(113) SE-sem-III - CBSGS - ExTC/Electrical - Am-III 29/11/16

Q.P. Code : 13606

(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) Find the angle between the surfaces 05
$x \log z + 1 - y^2 = 0, \quad x^2 y + z = 2$ at $(1, 1, 1)$.

b) Show that the functions $f_1(x) = 1$, $f_2(x) = x$ are orthogonal on 05
$(-1, 1)$. 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.

c) Find the Laplace transform of $\int_0^t u^{-1} e^{-u} \sin u \, du$. 05

d) Prove that $f(z) = (x^3 - 3xy^2 + 2xy) + i(3x^2 y - x^2 + y^2 - y^3)$ 05
is analytic and find $f'(z)$ and $f(z)$ in terms of z.

Q.2 a) Obtain half- range sine series of $f(x) = x(\pi - x)$ in $(0, \pi)$ and hence, 06
find the value of $\sum \frac{(-1)^n}{(2n-1)^3}$.

b) Prove that 06
$\bar{F} = (y^2 \cos x + z^3)\, i + (2y \sin x - 4)\, j + (3xz^2 + 2)\, k$
is a conservative field. Find the scalar potential for $\bar{F}$.

c) Find the inverse Laplace transform of 08

(i) $\dfrac{s+2}{s^2 - 4s + 13}$

(ii) $\dfrac{1}{(s-a)(s-b)}$

Q. 3 a) Prove that $J_{5/2}(x) = \sqrt{\frac{2}{\pi x}} \left(\frac{3 - x^2}{x^2} \sin x - \frac{3}{x} \cos x \right)$. 06

b) Find the analytic function $f(z) = u + iv$ if 06
$3u + 2v = y^2 - x^2 + 16xy$.

TURN OVER

c) Expand $f(x) = \begin{cases} \pi x, & 0 < x < 1 \\ 0, & 1 < x < 2 \end{cases}$ period 2 into a Fourier Series. 08

Q. 4 a) Prove that 06
$\int x^3 \cdot J_0(x)\, dx = x^3 \cdot J_1(x) - 2x^2 \cdot J_2(x).$

b) Use Stoke's Theorem to evaluate $\int_C \bar{F} \cdot d\bar{r}$ 06
where $\bar{F} = yz\, i + zx\, j + xy\, k$
and C is the boundary of the circle $x^2 + y^2 + z^2 = 1,\ z = 0.$

c) Solve using Laplace transform $(D^2 - 3D + 2)\, y = 4e^{2t}$ with 08
$y(0) = -3$ and $y'(0) = 5.$

Q. 5 a) Prove that $2\, J_0''(x) = J_2(x) - J_0(x).$ 06

b) Use Laplace transform to evaluate 06
$\int_0^\infty e^{-t} \left(\int_0^t u^2 \sin hu \cos hu\ du \right) dt.$

c) Obtain complex form of Fourier Series for $f(x) = e^{ax}$ in $(-\pi, \pi)$ 08
where a is not an integer. Hence deduce that when α is a constant other than an integer

$$\cos \alpha x = \frac{\sin \pi\alpha}{\pi} \sum \frac{(-1)^n \alpha}{(\alpha^2 - n^2)}\, e^{inx}$$

Q. 6 a) Express the function 06

$$f(x) = \begin{cases} -e^{kx} & for\ x < 0 \\ e^{-kx} & for\ x > 0 \end{cases}$$

as Fourier Integral and hence, prove that

$$\int_0^\infty \frac{\omega \sin \omega x}{\omega^2 + k^2}\, d\omega = \frac{\pi}{2}\, e^{-kx} \quad if \quad x > 0, k > 0.$$

b) Using Green's theorem evaluate 06

$$\oint_C \left(e^{x^2} - xy\right) dx - \left(y^2 - ax\right) dy$$

where C is the circle $x^2 + y^2 = a^2.$

c) Under the transformation $w = \frac{z-1}{z+1}$, show that the map of the straight 08
line $y = x$ is a circle and find its center and radius.

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SE-sem-III - CBSGS - Electrical - EDC 23/11/1:

Q. P. Code: 23928

3 Hours Total Marks: 80

Instructions:

1. Question Number 1 is Compulsory.
2. Attempt Any Three from the remaining 5 Questions.
3. Figures to right indicate the full marks.
4. Assume the suitable data if necessary.
5.

