various methods of starting of single-phase induction motor. 8
(b) Explain working principle of linear induction motor. 7

(P-3)(Q-9)(23) (2)

UNIT - III

6. (a) Explain construction and working principle of hybrid stepper motor. 8
(b) State and explain the static and dynamic characteristics of stepper motor. 7
7. (a) Derive torque equation of SRM. 7
(b) What are the different types of power controllers used for SRM and explain the operation of any two schemes with suitable circuit diagram? 8

UNIT - IV

8. Explain the closed loop control scheme of permanent magnet brushless d. c. motor drive with suitable schematic diagram. 15
9. Write a short note on : 15
(i) Reluctance motors
(ii) Permanent magnet brushless a.c. motor

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-(P-3)(Q-9)(23) (3)

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B. Tech. 8th Sem. (Electrical Engg.)

Examination – May, 2023

SOLAR THERMAL APPLICATIONS

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

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

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

1. (a) Explain various types of solar radiations emitted by the Sun. 2.5
- (b) Define the drying mechanism. 2.5
- (c) Define transmissivity. Which instrument is used to find the transmissivity of a surface ? 2.5

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P. T. O.

- (d) Explain solar concentrator. 2.5
- (e) Define sensible heat material. 2.5
- (f) Explain the greenhouse effect. 2.5

SECTION - A

- 2. Obtain the schematic presentation of radiations received on the earth's surface with a neat and clean diagram with all the specifications. 15
- 3. What are the measuring instruments used for solar radiations ? Explain pyranometer with a neat diagram. 15

SECTION - B

- 4. Classify flat plate collectors. Explain anyone with a suitable diagram and explain its working. 15
- 5. Explain the working of disc collector with a suitable diagram. 15

SECTION - C

- 6. What is a latent heat storage system ? Give some examples of phase change materials with their properties. 15

- 7. What is PCM ? Give examples. Explain their properties. 15

SECTION - D

- 8. What is a greenhouse ? Classify them with a diagram. 15
- 9. Explain the types of dryers. 15

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**B. Tech. 8th Semester
(Electrical Engineering)**

Examination – May 2023

SOLAR ENERGY APPLIANCES

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

Time : Three hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

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

1. Explain :

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|--|-----|
| (a) The working of a solar cell. | 2.5 |
| (b) Types of solar cookers. | 2.5 |
| (c) Drying phenomenon method. | 2.5 |
| (d) Desalination process. | 2.5 |
| (e) Types of desalination. | 2.5 |
| (f) Views of solar still for sea water. Justify your answer. | 2.5 |

SECTION - A

2. What is solar home lighting systems ? Explain in detail with suitable diagram. 15
3. How solar lighting system works ? Explain with one case study with neat diagram. 15

SECTION - B

4. What is a solar cooker ? Explain its working analysis with a neat sketch. 15
5. Analyse the performance evaluation of a solar cooker. 15

SECTION - C

6. What is a solar dryer ? Classify them with schematic diagrams and explanations. 15
7. What is a mixed-mode type solar dryer ? How does it differ from hybrid dryers ? 15

SECTION - D

8. What is solar desalination ? Explain its working and performance with a suitable sketch. 15
9. What are various desalination techniques ? Which method is the best and why ? 15