

- (b) Illustrate the Torque –Current characteristics of various types of d.c. motors. (4)
- (c) State and explain 3 point starter for D.C. Motor. State the necessity of starter in d.c. motor. Also state its limitations. (7)
- Q-4 Attempt all questions (14)**
- (a) Derive an emf equation of single phase transformer. (4)
- (b) Describe the S.C. and O.C. test for single phase transformer. (5)
- (c) A transformer is having 200 volt on secondary side and supply frequency of 40 Hz. If the number of turns on the primary winding is 150. Find(i)the flux in the limb of a transformer.(ii) Calculate the voltage on the secondary side if the turns ratio is 3. (5)
- Q-5 Attempt all questions (14)**
- (a) Explain the function of differential amplifier with neat sketch. (4)
- (b) Draw the pin diagram of OPAMP 741c. Explain the function of each pin. (5)
- (c) Explain the AND, OR and NOT gate with its truth table and symbol. (5)
- Q-6 Attempt all questions (14)**
- (a) A particular load is driven by induction motor at about 1500 RPM of ideal speed. What should be the no of poles for a three phase induction motor when
(i) $f= 50$ Hz. (ii) Calculate the actual speed if the rated slip is 4% (4)
- (b) Define Power Factor. State the disadvantages of low power factor. (5)
- (c) Explain D’Morgan’s Law for the Boolean Algebra. (5)
- Q-7 Attempt all questions (14)**
- (a) Describe the constructional features of an alternator. (4)
- (b) Enlist the various equipments used in the substation. Explain the function of any four. (6)
- (c) A D.C. Motor is operating on a supply voltage of 500 volt DC has armature resistance of 5 ohm. Its back emf is 200 volt. Calculate(1) the armature current (2) Power supplied to armature. (4)
- Q-8 Attempt all questions (14)**
- (a) An input voltage to an OPAMP is 1.8 volt D.C. The value of input resistance R_1 is 10 kohm and feedback resistance R_f is 20 kohm. Calculate the output voltage if the (i) OPAMP is connected in the inverting mode. (ii) If the input signal is applied at non-inverting terminal. (4)
- (b) A 4 pole D.C. Shunt Generator has a lap wound armature with 728 conductors . The flux per pole is 25 mWb . The generator supplies two hundred 110 volt , 75 watt lamps. Determine speed of the generator. Armature and Field Winding Resistances are 0.075 ohm and 110 ohm respectively. (5)
- (c) Explain functions of different equipments in substation. (any five) (5)