Que. 1 Answer **Any FOUR** of the following 20

a Draw and explain the construction of D-MOSFET

b Explain the construction and characteristic of LED and give the applications of it.

c Explain in brief the r_e model in BJT

d What is necessity of cascading? What is the effect of it?

e A Colpitt's Oscillator circuit having two individual capacitors of 0.1μF each are designed to resonate in parallel with a variable inductor used is of 0.5mH. Determine the frequency of oscillation.

f State the advantages of negative feedback.

Que. 2 a State the various types of low frequency oscillators and explain any one in detail. 10

b Explain the features of multistage RC coupled amplifier. Draw the neat circuit diagram of two stage R-C coupled transistor amplifier and also give its frequency response 10

Que. 3 a State the types of Negative feedback amplifiers and explain current series type amplifier in detail 10

b Draw and explain the bridge wave rectifier with CLC filter with proper waveforms. 10

Que. 4 a State the various biasing techniques used in BJT and explain voltage divider biasing technique in detail 10

b Draw and explain E-type MOSFET in detail with its input and output characteristics. 10

Que. 5 a Give the complete AC analysis of CE amplifier using either h parameter model or re model. 10

b Differentiate JFET and MOSFET in terms of symbol, construction, Input impedance, biasing methods used and also source and drain characteristics. 10

Que 6 Write a short note on **any two** of the following 20

a AC analysis of CS amplifier

b FET Differential Amplifier

c Concept of DC load Line used in BJT

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SE:- Electrical (CBGS) 7/12/201

CNCPA

(1)

QP Code : 22952

(3 Hours) (Total Marks : 80

N.B : (1) Question **No.1** is **compulsory**.
(2) Attempt **any three** from the remaining questions.
(3) **Figures** to the **right** indicate **full marks**.
(3) Assume **data** if **necessary** and **justify**.

1. (a) Define the following terms : **5**
   (i) Demand factor
   (ii) Load factor
   (iii) Diversity factor
   (iv) Utilization factor
   (v) Plant capacity factor
   (b) Compare Nuclear fission and fusion. **5**
   (c) Define the following terms : **5**
   (i) Plasma technology
   (ii) Tidal energy sources
   (d) Differentiate between conventional and non-conventional sources of energy. **5**

2. (a) Explain BWR with neat sketch. Compare the same with PWR. **10**
   (b) Explain advantages, disadvantages, layout and field of use of Diesel power plant. **10**

3. (a) List advantages and disadvantages of steam power plant. Write the names of turbines used in thermal power plant. **10**
   (b) The runoff data of a river at a particular site is tabulated below : **10**

Month	Mean discharge per month (millions of Cum)	Month	Mean discharge per month (millions of Cum)
January	40	July	75
February	25	August	100
March	20	September	110
April	10	October	60
May	0	November	50
June	50	December	40

   (i) Draw a hydrograph and find the mean flow.
   (ii) Also draw the flow duration curve.

TURN OVER

4. (a) Define tariff and explain various types of tariff in brief. **10**
   (b) Explain "Pulverized Coal Handling" in steam power plant. **10**

5. (a) Explain "Principle of operation of fuel cell". Also discuss types of fuel cell. **10**
   (b) A generating station has the following daily load cycle. **10**

Time (Hours)	0 - 6	6 - 10	10 - 12	12 - 16	16 - 20	20 - 24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find maximum demand units generated per day, average load and load factor.

6. (a) Explain thermal power plant in detail with its neat block diagram. **10**
   (b) Explain the classification of Hydro power plant. **10**

SE-sem-III – CBSGS-Electrical-EN 19/12/17

Q. P. Code: 24370

(3 Hours)

[Total marks: 80]

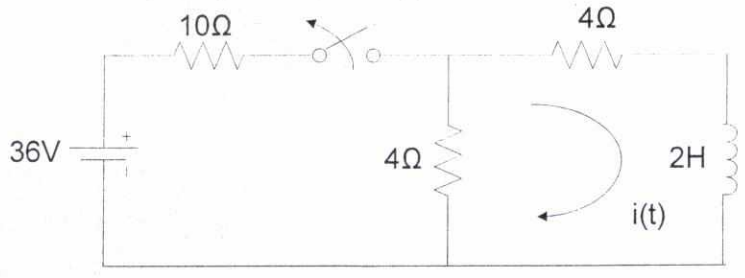
N.B:- (1) **Question 1 is compulsory**
(2) Solve any **three** questions from remaining **five** questions.
(3) Figures to the right indicate **full** marks.
(4) Assume suitable data if necessary.

