b) Two coils A &B have self inductance of 120 μH and 200 μh respectively. A current of one ampere through coil A produces flux linkages of 60μwb-turns in coil B . Calculate , [04]
i) The mutual inductance between the coils,
ii) The coefficient of coupling.
iii) The average emf induced in coil B if a current of 1 Amp is reversed at a uniform rate in 0.1 sec.

c) Differentiate between shell and core type transformer. [03]

Q7 a) Write a short note on following (**any four**) [10]
i) Principle of D.C. motor and significance of back EMF
ii) Construction of squirrel cage motor.
.iii) Magnetic leakage and fringing.
iv) EMF equation of transformer
v) Single phase energy meter

b) Miss. Vandana uses the following home appliances in her house. Find out monthly bill at the flat rate 4.50 Rs per unit. [04]

S NO	PARTICULAR	NO .OF QUANTITIES	DAILY HOUR's USED	RATING
01	T.V.	1	8hours	60 Watt
02	Electric Iron	1	55 minute	01 Watt
03	Refrigerator	1	24 hours	160 Watt
04	Washing Machine	1	80 minutes	500 Watt
05	Tube Light	09	10 hours	40 Watt
06	Selling Fan	04	11 hours	60 Watt
07	Single Phase Motor	01	1 hours	05 H. P.

A Government College of Engineering, Aurangabad
(An Autonomous Institute of Government of Maharashtra)

F. E. (EEP, MECH & CIVIL) Examination
End Semester Examination DEC 2016

EE 113 : Basic Of Electrical Engineering

Time: Three Hours **Date:** 12 DEC 2016 *Max. Marks: 70*

N.B:-
1. Solve any five questions.
2. Figures to the right indicate full marks
3. Assume suitable data if necessary and state it clearly
4. Use of non-programmable calculator is allowed

Q.1 a) What is meant by sources? Explain types of sources with their characteristic. [04]
b) What is meant by time constant in RC circuit? Define in different ways. [03]
c) Find the currents V_1, V_2, V_3 with the help of super node analysis as shown in **fig. (a)** [07]

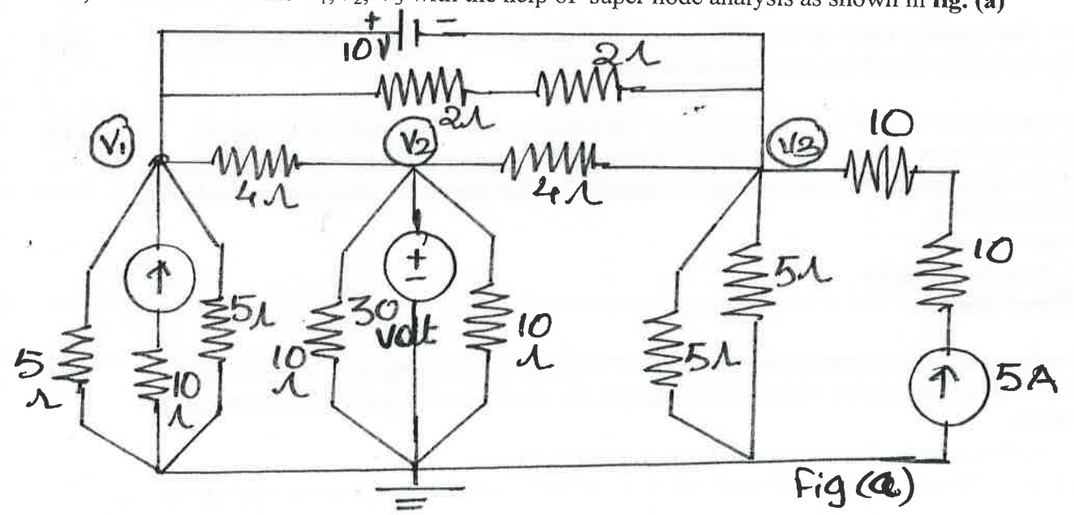
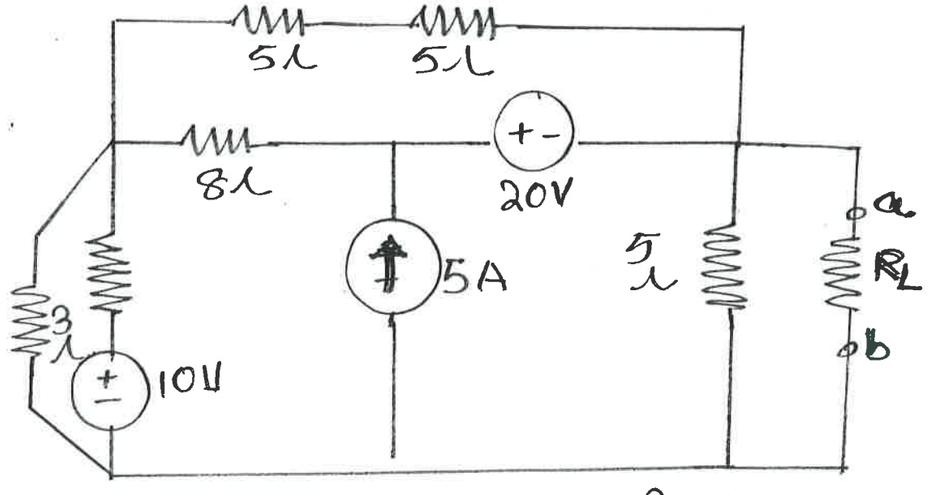


