S E – Sem – III – Extc/Electrical – CBSGS – Am – III 18/5/L

Q.P. Code : 13608

(3 Hours) [Total marks : 80

Note :-
1) Question number **1** is **compulsory.**
2) Attempt any **three** questions from the remaining **five** questions.
3) **Figures** to the **right** indicate **full** marks.

Q 1.A) Show that u = $y^3 - 3x^2y$ is a harmonic function. Also find its harmonic conjugate. (5)

B) Find half range Fourier sine series for f(x) = x^3, $-\pi < x < \pi$. (5)

C) If $\bar{F} = xye^{2z}i + xy^2coszj + x^2cosxyk$ find div$\bar{F}$ and curl$\bar{F}$ (5)

D) Evaluate $\int_0^\infty e^{-2t}sin^3t\ dt$. (5)

Q.2) A) Prove that $J_{-\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}}\ cosx$ (6)

B) Find an analytic function f(z) whose imaginary part is $e^{-x}(ysiny + xcosy)$ (6)

C) Obtain Fourier series for f(x) = $1 + \frac{2x}{\pi}$ $-\pi \leq x \leq 0$

= $1 - \frac{2x}{\pi}$ $0 \leq x \leq \pi$

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots$ (8)

Q.3) A) Show that $\bar{F} = (2xyz^2)i + (x^2z^2 + zcosyz)j + (2x^2yz + ycosyz)k$, is a conservative field. Find its scalar potential φ such that $\bar{F} = \nabla\varphi$ and hence, find the work done by $\bar{F}$ in displacing a particle from A(0,0,1) to B(1,π/4,2) along straight line AB (6)

B) Show that the set of functions $f_1(x) = 1, f_2(x) = x$ are orthogonal over (-1, 1). Determine the constants a and b such that the function $f_3(x) = -1 + ax + bx^2$ is orthogonal to both f_1 and f_2 on that interval (6)

TURN OVER

A6770F26CF24EE77E6B958C4E124CDF5

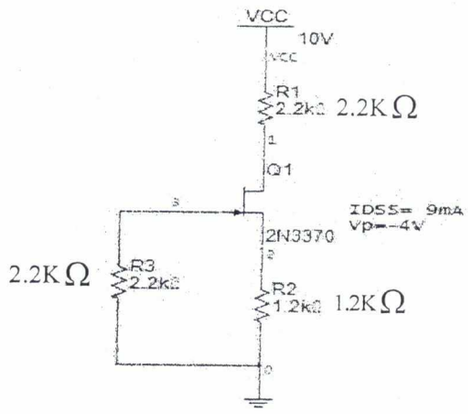
(29) SE - Sem-IV - CBSGS - Electrical - EDC 12/5/17

QP Code : 541900

(3 Hours) **[Total Marks :80**

N.B. : (1) Question Number One is compulsory
(2) Attempt Any Three of Remaining Five Questions
(3) Figure to right indicate full Marks
(4) Assume the suitable data if it is necessary

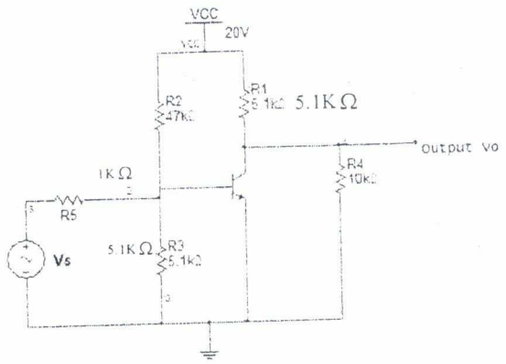
1. Answer **Any Four** of the following : **20**
   (a) What is the thermal runaway in transistor? How it can be compensated
   (b) Give the working principle of Schottky diode with its applications.
   (c) Determine the operating point parameters V_{GSQ}, I_{DQ} and V_{DSQ} for the circuit shown below



   (d) Explain the concept of Negative feedback with its advantages
   (e) Give the DC analysis of SISO differential amplifier using transistor

2. (a) Draw FWR with C filter and describe the circuit operation with waveform. Compare the performance of C, L, LC filters. **10**

