Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5459]-120

S.E. (Mechanical, Mech. Sandwich & Automobile)

(Second Semester) EXAMINATION, 2018

ELECTRICAL AND ELECTRONICS ENGINEERING

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Attempt Q. No. **1** *or* **2**, Q. No. **3** *or* **4**, Q. No. **5** *or* **6**, Q. No. **7** *or* **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

1. (*a*) Derive the general expression of torque in a three-phase induction motor. Hence obtain the condition for maximum torque. [6]

(*b*) A 250 V, 4 pole lap wound DC shunt motor takes no-load current of 4 A when running at 1200 r.p.m. The resistance of armature winding is 0.1 Ω and shunt field winding is 125 Ω. The brush drop is 2 V. If it takes current of 61 A on full-load, calculate its full-load speed. Assume that flux gets weakened by 5% on full-load condition due to armature reaction. [7]

Or

2. (*a*) Draw the schematic arrangement of Three Point Starter in a DC shunt motor and explain its working by mentioning the role of each component in it. [6]

P.T.O.

(*b*) A 6-pole, 50 Hz, 3-phase induction motor running at full load with 4% slip develops a torque of 149.3 N-m at the shaft. The friction and windage losses are 200 W and the stator copper and iron losses amounts to 1620 W. Calculate (*i*) output power (*ii*) rotor copper loss and (*iii*) efficiency at full load. [7]

3. (*a*) Write any *six* important features of ATmega 328P microcontroller. [6]

(*b*) Elaborate the construction and operation of AC and DC Servo motor with the help of necessary diagrams. [6]

Or

4. (*a*) Describe the constructional details and operation of capacitor start capacitor run induction motor with the help of diagrams. [6]

(*b*) Draw bit pattern of status register of ATmega 328P and explain the significance of all bits. [6]

5. (*a*) Explain how many timers are present in ATmega 328P. In which mode these timers work ? [6]

(*b*) Explain the interfacing of LED with Arduino board and write an algorithm to blink an LED. [6]

Or

6. (*a*) Write algorithm to interface keypad and Arduino. [6]

(*b*) Draw interfacing circuit diagram of Arduino board and LCD. Also write basic algorithm used for this interfacing. [6]

7. (*a*) List any *six* features of in-built ADC in ATmega 328P microcontroller. [6]

(*b*) Write algorithm and draw the diagram to interface LVDT with Arduino. [7]

Or

8. (*a*) Explain serial communication with reference to Arduino. [6]

(*b*) Explain the format of ADCSRB and DIDRO registers mentioning the function of each bit. [7]