

Total No. of Questions : 8]

SEAT No. :

PD4150

[Total No. of Pages : 2

[6402]-111

S.E. (Robotics & Automation Engineering)
INDUSTRIAL ELECTRONICS & ELECTRICAL TECHNOLOGY
(2019 Pattern) (Semester - III) (211501)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable additional data if necessary.
- 5) Use of non-programmable calculator is allowed.

- Q1) a)** Explain following functions used in ADC **[6]**
i) analogRead() function;
ii) analogWrite() function;
iii) analogReference() function
b) What is ADC? Write features of ADC in AtMega 328P microcontroller. **[4]**
c) Draw and explain interfacing of strain gauge with Arduino Atmega 328P. Write its algorithm. **[8]**

OR

- Q2) a)** Draw and explain interfacing of LVDT with Arduino Atmega 328P. Write its algorithm. **[8]**
b) Draw interfacing diagram of temperature sensor (LM35) with Arduino Atmega 328P. Output of LM35 is connected to Arduino analog input pin number A2. **[4]**
c) Explain the concept of PWM with waveform. **[6]**

- Q3) a)** Explain the following types of DC motors with the neat diagram. **[6]**
i) DC Series Motor;
ii) DC Shunt motor.
b) Explain construction of DC generator along with its neat diagram. **[7]**
c) Draw and explain Torque – Armature current characteristics for DC series motor. **[4]**

OR

- Q4) a)** Explain the armature resistance control method used for controlling the speed of the DC motor. Explain with neat diagram. What are the drawbacks of that method? **[7]**
b) Derive the torque equation of DC motor. **[6]**
c) Draw and explain Speed – Armature current characteristics for DC series motor. **[4]**

P.T.O.

- Q5) a)** The power input to the 550 V, 50 Hz, 6 pole, 3 phase induction motor running at 970 rpm is 45 kW. The stator losses are 1 kW and windage loss are 2 kW. Calculate [6]
- i) Slip;
 - ii) Rotor copper loss;
 - iii) Efficiency of motor.
- b) Explain power stages in three phase induction motor. [4]
- c) Explain working, principle of three-phase induction motor along with the neat diagram. [8]

OR

- Q6) a)** What is the need of the starter? Explain the star-delta starter used to start three phase induction motor, with the neat sketch. [8]
- b) Draw and explain Torque – slip characteristics for three phase induction motor. [4]
- c) A 6 pole, 50 Hz, 3-phase induction motor running at full load with 5% slip develops a torque of 155 N-m at the shaft. The friction and windage losses are 250 W, and stator iron losses amounts to 1600W. Calculate [6]
- i) Output Power;
 - ii) Rotor Copper loss;
 - iii) Efficiency at full load.
- Q7) a)** Write down two applications of the following motors. [4]
- i) Stepper motor;
 - ii) BLDC motor.
- b) Draw neat sketch of Universal motor and explain its working. [6]
- c) Explain construction and working of Linear Induction Motor with neat sketch. [7]

OR

- Q8) a)** Compare AC series and DC series motor in detail. [4]
- b) Draw the sketch of shaded pole induction motor and explain its working. [6]
- c) Explain the construction and working of the permanent magnet stepper motor with neat diagram. [7]

