Total No. of Questions : 8]

SEAT No. :

P712

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[5869]-383

S.E. (Robotics and Automation Engineering)

INDUSTRIAL ELECTRONICS AND ELECTRICAL TECHNOLOGY

(Semester - III) (2019 Pattern) (211501) (Theory)

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) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Explain the following functions in detail **[6]**

i) analogRead()

ii) analogWrite()

b) What is accelerometer? Explain how does it works. Mention the types of accelerometer. **[6]**

c) Draw and explain the interfacing diagram of Atmega 328P microcontroller to control the operation of DC motor using PWM. **[6]**

OR

Q2) a) Draw and explain the interfacing of Atmega 328P microcontroller with the temperature sensor (LM35). **[6]**

b) Explain construction, working of LVDT with neat diagram. **[6]**

c) Explain in detail the concept of ADC in Atmega 328P. **[6]**

Q3) a) What are the different types of dc motors based on the connection of field and armature winding? Draw their figures and write voltage and current relationship. **[6]**

P.T.O.

b) A dc series motor is running with a speed of 800 rpm while taking a current of 15 A from the supply. If the load is change such that the current drawn by the motor is increased to 40 A, calculate the speed of the motor on new load. The armature and series field winding resistances are 0.2 Ω and 0.3 Ω respectively. Assume the flux is proportional to the current. Assume the supply voltage as 240 V. **[6]**

c) Why not to start dc series motor on no load? **[5]**

OR

Q4) a) A 240 V dc series motor takes 25 A when running at 750 rpm. Calculate the speed at which motor will run if a resistance equal to the field winding resistance shunts the field winding and the load torque is increased by 50%. Armature resistance is 0.15 Ω and series field resistance is 0.1 Ω. Assume the flux produced is proportional to the field current. **[6]**

b) Draw neat diagram of three-point starter for dc shunt motor and explain its working. **[6]**

c) Explain Ward Leonard system of speed control for dc motor. **[5]**

Q5) a) The full load power input to 4 pole, 50 Hz three-phase induction motor is 45 kW, running at 1440 rpm. Calculate its full load efficiency if stator losses are 1000 W and frictional losses are 650 W. **[6]**

b) Explain the working principle of three-phase induction motor with neat diagram. **[6]**

c) Derive the torque equation of three-phase induction motor. **[6]**

OR

Q6) a) Sketch and explain the typical torque slip characteristics of three-phase induction motor. **[6]**

b) Compare the squirrel cage and wound rotor induction motor in detail. **[6]**

c) A 4- pole, 50 Hz, 7.46 kW motor has, at rated voltage and frequency, a starting torque of 150% and a maximum torque of 200% of full load torque. Determine (i) full load speed; (ii) speed at maximum torque. **[6]**

Q7) a) Explain construction and working of stepper motor with neat sketch. **[6]**

b) Explain construction and working of linear induction motor (LIM) with neat sketch. **[6]**

c) Explain the construction and working of Universal motor with neat sketch. **[5]**

OR

Q8) a) Explain construction and working of Brush Less DC motor (BLDC) with neat sketch. **[6]**

b) Explain the construction and working of shaded pole induction motor with neat sketch. **[6]**

c) Compare ac series and dc series motor in detail. **[5]**

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