Q1 Attempt the following 20

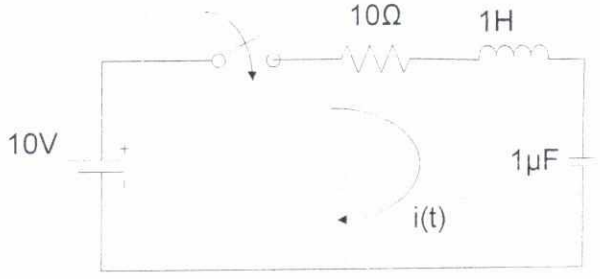
a) Write short note on duality of network
b) Find the condition of reciprocity for Z parameters.
c) Write properties of positive real function
d) Test whether the polynomial $s^5 + 3s^3 + 2s$ is Hurwitz.

Q2 a) Linear graph of a network is given below. Write f-cutset, f-tieset and incidence matrix. 10

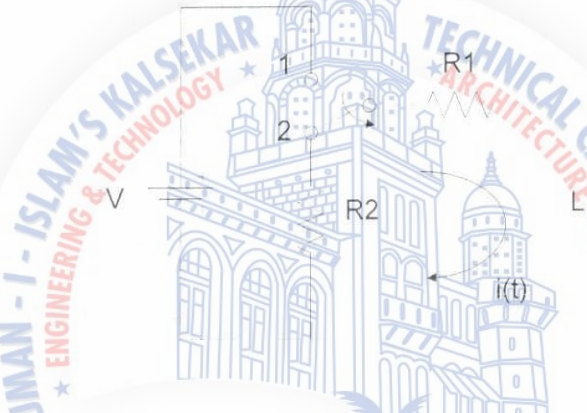
Q2 b) The network shown has acquired steady state with the switch closed for t<0. At t=0, the switch is opened. Obtain i(t) for t>0. 10



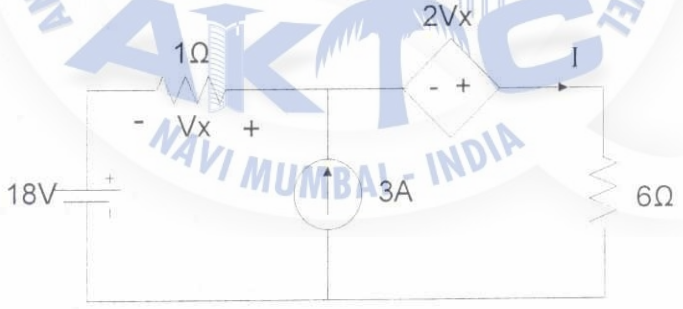
Q3 a) In the network shown, the switch is closed. Assuming all initial conditions as zero, find $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at t=0⁺. 10



Q3 b) In the network shown, the switch is initially at position 1. On the steady state having reached, the switch is changed to the position 2. Find current i(t). 10



Q4 a) Find the current in the 6Ω resistor using nodal voltage 10



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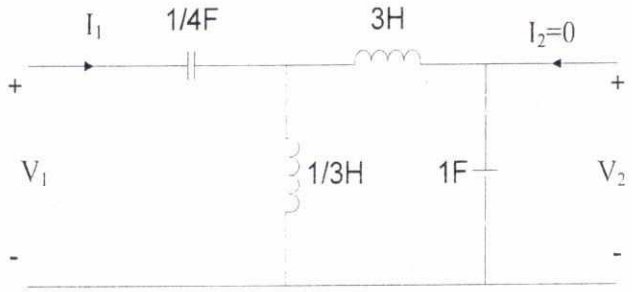
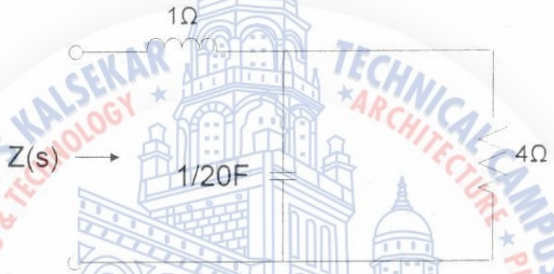
Q4 b) Find Z_{11} and G_{12} for the following circuit. 10