(b) For the transistor amplifier shown below with h_{ie}= 1.5KΩ, h_{fe}= 100, h_{re}= $3x10^{-4}$, hoe= 25μ, calculate A_i, R_i, R_o and A_v. 10



3. (a) Compare the different negative feedback amplifiers. 10
   (b) With the working principle used in oscillators explain the Colpitt' s Oscillator in detail with circuit diagram and equations. 10

4. (a) Give the different types of MOSFETs and explain any one with its construction and working 10
   (b) Give the DC and AC analysis of Dual Input Balanced output differential Amplifier. 10

5. (a) Explain the working of CE amplifier with its frequency response 10
   (b) Draw the circuit of Darlington emitter follower. Derive the expressions for its voltage gain, input impedance, output impedance and current gain. 10

6. Write a short note on **any two** of the following : 20
   (a) Explain FET as a Differential Amplifier
   (b) UJT Relaxation oscillator
   (c) H parameter model used in Transistor

6

BE - Sem-III - Electrical - CBSGS 24/5/17

Q. P. Code : 542103

(3 Hours) [Marks : 80]

Note : (1) Question No 1 is compulsory
(2) Solve any three out of remaining
(3) Assume the suitable data required and mention the same

Q.1	a)	Explain load curve and load duration curve.	05
	b)	What are different types of Hydro power plant?	05
	c)	State advantages of Pumped storage plant.	05
	d)	Explain nuclear fission and fusion.	05
Q.2	a)	Draw layout of Thermal power plant.	10
	b)	Explain different types oftariffs.	10
Q.3	a)	Explain important factors governed for selection of site of Hydro power plant. Also state advantages and disadvantages of the plant	10
	b)	Explain operation of Diesel power plant with layout.	10
Q.4	a)	Explain effects of fluctuating load on operation of power plant. Also describe methods of meeting fluctuating load.	10
	b)	Explain advantages and disadvantages of Gas power plant.	10
Q.5	a)	Explain operation of Vertical axis and Horizontal axis wind turbine.	10
	b)	Describe operation of Solar pond with layout.	10
Q.6	a)	Explain operation of Solar PV cell. Describe method of manufacturing mono-crystalline and polycrystalline PV cells.	10
	b)	Explain operation of PWR nuclear reactor. State its advantages and disadvantages.	10

****

(22) SE-Sem-III-CBSGS-Electrical 6/6/17

T1223 / T1485 ELECTRICAL NETWORKS

QP Code : 542100

(3 Hours) **[Total Marks : 80**

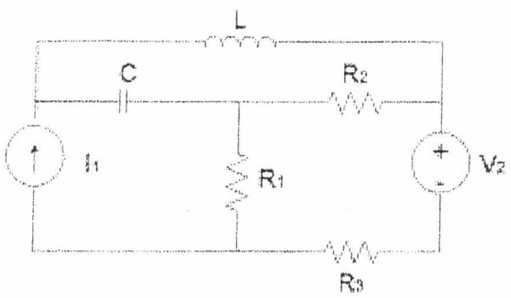
N. B. : (1) Question 1 is **compulsory**.
(2) Solve any **three** questions from remaining **five** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume suitable data if necessary.

1. Attempt the following 20
   (a) Find the condition of symmetry for Z parameters.
   (b) What is network synthesis. Construct the circuit for

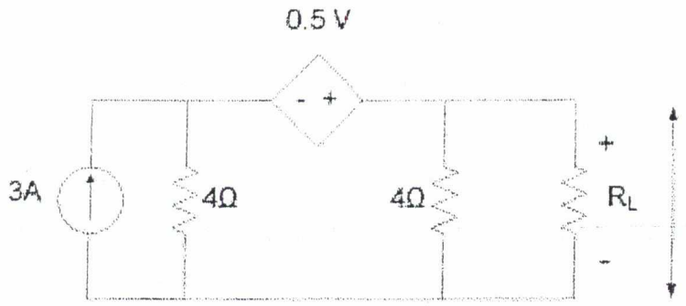
$$Z(s) = 4s + \frac{9}{s} + \frac{15s}{s^2+4}$$

   (c) Derive the s- domain equivalent for inductor with initial current I_0 and capacitor with initial voltage Vo.
   (d) Express Y parameters of two port network in terms of two port currents and voltages.