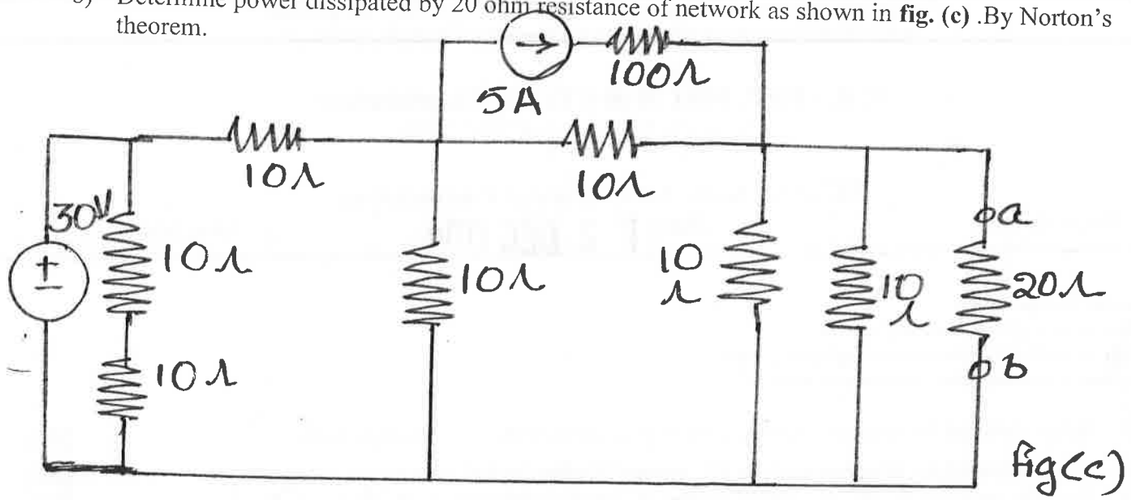
Fig (a)

Q2 a) Determine load resistance R_L of network as shown in **fig. (b)** .By using Maximum power transfer theorem, also find maximum power. [07]



Fig(b)

b) Determine power dissipated by 20 ohm resistance of network as shown in **fig. (c)** .By Norton's theorem. [07]



fig(c)

Q.3 a) Prove that in purely capacitive circuit current lead the applied voltage by 90^0 and current in purely inductive circuit lag the applied voltage by 90^0. [07]

b) Two impedances Z_1 and Z_2 when connected separately across a 230 Volt ,50 Hz supply consume power of 100 W, 60W at power factors of 0.5 lagging and 0.6 leading respectively. [07]

If two impedances are now connected together in series across the same supply , calculate

i) Circuit current.

ii) Power absorbed.

iii) Circuit power factor.

iv) Phasor diagram.

