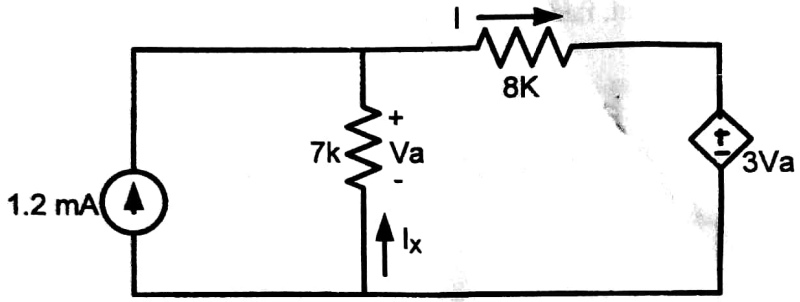
Date: 23/9/2017

AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
1ST YEAR 2ND SEMESTER, FINAL EXAMINATION, SPRING-2017
COURSE NO: EEE-1241 COURSE TITLE: BASIC ELECTRICAL ENGINEERING

TIME: 3 HRS **FULL MARKS: 210**

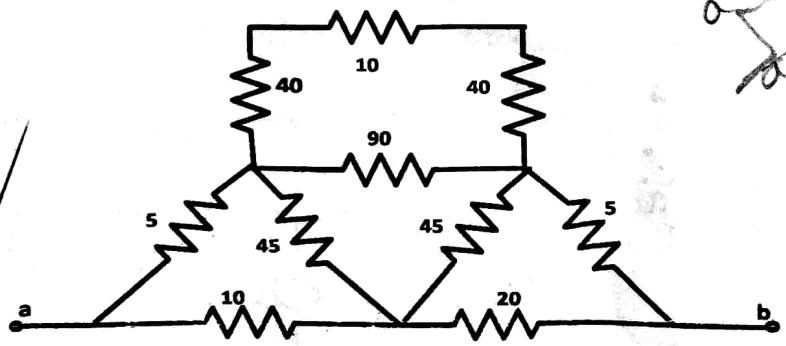
There are Eight (8) questions. Answer any Six (6)
Marks allotted for each question are indicated in the right margin
(All resistances are in ohms if not specified)

01. (a) State KVL and KCL. Find the value of current I and I_x for the following circuit. **17**

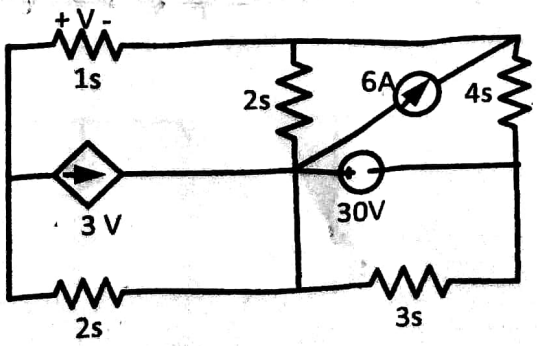


(b) State Maximum power transfer theorem and prove that, $P_{max} = V_{th}^2/4*R_{th}$. Also Show that the efficiency for maximum power transfer is 50%. **18**

02. (a) Determine the equivalent resistance at terminals a-b for the following network **17**



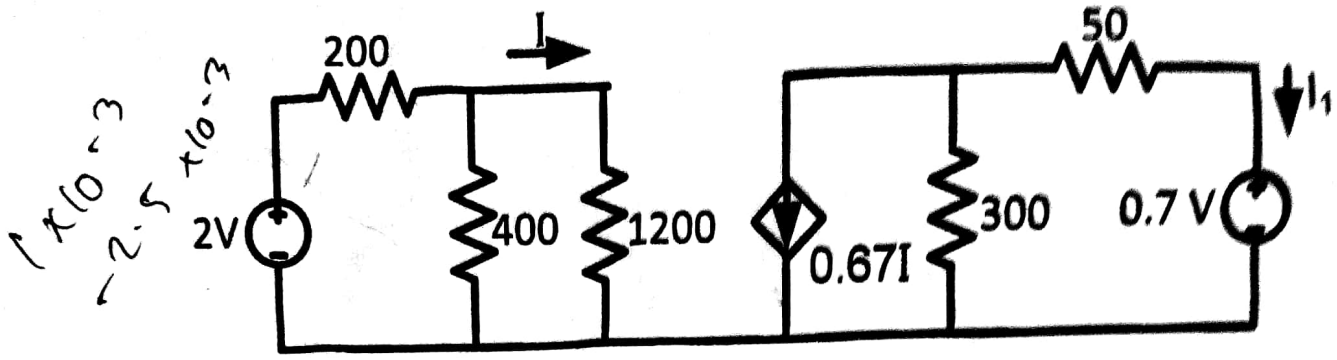
(b) Determine the value of voltage V for the following circuit using node voltage analysis. **18**



