SUBJECT CODE NO:- K-37
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (EEP/EE/EEE) Examination Oct/Nov 2016
Network Analysis
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Q.No.1 and Q.No.6 is compulsory and solve two questions from remaining questions from each
            Section A and B.
   ii) Assume suitable data if necessary.

Section A

Q.1   Solve any five questions.   10
        (a) Give the principles of duality
        (b) Explain the concept of dependent source? Which are its various types?
        (c) State and explain superposition theorem
        (d) By dot convention make the dotted ends for the arrangement of coils in figure 1.
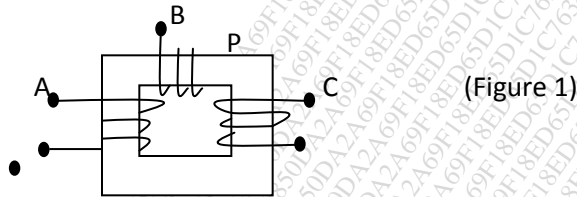
(Figure 1)

        (e) In how many seconds after $t = 0$ has the current $i(t)$ become one half of its initial value in the given
   circuit of figure 2
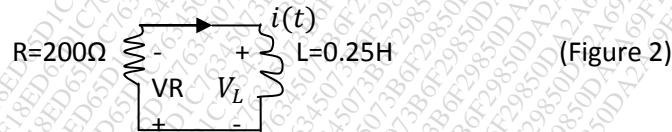
(Figure 2)

        (f) Find the Laplace transform of the function in figure 3

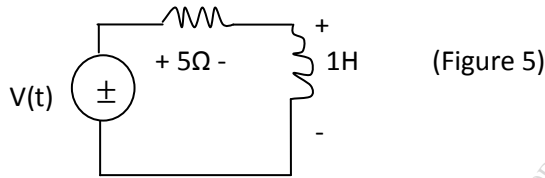(Figure 3)
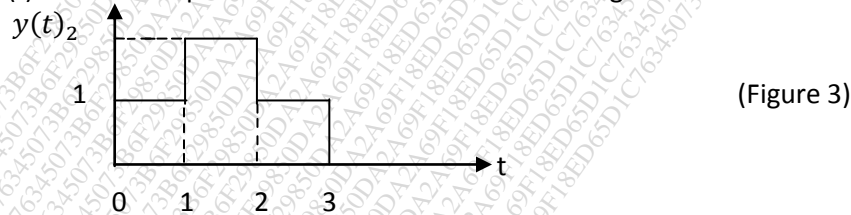
        (g) Draw the equipment circuit of single inductor in Laplace domain.
        (h) Define and explain. Characteristics of unit step and ramp function.

Q.2   (a) For series RLC circuit the capacitor is initially charged to IV. Find the current $i(t)$ when the switch k is   05
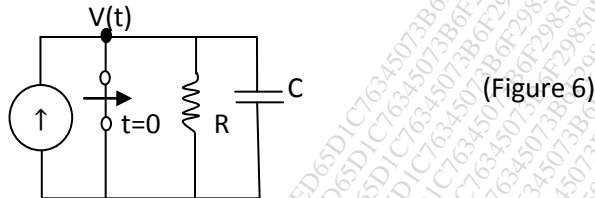   closed at $t = 0$ use Laplace transform (figure 4)
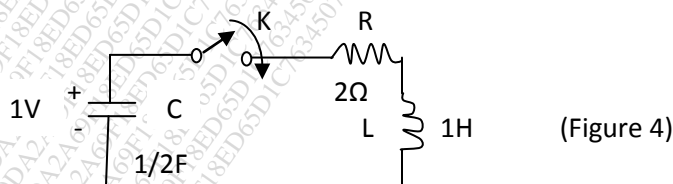
(Figure 4)

                                                                                                          05
        (b) The network shown in the figure is exited by $v(t) = \varrho\mu(t) + k\delta(t)v$ the intial current through
             induction is zero. Determine the value of k so that the expression of the current $i(t)$ does not have

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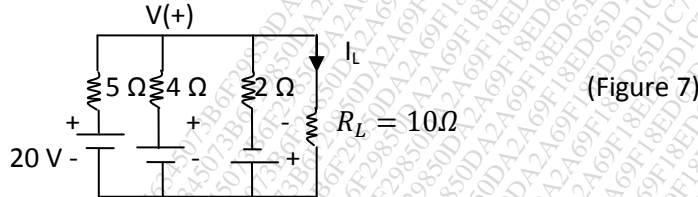any translient term (figures 5)

(Figure 5)

05

(c) Switch is opened at t=o solve for $v(t)$, $\frac{dv(t)}{dt}$ and $\frac{d^2v(t)}{v(t)dt^2}$ at $t = 0^t$ (figure 6)
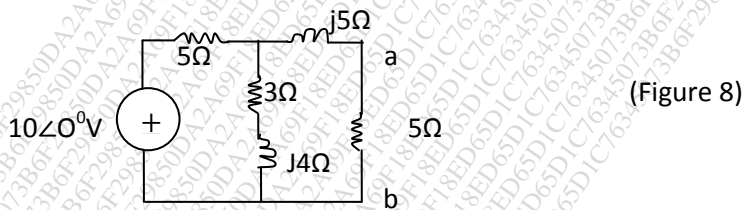

(Figure 6)

Q.3   (a) Find the current I_L using Milman's theorem   05
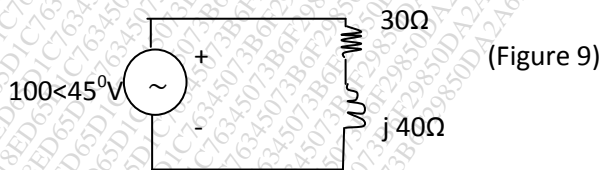

