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RN-6241

B. E. - II (Sem. III) (I.T.) Examination

May / June – 2010

Elements of Electrical Engineering

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (Sem. 3) (IT)**

Name of the Subject :

☛ **Elements of Electrical Engineering**

☛ Subject Code No. : **6 2 4 1** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Answer to the two sections must be written in separate answer books.
(3) Figures to the right indicate full marks.
(4) Attempt all questions.
(5) Students maust use FX-100W casio or equivalent scientific calculator.

SECTION - I

1 (a) Answer in short (each 2 marks) **10**

(i) What is the different between a DC shunt motor and a DC Compound Motor?
(ii) What is the function of Conservator and Airbreather for a transformer?
(iii) How can we change the direction of rotation of induction motor?
(iv) Where does the eddy current flow in a transformer?
(v) What are the various types of insulations used in transformers?

(b) Write a note on Losses in DC machines. **6**

2 (a) Derive the equivalent circuit of induction motor. 8
How can the parameters of the equivalent circuit to be found out? Explain the tests in detail.

(b) Describe various methods of Starting Induction Motor. 8

OR

2 (a) Draw the complete vector diagram of a transformer for (1) Unity and (2) Lagging power factor.

(b) The following readings were obtained from O.C. and S.C. tests on 8 kVa, 400/120 V 50 Hz transformer. Open circuit : 120 V, 4 Amp., 75 W on primary Short Circuit : 9.5V, 20 A, 110 W on secondary. Find out the equivalent ckt. Parameters and draw the equivalent circuit. 8

3 Attempt any **three** : 18

(a) Write a short note on "Speed control of DC Shunt Motor".

(b) Draw the speed torque characteristics of an induction motor and explain in detail.

(c) Compare 3 phase squirrel cage induction motor and 3 phase slipring induction motor.

(d) Write a short note on Construction of Transformer explaining the function of various parts.

(e) Write a short note on Construction and working principle of DC Motor.

SECTION - II

1 (a) Attempt all questions :

(i) State Kirchhoff's current law 2

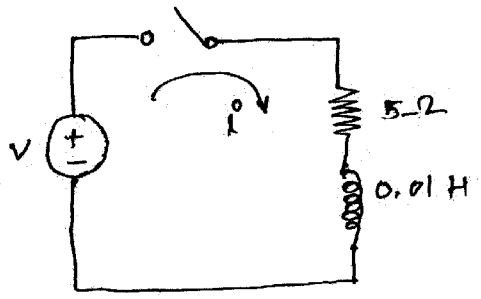
(ii) State Thevenin's theorem. 2

(iii) Mutual Inductance = M = _____. 1

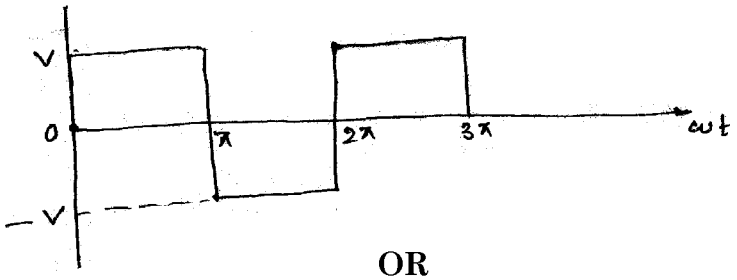
(iv) Find and match the dual of the given quantity. 5

(i)	Current	(a)	Node
(ii)	Mesh	(b)	Open circuit
(iii)	Loop	(c)	Capacitor (C)
(iv)	Inductor (L)	(d)	Voltage
(v)	Short circuit	(e)	Node pair

(b) In the series RL circuit shown in figure, the source is V = 100 sin (500 t + ϕ) (V). Determine the resulting current if the switch is closed at a time corresponding to ϕ = 0. 8

