

161

October 2023

Time - Three hours
(Maximum Marks: 100)

- DAI* *EEF* *48* *10*
- [N.B. 1. Answer all questions under Part-A. Each question carries 3 marks.
2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART - A

1. Define: (i) Current (ii) E.M.F (iii) Resistance.
2. State Ohm's law.
3. Write the expression for star to delta transformations.
4. Draw the Norton's equivalent circuit and expression to find the load current.
5. Draw a sinusoidal voltage waveform and mark the cycle, time period and peak value.
6. Write the equation for active, reactive, apparent power in A.C circuits.
7. Draw the types of 3 phase connection.
8. What are the methods for measuring 3 phase power?
9. What are the indications of fully charged cells?
10. Define (i) Sedimentation (ii) Internal short circuit.

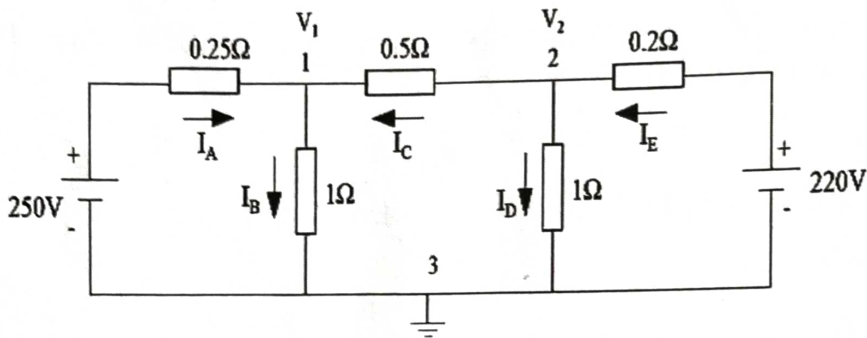
PART - B

11. (a) (i) Three resistances of values 8Ω , 12Ω and 24Ω are connected in series. Find the equivalent resistance. Also find the equivalent resistances when they are connected in parallel.(7)
(ii) If two capacitors having capacitance of 6mfd and 10mfd respectively, are connected in series across a 320V supply. Find (i) the potential difference across each capacitor (i) the charge on each capacitor.(7)

(Or)

- (b) (i) A circuit consist of two resistances $10\ \Omega$ and $5\ \Omega$ connected in series across a supply of 60V . Calculate the voltage across each resistance.(8)
 (ii) State and explain Kirchhoff's laws.(6)

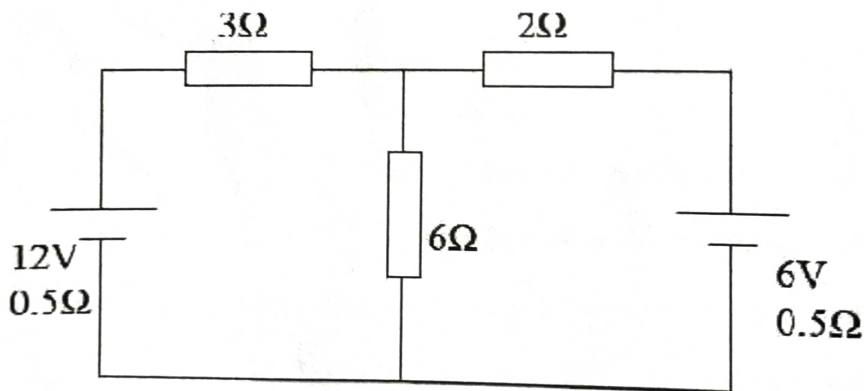
12. (a) (i) Find by nodal analysis, the current I_A and I_C in the circuit shown.(10)



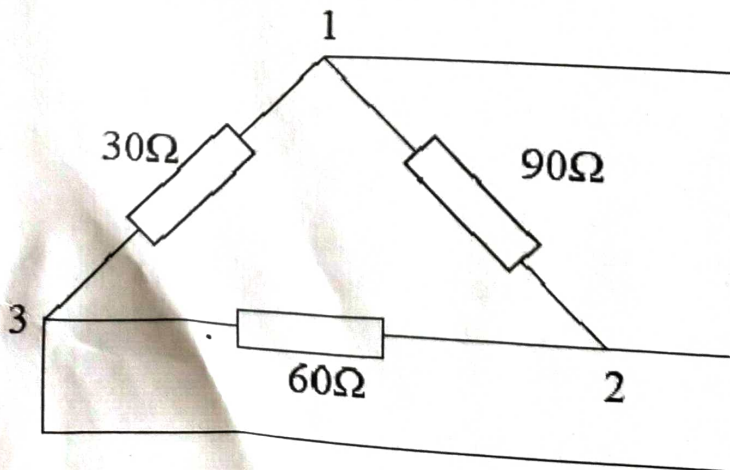
- (ii) State Superposition theorem.(4)

(Or)

- (b) (i) Determine the current flowing through $6\ \Omega$ resistor by using Norton's theorem. (7)



- (ii) Find the STAR Resistance for given DELTA. (7)



13. (a) (i) The alternating current passing through a circuit is given by the expression $i = 141.4 \sin 314.2t$. Calculate (i) maximum value of current (ii) r.m.s value of current (iii) the frequency and (iv) the instantaneous value of the current when $t=0.02$ sec. (8)
- (ii) Derive an expression for the impedance in RL series circuit.(6)

(Or)

- (b) (i) A capacitor of $80 \mu\text{F}$ is connected in parallel with a coil that has a resistance of 20Ω and inductance of 0.08H . If this combination is connected across 230V , 50Hz supply calculate current, power factor and power.(8)
- (ii) Explain the concept of parallel resonance.(6)

14. (a) A balanced star connected load of $(4+j3) \Omega$ per phase is connected to a balanced 3 phase 400V , AC supply. The phase current is 12A . Find (i) the total active power (ii) reactive power and (iii) apparent power.

(Or)

- (b) Explain the concept of balanced and unbalanced load.

15. (a) (i) The power input to a 3 phase induction motor is read by two watt meters. The readings are 860W and 240W . What is the input power and power factor of the motor? (10)
- (ii) Define line current and phase current.(4)

(Or)

- (b) (i) Explain about physical changes during charging nickel iron batteries.(7)
- (ii) Explain about mercury cells.(7)