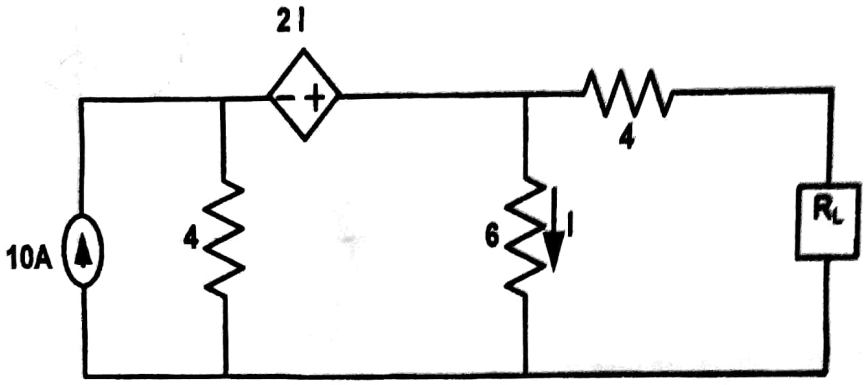
Scanned by CamScanner

03.

(a) Determine the value of current I and I_1 for the following circuit. 17

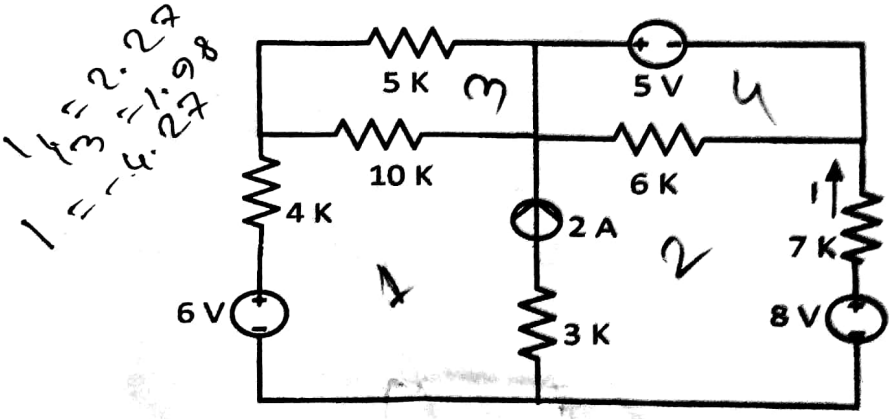


(b) For the following circuit, find the Thevenin's equivalent circuit with respect to the load resistance R_L. 18

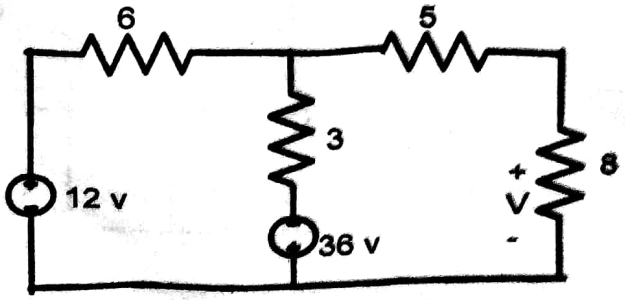


04.

(a) Using mesh current analysis, find out the value of current I for the following circuit. 18



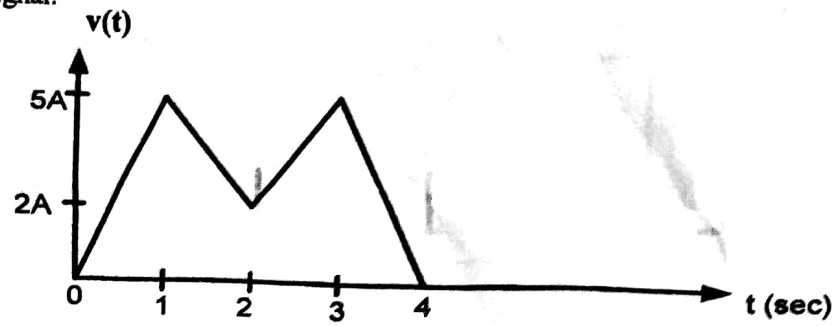
(b) For the following circuit, find the value of voltage V using superposition theorem. 17



Scanned by CamScanner

05.