2. (a) For the given network draw an oriented graph and write f-cutset and f- tieset matrix. 10



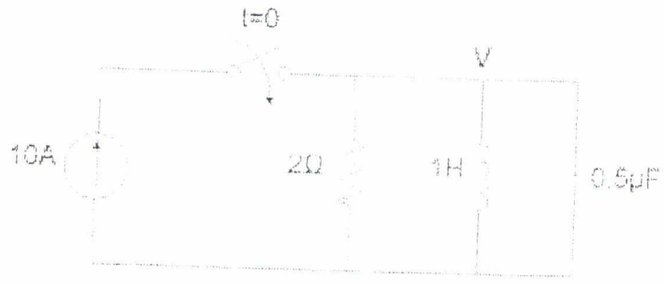
   (b) What will be the value of R_L to get maximum power delivered to it. What is value of this power. 10



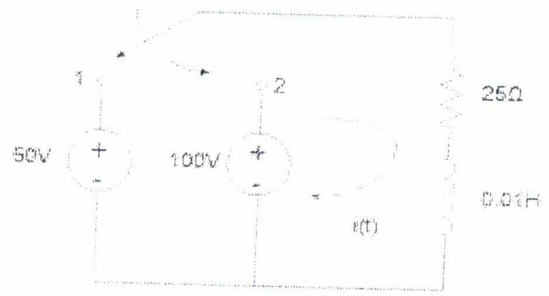
[TURN OVER

3. (a) For the network shown in figure, switch is closed at t=0, determine **10**

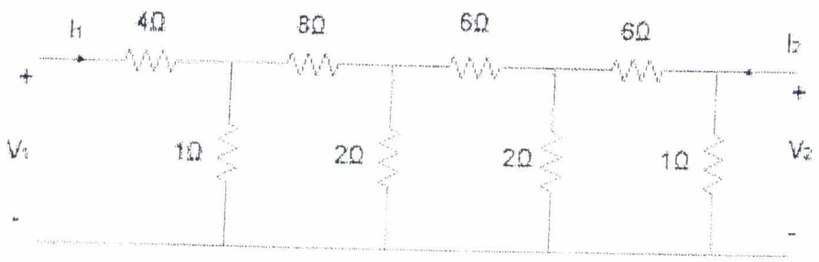
$v, \frac{dv}{dt}, \frac{d^2v}{dt^2}$ at $t = 0^+$.



(b) In the RL circuit shown, switch is in positionl long enough to establish steady state condition. At t=O, switch is changed to position 2. Find i(t) **10**