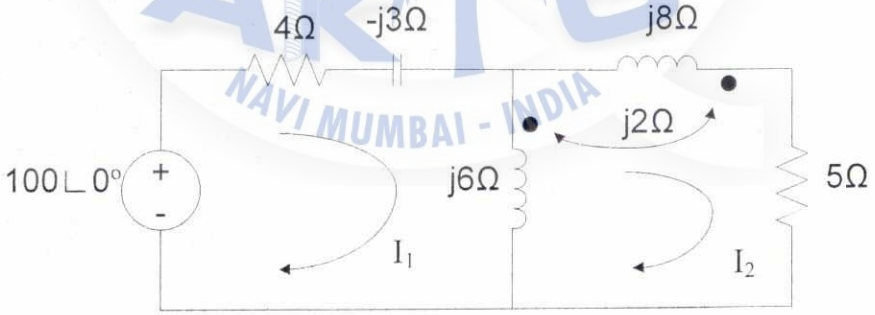
Q5 a) Determine Z(s) in the network shown. Find out poles and zeros of Z(s) and plot them on s-plane 10



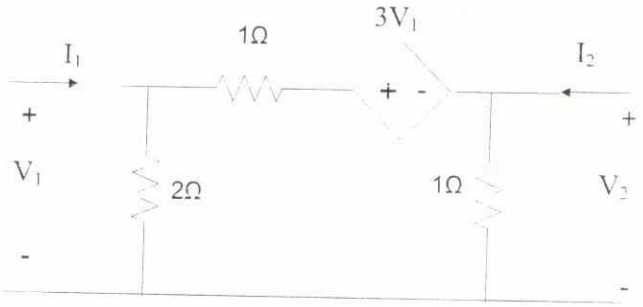
Q5 b) Realize Cauer I and Cauer II form for following function 10

$$Z(s) = \frac{4(s^2+1)(s^2+9)}{s(s^2+4)}$$

Q6 a) Calculate the mesh currents in the circuit shown 10



Q6 b) For the network shown , find Y and Z parameters 10



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Correction : T1223 / T1485 ELECTRICAL NETWORKS QP Code : 24370

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Correction : T1223 / T1485 ELECTRICAL NETWORKS **QP Code : 24370**
Question No. 5 a). Inductor value is 1Henry instead of 1ohm in the circuit given

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Mon-Fri, 10am - 5pm

SE - Sem - II - CBSGS - Electrical - EEM

13/12/15

Q.P. Code: 25119

Time: 3 Hours **Marks: 80**

N. B.
(1) Question No. **1** is **compulsory**.
(2) **Attempt** any **three** questions out of remaining questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) **Assume** suitable **data** if **necessary**.

1. Solve any **five** :- 20
   a) Explain measurement of medium resistance.
   b) Explain classification of analog instruments.
   c) Explain resolution and sensitivity of digital meter.
   d) Compare slide wire potentiometer and Crompton's potentiometer.
   e) Explain classification of Transducers in brief.
   f) Short note on - basic Q meter.

2. a) Explain working principle, construction of PMMC type meter and derive the torque equation. 10
   b) Explain the Construction and Working of Maxwell's Bridge. Also Derive the equation for unknown inductance. Draw the phasor diagram. 10

3. a) A PMMC instrument with full scale deflection of 100 μA and coil resistance of 50Ω is to be converted into a multimeter to measure voltage (0-500V) and current (0-10A). Find the suitable values of shunt and multiplier resistance required. 10
   b) Explain the construction and working of LVDT. 10

4. a) Explain with neat sketch Piezo-electric transducers and derive the expression for magnitude of voltage across the load by making simplifying assumptions. List the advantages and disadvantages. 10
   b) Explain in detail different types of error that occur during measurement. Write expression for relative limiting error. 10

5. a) Explain construction and working of Electrodynamometer type power factor meter. Also derive the torque equation. 10
   b) Explain with block diagram: Ramp type digital voltmeter. Also write its advantages and disadvantages. 10

6. Write a short note on-
   a) Digital frequency meter 07
   b) Megger 07
   c) Calibration of wattmeter 06