(a) The voltage across the capacitor of 2mF is represented by the following signal. Draw the current signal. **18**



(b) The current equation and voltage equation of a circuit is represented by i= -2 cos(ωt-60°) and v =3 sin(ωt-150°) respectively. Draw the voltage and current wave shapes and determine the phase relationship between voltage and current? A 4A dc current component is added to the sinusoidal AC current of peak value 5A. Sketch the resultant wave shape. Also, write down the analytical expression for the resultant current wave shape if the frequency is 60Hz. **17**

06.

(a) What do you meant by hysteresis loop for a ferromagnetic material. What is the physical significance of the area inside the hysteresis loop. **15**

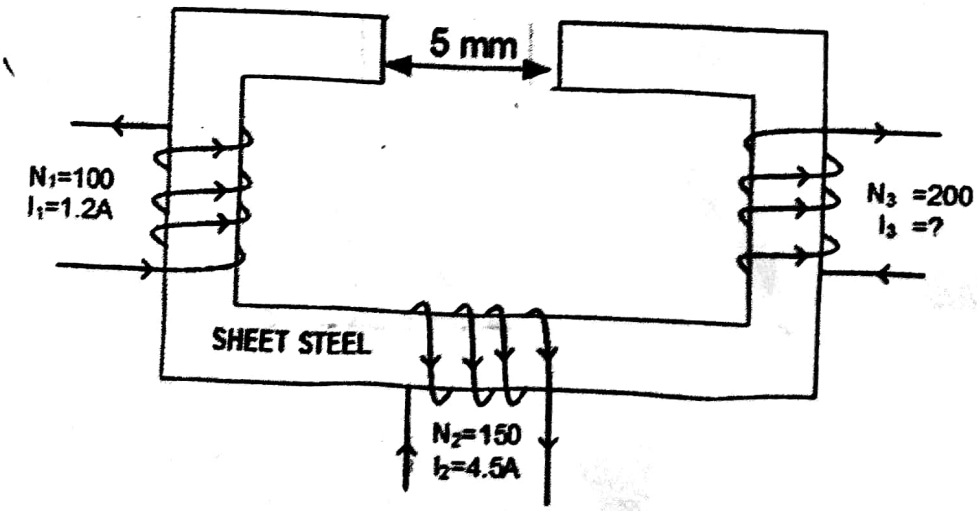
(b) Find the current I required to establish the flux, 0.4 mwb in the following magnetic circuit. A set of B-H curve is attached at the end of the question. Mark the appropriate points on the B-H curve and attach the page with your answer script. **20**

Area, A= 3 cm^2 (throughout)

$l_{cast\ steel}$= 100cm

$y = mx + c$

$m = \frac{y_2 - y_1}{x_2 - x_1}$



07.

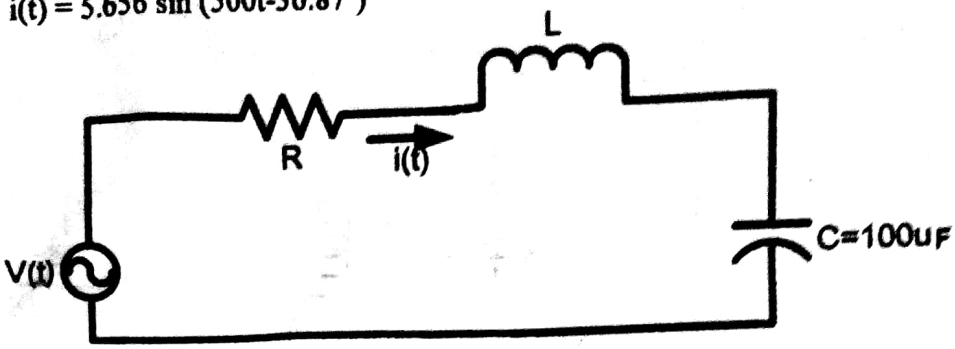
(a) The current passing through R-L-C series circuit is, $i = I_m \sin \omega t$. Find out the expression of voltage, power and impedance for the circuit. **17**

