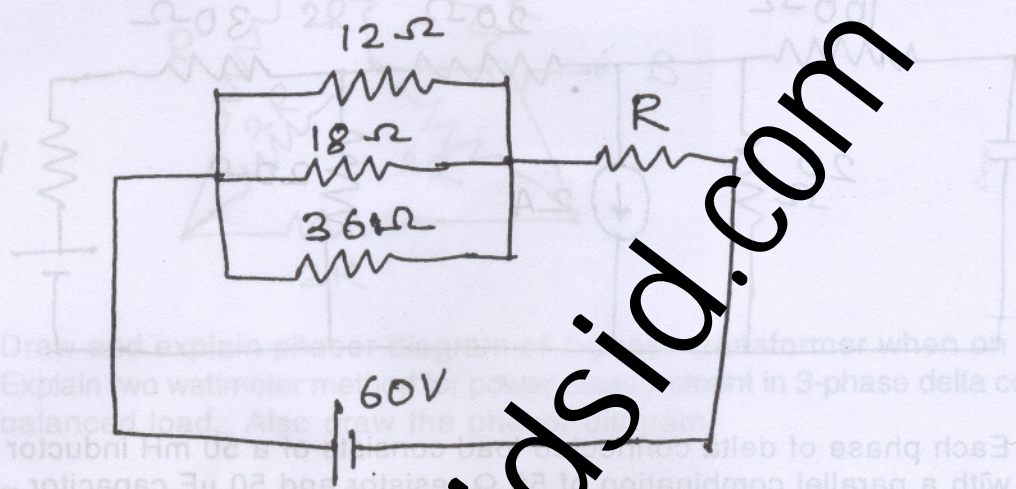


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Basic Electrical & Electronics Engineering

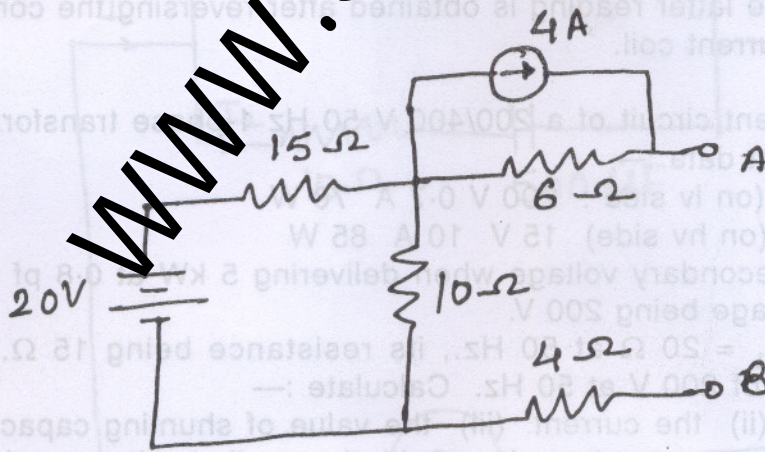
- N.B.: (1) Question No. 1 is compulsory.
(2) Attempt any four from the remaining six questions.

1. (a) Find the value of Resistance 'R' when power consumed by the 12Ω resistor in the given circuit is 36 W. 20



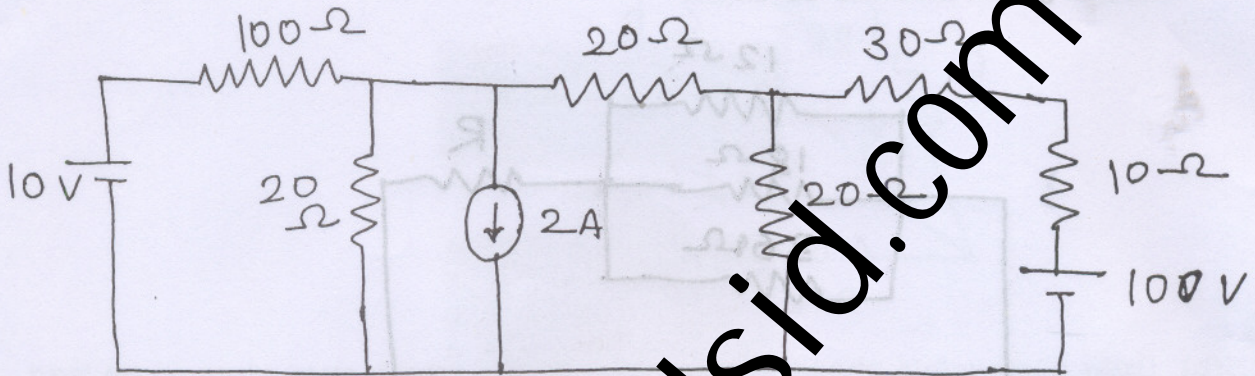
- (b) An a.c. current is given by $i = 14 \sin(\omega t + \pi/6)$. Find the rms value and phase angle of current.
(c) What is Zener diode? Explain the term zener voltage V_z .
(d) State different types of dc generator and state application of each type.
(e) Explain effect of temperature on resistance of different material.