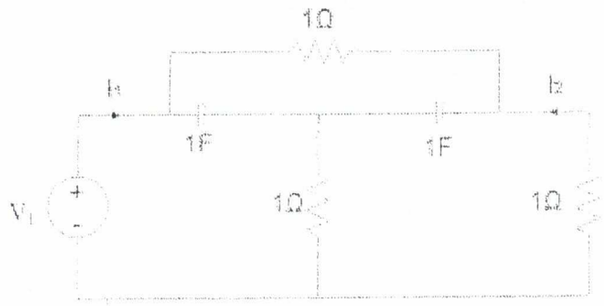


4. (a) Find A, B, C, D parameters for the network **10**

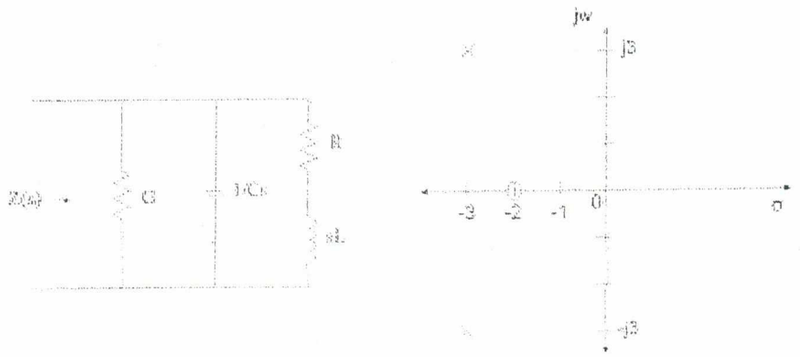


[TURN OVER

(b) Find the driving point admittance Y_{11} and transfer admittance Y_{12} 10



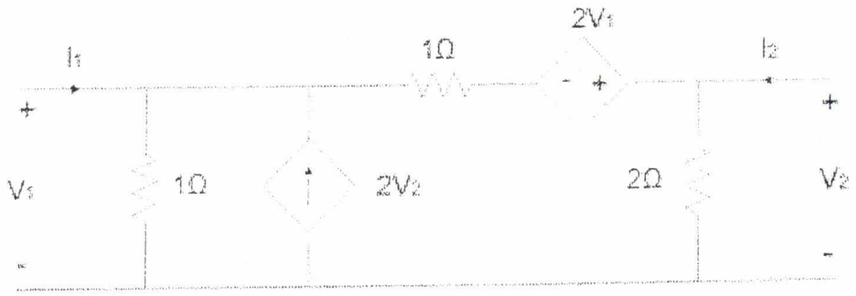
5. (a) A network and pole zero diagram for a driving point impedance Z(s) are shown in figures. Calculate the values of the parameters R, L, G and C if Z(j0)=1. 10



(b) Synthesize the following function by Foster I and Cauer I form 10

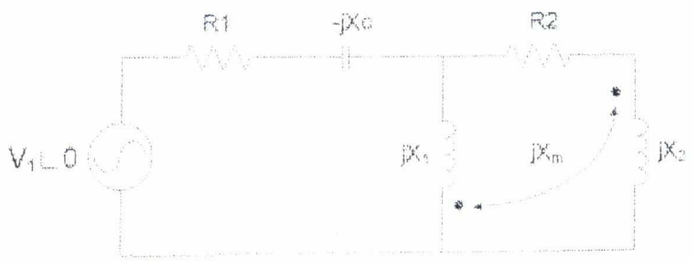
$$Z(s)=\frac{(s+1)(s+4)}{(s)(s+2)}$$

6. (a) Write the mesh equation for the circuit. Find Y and Z parameters. 10



(b) Find the Norton's equivalent across A-B in the figure shown. 5

(c) Write the mesh equations for circuit 5



———

12

~~FE~~ SE - Sem - III - Electrical - CBSGS

30/5/17

Q.P. Code : 542201

(3 Hours) [Total Marks 80]

N.B.:- (1) Question No.1 is compulsory.
(2) **Attempt** any **three** questions out of remaining **five** questions.
(3) Assume suitable data if necessary and justify the same.

Q 1. Answer the following questions. **20**
a) Differentiate between indicating and integrating instrument
b) Explain resolution and sensitivity of digital meter.
c) Explain piezo electric transducer.
d) Explain resistance temperature detector(RTD)

Q 2 a) Explain construction , working principle of moving iron instrument and hence derive the torque equation **10**

Q 2 b) Describe construction and working principle of dynamometer type wattmeter. **10**

Q 3 a) Explain with block diagram Ramp type digital voltmeter. **10**

Q 3 b) Explain Kelvins double bridge to measure low resistance and hence derive the equation for unknown resistance. **10**

Q 4 a) Explain Maxwell's Inductance bridge to measure self-inductance, derive the expression for self-inductance and draw phasor diagram. **10**

Q 4 b) Explain the construction and working of D.C. Crompton type potentiometer. **10**

Q 5 a) A moving coil instrument gives a full scale deflection of 24mA when the potential difference across its terminals is 72 mV. Calculate **10**
(i)The shunt resistance for a full scale deflection corresponding to 120A
(ii) The series resistance for full scale reading with 600V
Calculate the power dissipation in each case.

Q 5 b) Explain the construction and working principle of LVDT. **10**

Q 6 a) Explain the construction and working of Megger. **10**

Q 6 b) Explain the working of digital frequency meter and show it is useful for time interval measurement. **10**