Scanned by CamScanner

(b) For the following circuit find the value of R and L. If- 18

v(t) =282.8 sin 500t

i(t) = 5.656 sin (500t-36.87°)

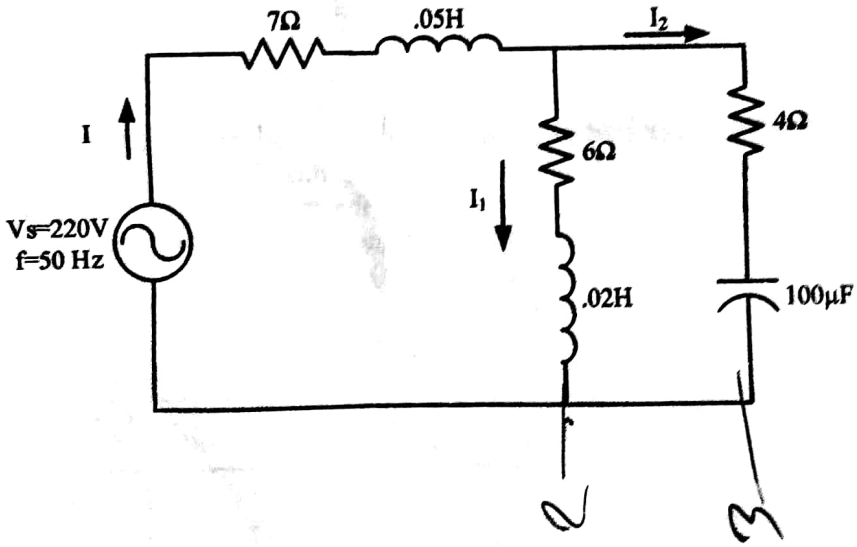


08.

(a) An alternating voltage $v(t)=V_m \sin \omega t$ is applied to the capacitive circuit. Prove that energy received by the capacitor during a quarter cycle is $W_C = \frac{1}{2}CV_m^2$. 15

