3. An alternating voltage $v(t) = 150 \sin(2\pi f)\, t$, 50Hz, is applied to series circuit consisting of 10Ω resistance, 0.0318 H inductance. Find the (i) expression of current, (ii) phase angle between voltage and current, (iii) power factor, (iv) active power.   2+1+1+1

4. Describe Delta-Star transformation.   5

5. Determine the bandwidth and edge frequencies for R-L-C series circuit in resonance condition   3+2

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B.Tech Even (Mid) Semester Examination-2021

Computer Science & Engineering / Agricultural Engineering / Electronics & Communication Engineering

Course No.: ASH-204
(Basic Electrical Engineering)

Full Marks: 30
Pass Marks: 09/15

Time: 1½ hours

Note: 1. All questions are compulsory.
2. Answer parts of a question at a glance.
3. Assume reasonable data whereever required
4. The figures in the right margin indicate full marks for the question.

1. (i)   What is meant by 'node'?   1

    (ii) Kirchhoff's voltage law is concerned with

        (a) IR drop

        (b) Battery emf

        (c) Junction Voltage

        (d) Both IR drop and Battery emf   1

    (iii) In a linear circuit, the superposition principle can be applied to calculate the

        (a) voltage and power

        (b) voltage and current

        (c) current and power

        (d) power, voltage and current   1

(iv) If the number of branches in a network is 'B', the number of nodes is 'N' and the number of dependent loops is 'L' , then the number of independent node equations will be

(a) N+L-1

(b) B-1

(c) B-N

(d) N-1   1

(v) State Kirchhoff's current law.   1

(vi) While determining the Thevenin's equivalent resistance of a circuit (a) voltage and current sources should be left as they are(b) all sources should be replaced by their source resistances(c) all independent current and voltage sources are short circuited (d) none of these.   1

(vii) Superposition theorem is applicable for:

(a) Linear circuits only

(b) Non-linear circuits only

(c) Linear and non-linear circuits both

(d) None of these   1

(viii) What is Norton theorem?   1

(ix) For determining the polarity of the voltage drop across a resistor, it is necessary to know

(a) value of the resistor

(b) value of the current

(c) direction of current flowing through the resistor

(d) value of emf in the circuit   1

(x) Following question consists of two statements, one labelled 'Assertion (A) and other labelled the 'Reason (R)'.

(A): Norton's theorem is applied to a network for which no equivalent Thevenin's network exists.

(R): Norton's theorem enables one to calculate quickly current and voltage in a particular branch of interest in complicated network.Examine the two statements carefully and select your answers to this question using codes given below.
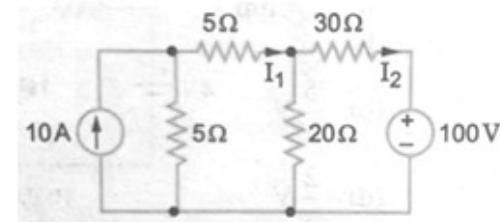
(a) Both A and R are true and R is correct explanation of A.

(b) Both A and R are true and R is not a correct explanation of A.

(c) A is true but R is false

(d) A is false but R is true   1

2. (a) Find the current I_1 and I_2 in the circuit.   2

(b) Find the current through the 1 Ω! resistor using node voltage method for the circuit   shown in figure   3