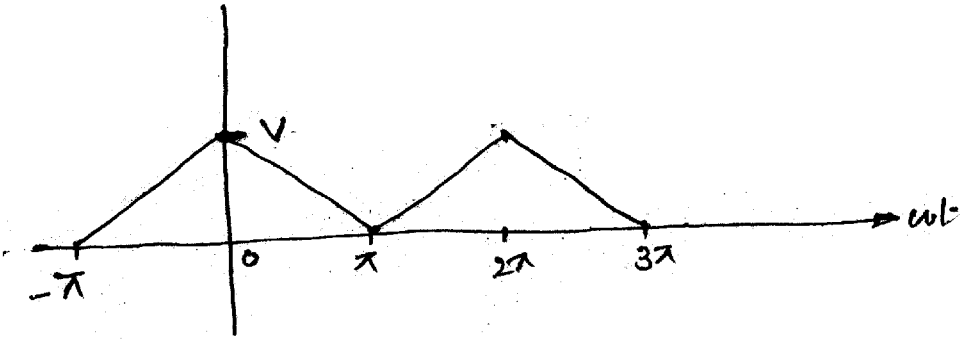


2 Find the trigonometric fourier series for the square wave shown in figure below and plot the line spectrum. 14



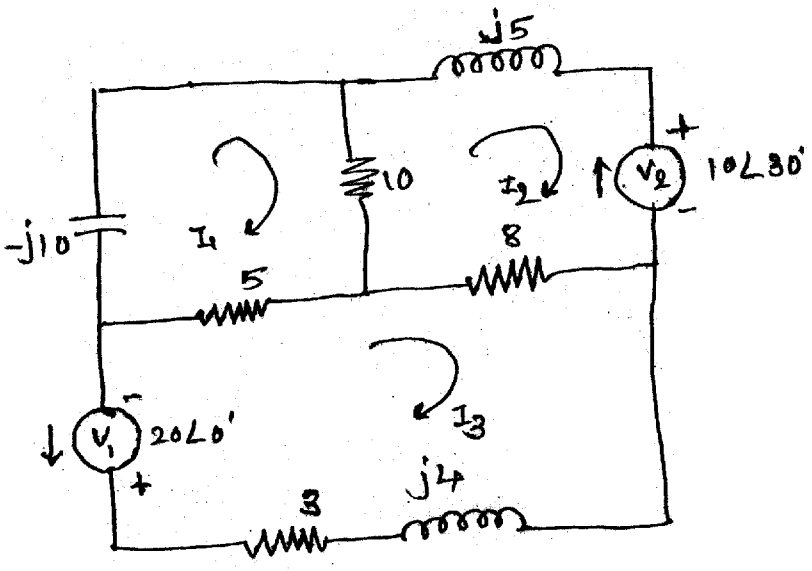
OR

2 Find the trigonometric fourier series for the triangular wave shown in figure and plot the line spectrum. 14

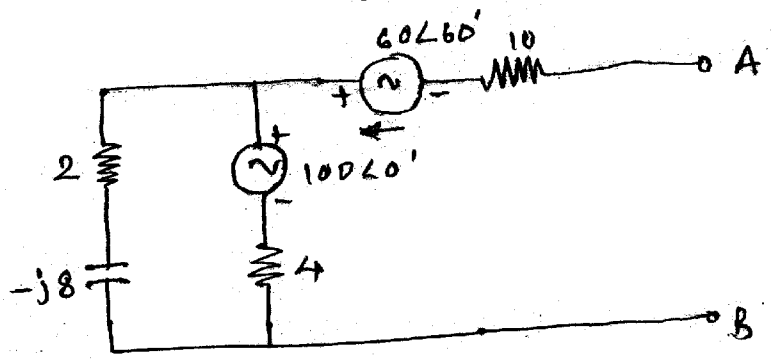


3 Attempt any **three** : 18

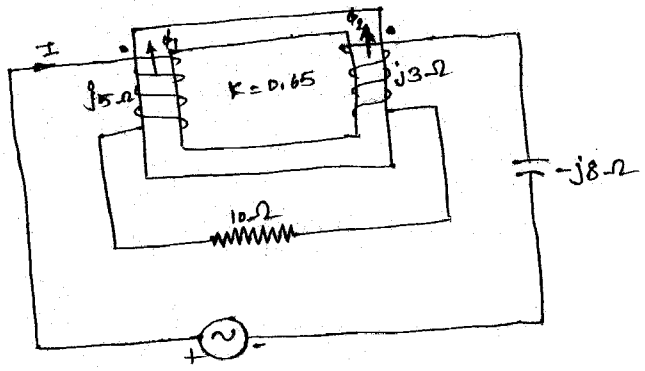
(i) Write the three mesh current equations for the network shown in figure.



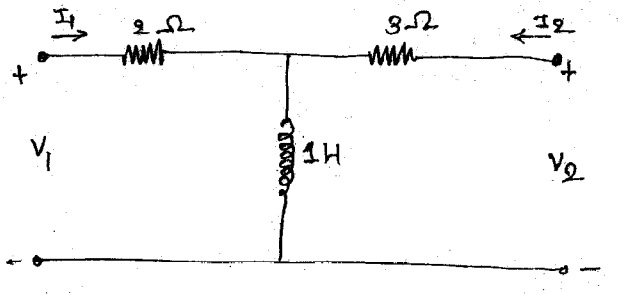
(ii) Find the Thevenin's equivalent circuit at terminal AB of the circuit shown in Figure.



(iii) Find the current I supplied by the source for the following circuit.



(iv) Find the Z parameters of the two port circuit shown in figure.



(v) Find the laplace transform of the collowing :

(a) e^{-at} cos wt, where, a is a constant

(b) $1-e^{-at}$ where, a is a constant