(Figure 7)

(b) Find the current through branch a-b of the network shown in the figure using Thevenin theorem   05
(figure8)

(Figure 8)

(c) Calculate the change in current in the network shown in figure by using compensation theorem when   05
the reactance has changed to j35 Ω (figure 9)
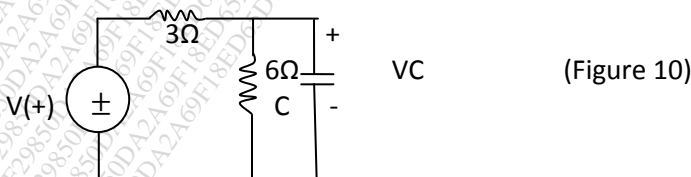

(Figure 9)

Q.4   (a) Let $vc\ (0) = 2v$ with the polarities shown in the figure. write suitable differential equation and using   05
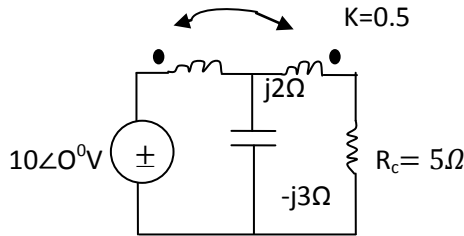Laplace transform find $vc(+)$ (figure 10)

(Figure 10)

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(b) Explain the graphical method to draw dual network. 05
(c) Write a short note on dot connection for coupled circuit. 05

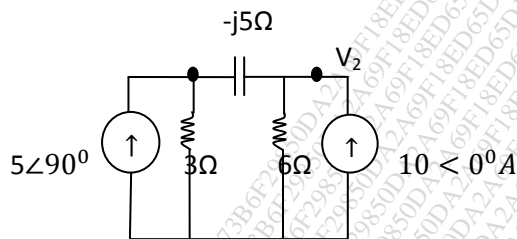Q.5 (a) Find drop across R_L in the network as shown in (figure 11) 05

(Figure 11)

$10\angle 0^0 V$, $j2\Omega$, $-j3\Omega$, $R_c = 5\Omega$, K=0.5

(b) Write short note on super node. Concept. 05
(c) The nodal Analysis to find V_2 in the circuit shown in figure 12. 05

(Figure 12)

$-j5\Omega$, V_2, $5\angle 90^0$, 3Ω, 6Ω, $10 < 0^0 A$

## Section – B

Q.6 Solve any five questions. 10
   (a) What is a two port network?
   (b) Define energy and power when a network is excited by purely sinusoidal voltage.
   (c) Define effective or rms value. Explain its practical significance.
   (d) State the Dirichlet's conditions.
   (e) Write the Trigonometric form of the Fourier series.
   (f) Write the physical significance of reactive power.
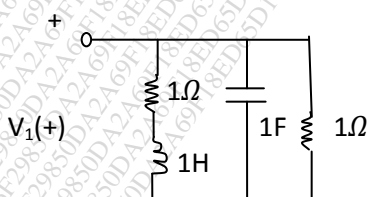   (g) The current of the following wave form is passed through 5 Ω resistance find the power consumed (figure 13)

$i(t)$, $50 \sin wt$, θ, 0, π, 2π
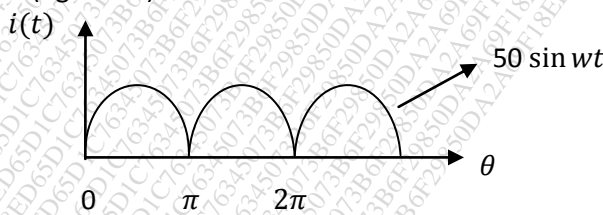
(Figure 13)

   (h) Define network function. State its significance.

Q.7 (a) Find the driving point admittance $y(s)$ for the network shown inn figure 14 and plot pole new diagram. 05

(Figure 14)

$V_1(+)$, 1Ω, $1H$, $1F$, 1Ω

(b) Explain the necessary conditions for transfer functions. 05

(c) A network function is given as below. 05

$Z(s) = \frac{s}{s^2+2s+2}$ find value of $Z(s)$ at $s = j^2$.

Q.8 (a) Find the Fourier series for a square wave defined as $f(t) = +A \ \ 0 < t < {}^T/_2$ 05

$$= -A \ \frac{+T}{2} < t < T$$

(b) Derive the complete form representation of Fourier series. 05

(c) Explain in brief concept of even and odd function. 05

Q.9 (a) What is insertion loss? Explain. 05

(b) Calculate the average value, rms value and form factor of the output of a half wave rectifier when 05
input to rectifier is purely sinusoidal alternating current.

(c) Derive the condition of reciprocity for z parameters. 05
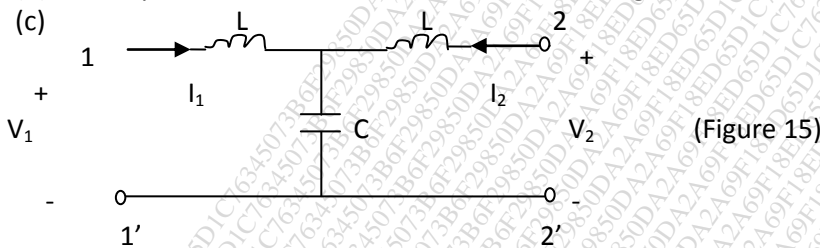
Q.10 (a) State the different types of inter connection of two ports. (explain any one) 05

(b) Find Z parameters of the network as shown in figure 15 05

(c)

(Figure 15)

(d) Obtain transmission parameters for the network shown in circuit of figure 16. 05

(Figure 16)