

**B.Tech. (Electrical Engineering) 8th Semester
(G-Scheme) Examination, July-2022
SPECIAL ELECTRICAL MACHINES
Paper- PEC-EE-402-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 out the difference between Squirrel cage IM and Slip ring IM. 2.5×6
- (b) What is the purpose of deep- bar cage rotors?
- (c) Why single phase Induction motor does not have starting torque?
- (d) Calculate step angle for 3-phase, 24- pole permanent magnet stepper motor.
- (e) State advantage of servomotors over large industrial motors
- (f) Write some important application of PMDC motors.

Unit-I

2. (a) Describe with neat sketch construction of 3-phase Induction motor 7.5

3732-P-3-Q-9 (22)

[P.T.O.]

- (b) A 746 KW, 3-phase Induction motor 50 Hz, 4 poles has rotor resistance of $.02\Omega$ and reactance of $.15\Omega$ at standstill. Full load torque is obtained at 360 rpm. Calculate a) Speed at which maximum torque occur b) Ratio of maximum to full load torque c) External resistance per phase to be inserted in rotor circuit to get maximum torque at starting
3. Discuss briefly the various methods of speed control of 3-phase Induction motor

Unit-II

4. Draw the circuit diagram of Split phase Single phase Induction Motor and explain its working. When type of motor is commonly used?
5. What is two-phase servomotor? Describe its construction and working. Draw its torque-speed characteristics for various control voltages

Unit-III

6. Name the most popular types of stepper motor. Describe operation of variable reluctance type stepper motor.
7. Draw and explain torque-speed characteristics of reluctance motor. Compare reluctance motor with induction motor.

Unit-IV

What types of permanent-magnet materials are used for permanent-magnet d.c. motor? State their properties and applications. 15

Describe the construction and working operation of brushless dc motor. State its application also. 15

**B.Tech. (Electrical Engineering) 8th Semester
(G-Scheme) Examination, July-2022**

SOLAR THERMAL APPLICATIONS

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

Time allowed : 3 hours]

[Maximum marks : 75

Note : Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory. All questions carry equal marks.

1. (a) What is the indirect form of solar energy? 2.5×6
- (b) Define angle of incidence, surface azimuth angle.
- (c) Write advantage and disadvantage of concentrating collector.
- (d) Under what circumstances storage of energy become essential?
- (e) What is purpose of double layer of glazing in green house?
- (f) Define concentration ratio and collector efficiency.

Unit-I

2. Explain in detail various instruments used for measurement of solar radiation 15
3. Derive empirical equations for estimating availability of solar radiation 15

3737-P-2-Q-9 (22)

[P.T.O.]

Unit-II

4. With the help of schematic diagram explain working of cylindrical parabolic collector and compound parabolic collector 15
5. Explain the effect of various parameters on the performance of solar collector. 15

Unit-III

6. Describe Sensible heat storage technique in thermal energy storage system. 15
7. On what basis energy storage systems are classified? Can energy stored in one form be stored in other form? 15

Unit-IV

8. Write short notes on
- (a) Performance of conventional air heater 7.5
- (b) Air dryer 7.5
9. What do you understand by greenhouse effect? What are its consequences? How is it caused? 15

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**B.Tech. (Electrical Engineering) 8th Semester
(G-Scheme) Examination, July-2022
INTELLIGENT INSTRUMENTATION FOR
ENGINEERS**

Paper- OEC-ECE-452-G

allowed : 3 hours]

[Maximum marks : 75

: Attempt any five question in all, selecting one question from each section. Question No.1 is compulsory. All Questions carry equal marks.

Define the following:

6×2.5

- (a) Definition of intelligent instrumentation
- (b) Data transfer control
- (c) Ring and bus networks
- (d) Low pass Filter
- (e) IEEE 488 Bus
- (f) Fibre Optic Distributary Networks

Section-A

- (a) Discuss the components of intelligent instrumentation system with the help of a block diagram. 7
- (b) Discuss the different features that differentiate an intelligent instrumentation system from a dumb instrumentation system. 8

i-P-3-Q-9 (22)

[P. T. O.]

(2)

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Or

3. What is an intelligent instrumentation system? Draw the block diagram of an intelligent instrumentation system.

Section-B

4. Write short notes on the following:

- (a) Phase Locked Loop
- (b) R - 2R digital to analog converter.

Or

5. Explain briefly the following terms w.r.t. an ADC

- (a) Quantization Error
- (b) Resolution
- (c) Aperture Time
- (d) Coding

Section-C

6. What are the basic issues of interfacing? peripheral devices can be interfaced with the computer. Explain anyone of them.

Or

7. Explain in brief the protocol for communication between host and smart sensor.

(3)

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Section-D

- (a) Derive the expression for the transfer function of a band pass RC Filter. Draw its characteristics and also the Bode Diagram. 7
- (b) What are active filters? Describe a low pass active filter and derive the expression for its cut off frequency. Also, draw its frequency characteristics. 8

Or

- (a) Design a high pass filter with a characteristic resistance of 50Ω and a cut off frequency of 20 MHz and an attenuation of 80dB at 5MHz. 7
- (b) What are spike filters? Explain. 8

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