

Total No. of Questions : 09

Total No. of Pages : 03

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

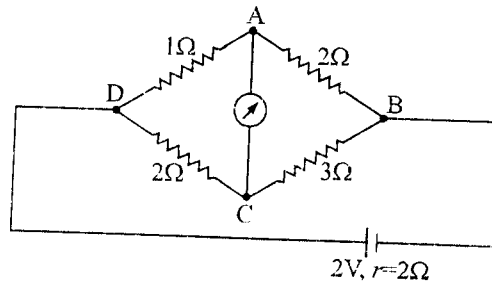
1. Write briefly :
 - a) Draw the phasor diagram of Electric field: $E_0 (e^{-j10\pi t} + e^{+j10\pi t})$. Also write it in rectangular form.
 - b) Give the analogous terms of magnetic circuit related to electrical circuit.
 - c) Draw the circuit diagram and waveforms of bridge rectifier.
 - d) Write the differences between Bipolar Junction Transistor and Field Effect Transistors.
 - e) Define synchronous speed. How does this speed relate to slip?
 - f) Convert the $(1234)_{10}$ number into the hexadecimal number.
 - g) Which motor is preferred for speed regulation?
 - h) Draw the characteristics curve of positive and thermistor.
 - i) A choke coil when connected across a 500 V, 50 Hz supply takes 1 A at 0.8 power factor. What capacitance must be placed in parallel with it so as to make the power factor of the combination unity?
 - j) A 3- ϕ induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate
 - i) the synchronous speed
 - ii) the rotor speed when slip is 4% and
 - iii) rotor frequency when rotor runs at 600 rpm.

SECTION-B

2. a) Determine the currents in the unbalanced bridge circuit of figure

Also determine the p.d. across BD and resistance from B to D.

4



Figure

- b) Find the amount of electrical energy expended in raising the temperature of 45 litres of water by 73°C . To what height could a weight of 5 tonnes be raised with the expenditure of same energy? Assume efficiencies of the heating equipment and lifting equipment to be 90% and 70% respectively. 4
3. a) Discuss and derive the resonance in series circuit. Give its properties. 4
- b) A voltage $v = 100 \sin 314 t$ is applied to a circuit consisting of a 25Ω resistor and an $80 \mu\text{F}$ capacitor in series. Determine :
- an expression for the value of the current flowing at any instant,
 - the power consumed
 - the p.d. across the capacitor at the instant when current is one half of its maximum value. 4
4. Establish the relation for emf induced in the secondary winding of transformer. What are types of losses occur in transformers? Establish the condition of maximum efficiency of transformer. 8
5. a) Discuss the types of D.C. motors. Compare their Torque, speed characteristics and applications. 4
- b) A 250 V shunt motor with armature resistance of 0.5 ohm runs at 600 rpm on full load and takes an armature current 20 A. If the resistance of 1.0 ohm is placed in the armature circuit, find the speed at i) full-load torque ii) half full-load torque. 4

SECTION-C

6. a) Explain the principle of working of a digital multimeter. 4
b) What is LVDT? Give its principle of working, applications, advantages and disadvantages. 4
7. a) Give input-, output-characteristics curves of Common Emitter configuration of transistor. What is its current gain, voltage gain and power gain? 4
b) How can you make a voltage regulator user Zener diode? Explain its operation. 4
8. Distinguish between latch and flip flop. Explain the working of cross coupled NAND gate as flip flop. Draw the truth table of RS, JK, D and T flip flops. Convert the RS flip flop into JK flip flop. How edge triggered flip flop different from level triggered? Give its advantage. 8
9. Write detailed short note on the following :
- a) Universal Gates 4
- b) Field Effect transistors 4