Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[4957]-1020

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

(II Sem.) EXAMINATION, 2016

ELECTRONICS AND ELECTRICAL ENGINEERING

(2012 PATTERN)

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

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **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*) State the following about each register in the register set of 8051 microcontroller : [6]

(*i*) Size and

(*ii*) Function.

(*b*) What is serial communication ? Explain the interfacing of 8051 microcontoller to PC. [6]

Or

2. (*a*) Explain addressing modes of 8051 microcontroller with the help of one example each. [6]

(*b*) What is function of TCON register ? Mention significance of each bit of TCON. [6]

P.T.O.

3. (*a*) 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. [6]

(*b*) State methods of speed control of DC shunt and series motors. Explain any *two* methods in each case. [7]

Or

4. (*a*) A 220 V DC series motor takes 40 A while running at 700 rpm. Calculate current taken from supply and the speed at which the motor will run if the field is shunted by a resistance equal to the field resistance and the load torque is increased by 50%. Given : armature resistance is 0.15 Ohm, field resistance is 0.1 Ohm, flux per pole is proportional to the field current prior to magnetic saturation. [6]

(*b*) Discuss the torque-slip characteristics of three phase induction motor. Explain the effect of change in rotor resistance on this characteristic curve. [7]

5. (*a*) Explain measurement of voltage, current and frequency of small signals using cathode ray oscilloscope. [6]

(*b*) What are advantages of digital voltmeters over analog voltmeters ? State limitations of digital voltmeters. [6]

Or

6. (*a*) Explain working of cathode ray oscilloscope with the help of block diagram. [6]

(*b*) Discuss working of frequency counter with the help of neat diagram. [6]

7. (*a*) What is the principle of operation of electrostatic instruments ? State their merits and demerits. [6]

(*b*) A 7.46 kW induction motor runs from a 3-phase, 400 V supply. The motor takes a line current of 4 A at a power factor of 0.208 lagging on no load condition. This motor operates at a power factor of 0.88 lagging and an efficiency of 89% while delivering full load. Determine the readings on each of the two wattmeters connected to measure the total power on : [6]

(*i*) no load and

(*ii*) full load.

Or

8. (*a*) Explain the working of Maxwell's Inductance Bridge for measurement of unknown inductance. [6]

(*b*) Discuss two wattmeter method for measuring active and reactive power in three phase balanced load with the help of connection diagram and phasor diagram. [7]