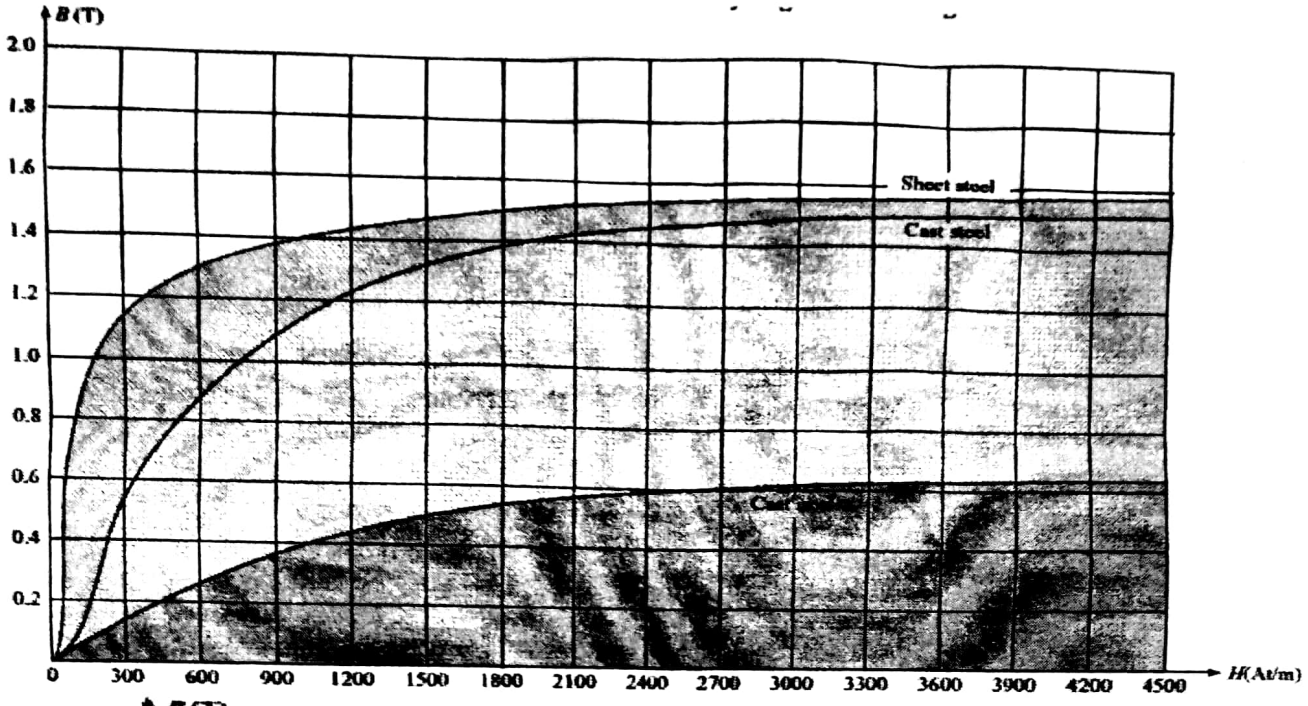
(b) 20

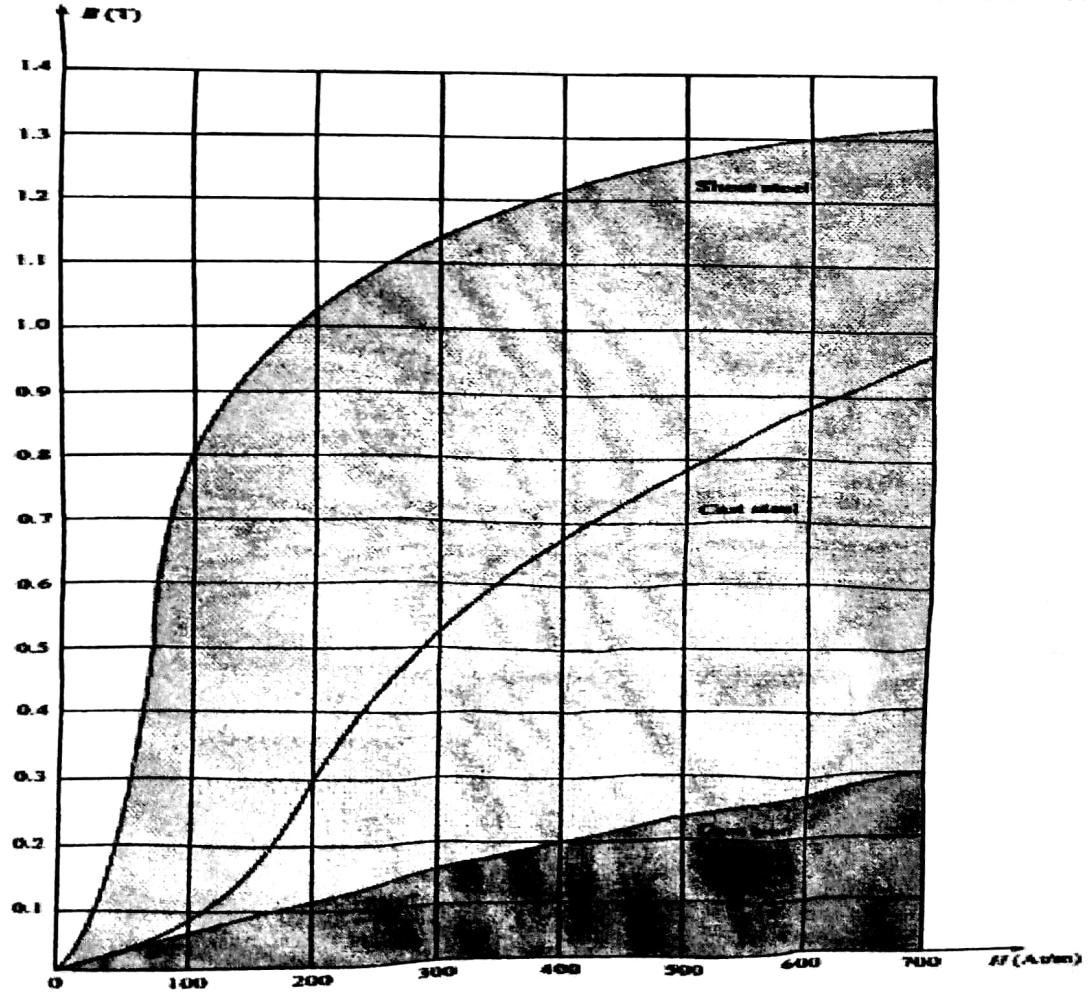
For the following network calculate the currents I, I_1 and I_2. Also find the power factor of the network.



Scanned by CamScanner

Signature of the Invigilator





Scanned by CamScanner