2. (a) Find the Norton's equivalent circuit for the active linear network shown : 10



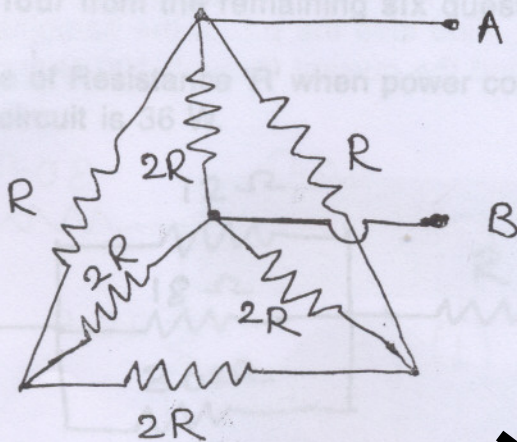
(b) Draw the circuit diagram for centre tapped full wave rectifier. Explain it and derive equations for I_{dc} , I_{rms} , V_{dc} and efficiency. 10

3. (a) A total current of 10A flows through the parallel combination of three impedances $(2 - j5) \Omega$, $(6 + j3) \Omega$ and $(3 + j4) \Omega$. Calculate the current flowing through each branch. Find also the p.f. of the combination. 10
- (b) Using node analysis find the current through 100Ω resistor in the network shown :— 10



4. (a) Each phase of delta connected load consists of a 50 mH inductor in series with a parallel combination of 50Ω resistor and $50 \mu\text{F}$ capacitor. The load is connected to a three phase 440 V , 800 rad/sec ac supply. Find :— 10
- (1) phase current
 - (2) line current
 - (3) power drawn
 - (4) power factor
 - (5) reactive power.
- (b) Two wattmeters connected to measure the input to balanced three-phase circuit indicates 2500 and 500 W , respectively. Find the total power supplied, and the power factor of the circuit 10
- (i) When both readings are positive and
 - (ii) When the latter reading is obtained after reversing the connections to the current coil.
5. (a) Obtain equivalent circuit of a $200/400 \text{ V}$ 50 Hz 1-phase transformer from the following test data :— 10
- OC test (on lv side) : 200 V 0.7 A 70 W
 SC test (on hv side) 15 V 10 A 85 W
- Calculate the secondary voltage when delivering 5 kW at 0.8 pf lagging, the primary voltage being 200 V .
- (b) A circuit has $X_L = 20 \Omega$ at 50 Hz ., its resistance being 15Ω . For an applied voltage of 200 V at 50 Hz . Calculate :— 10
- (i) The pf
 - (ii) the current
 - (iii) the value of shunting capacitance to bring the resultant current into phase with the applied voltage and
 - (iv) the resultant current in case (iii).

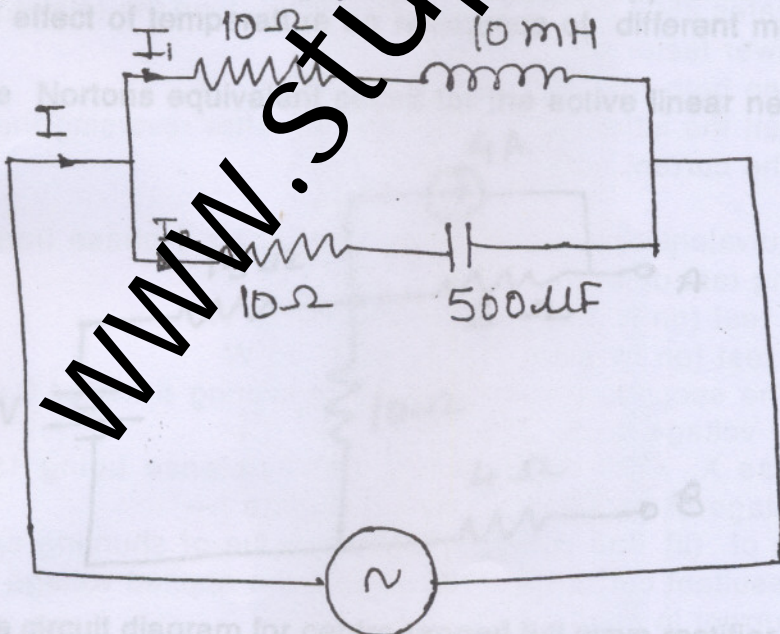
6. (a) Determine the resistance between A and B in the figure shown. 6



(b) Draw and explain phasor diagram of 1-phase transformer when on no load. 4
 (c) Explain two wattmeter method for power measurement in 3-phase delta connected balanced load. Also draw the phasor diagram. 10

7. (a) For a circuit shown in figure. Determine: 10

- (i) Total impedance of the circuit and total current
- (ii) Branch current I_1 and I_2
- (iii) Power factor of each branch and total power factor
- (iv) Power consumed by each branch



(b) Write short note on : 10
 (i) 1-phase Induction motor
 (ii) Superposition theorem.