Q4 a) The voltage measured between the terminals of 3- phase, 3 wires alternator is 230 Volt. A three phase load consisting of three 20 ohms resistors in star is connected to the terminals of alternator. [07]

i) Find phase current, line current and power taken from main.

ii) If one of the resistor open circuited , what would be the current and power consumed by circuit.

Write your comment on results.

b) A 60 Hz sinusoidal current has an instantaneous value at 7.07 at t=0 and RMS value of $10\sqrt{2}$ Amp. Assuming current wave to enter positive half at t=0. Find [07]

(i)Expression of instantaneous current.

(ii) Magnitude of current at t=0.0125 Sec

(iii) Magnitude of current at t=0.025 Sec.

Q5 a) Define design criteria for current and voltage coil in wattmeter. [07]

Show that for two wattmeter method power factor for inductive circuits,

$$\text{Cos } \Psi = \text{Cos}\left[\tan^{-1}\left[\frac{\sqrt{3}\,(W_1 - W_2)}{W_1 + W_2}\right]\right]$$

Write your comments for $\Psi=0^0$, 60^0 and 90^0.

b) A 250V, 50 Hz sinusoidal supply is connected to parallel circuit consisting of three branches, A , B and C. [07]

Branch A:A coil of resistance 3Ω and inductive reactance 4 Ω

Branch B: A series circuit consisting resistance 4 Ω and capacitive reactance 3 Ω.

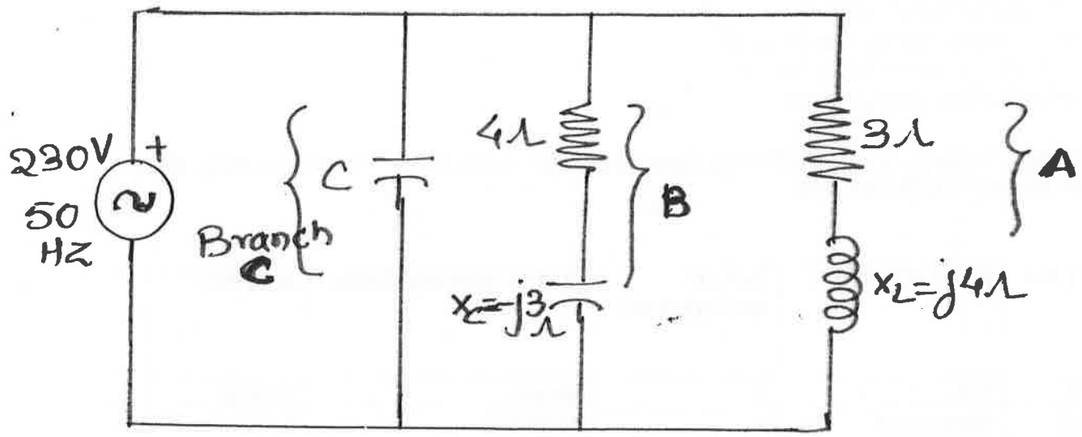
Branch C: A capacitor.

If the power factor of combined circuit is unity. Determine

(i)Value of capacitor .

(ii) Current drawn from supply.

(iii) Total power absorbed.



Q.6 a) A cast steel ring of mean diameter of 21 cm has a cast steel bar fitted to it as shown in fig .What is the current required in a magnetizing coil to produced a flux density of 1 Wb/ m^2 in the other half of the ring which does not carry any winding. The magnetization curve of cast steel as shown below. [07]

B in Wb/ m^2	1	1.1	1.18	1.25	1.33
H in A/m	900	1050	1200	1450	1650