ANJUMAN-I-ISLAM'S
AKTC KALSEKAR TECHNICAL CAMPUS
INNOVATIVE TEACHING · EXUBERANT LEARNING

School of Architecture

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Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2017-18/ **Date:** _____

School: SoET-CBSGS **Branch:** ELECT. ENGG. **SEM:** III

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Applied Mathematics- III	EEC301		✓	02
2	Electronic Devices & Circuits	EEC302		✓	02
3	Conventional And Non-Conventional Power Generation	EEC303			
4	Electrical Networks	EEC304		✓	02
5	Electrical And Electronic Measurement	EEC305			

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

(37)

SE - sem - III _ CBSGS – Electrical / EXTC

28/11/18

Paper / Subject Code: 49402 / APPLIED MATHEMATICS III

Q. P. Code : 37078

(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) Evaluate $\int_0^\infty e^{-2t} sin^2 2t\, dt$. 05

b) Find an analytic function $f(z) = u + iv$ where $u + v = e^x(\cos y + \sin y)$. 05

c) Obtain Fourier series of $x \cos x$ in $(-\pi, \pi)$. 05

d) Evaluate $\int_C \bar{F} \cdot d\bar{r}$ where $\bar{F} = x^2\, i + xy\, j$ from $(0,0)$ to $(1,1)$ along the parabola $y^2 = x$. 05

Q.2 a) Find half-range cosine series for $f(x) = e^x,\ 0 < x < 1$. 06

b) Prove that 06
$\bar{F} = (x + 2y + az)\, i + (bx - 3y - z)\, j + (4x + cy + 2z)\, k$
is solenoidal and determine the constants a, b, c if $\bar{F}$ is irrotational.

c) Prove that $w = i\left(\frac{z-i}{z+i}\right)$ maps upper half of the z −plane into the interior of the unit circle in the w −plane. 08

Q. 3 a) Prove that $J_n(x)$ is an even function if n is even integer and is an odd function if n is odd integer. 06

b) Find the inverse Laplace transform of 06
$\frac{s^2+2s+3}{(s^2+2s+5)(s^2+2s+2)}$.

c) Obtain the complex form of Fourier series for $f(x) = e^{ax}$ in $(0, a)$. 08

Q. 4 a) Prove that $\nabla f(r) = f'(r)\frac{\bar{r}}{r}$ and hence, find f if $\nabla f = 2r^4\bar{r}$. 06

b) Prove that $4J''_n(x) = J_{n-2}(x) - 2J_n(x) + J_{n+2}(x)$. 06

c)

(i) Find the Laplace transform of $e^{4t}\ sin^3 t$. 04

(ii) Find the Laplace transform of $t\sqrt{1+\sin t}$. 04

Q. 5 a) Prove that $\int x \cdot J_{\frac{2}{3}}\left(x^{\frac{3}{2}}\right) dx = -\frac{2}{3}\, x^{-\frac{1}{2}} J_{-\frac{1}{3}}\left(x^{\frac{3}{2}}\right)$. 06

b) Find p if $f(z) = r^2 \cos 2\theta + i\, r^2 \sin p\theta$ is analytic. 06

c) If $f(x) = \begin{cases} \pi x, & 0 \le x \le 1 \\ \pi(2-x), & 1 \le x \le 2 \end{cases}$ with period 2, show that 08

$f(x) = \frac{\pi}{2} - \frac{4}{\pi} \sum_{n=0}^{\infty} \frac{1}{(2n+1)^2} \cos(2n+1)\pi x.$

Q. 6 a) Show that the set of functions $\cos nx$, $n = 1, 2, 3, \ldots..$ is orthogonal on $(0, 2\pi)$. 06

b) Use Stoke's theorem to evaluate $\int_C \bar{F} \cdot d\bar{r}$ where $\bar{F} = (2x - y)\, i - yz^2\, j - y^2 z\, k$ and S is the surface of hemisphere $x^2 + y^2 + z^2 = a^2$ lying above the xy −plane. 06

c) Use Laplace transform to solve 08

$\frac{d^2y}{dt^2} + y = t$ with $y(0) = 1, y'(0) = 0$.

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(1)

Paper / Subject Code: 49401 / ELETRONIC DEVICES AND CIRCUITS

SE-sem-III - Electrical - CBGS

20/11/18

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

N.B. **(1)** Question no.1 is compulsory.
(2) Attempt any three questions from Question No. 2 to 6
(3) Make any suitable assumption wherever required.

Q.1 Answer any four.

(a) Give the working principle of Photodiode with its application 5M

(b) Explain the various bias compensation techniques in a BJT. 5M

(c) Determine the operating point parameters I_{CQ} and V_{CEQ} for the Fixed Bias circuit. Assume $\beta = 100$ and $V_{BE} = 0.7V$, $R_C = 3k\Omega$, $R_B = 470K\Omega$, $V_{CC} = 12V$.. 5M

(d) Explain the Effect of negative feedback on voltage gain, input impedance, output impedance, and bandwidth. 5M

(e) State and Explain Barkhausen's criteria for sustained oscillations. 5M

Q.2 **(a)** Analyze Voltage Shunt Negative feedback Amplifier with respect to Input Resistance, Output Resistance and Voltage gain. 10M

(b) Derive expression for voltage gain, input impedance and output impedance of a CS amplifier. 10M

Q.3 **(a)** Draw FWR with C filter and describe the circuit operation with waveform. Compare the performance of C, L, LC filters 10M

(b) Explain the Colpitts Oscillator in detail with circuit diagram and equations. 10M

Q.4 **(a)** Explain Crystal oscillator with the help of suitable diagram and waveforms. 10M

(b) Give the DC and AC analysis of Dual Input Unbalanced output differential Amplifier 10M

Q.5 **(a)** Explain the Construction and Working of E-MOSFET with the help of its characteristics. 10M

(b) Explain various types of coupling and their effect on the performance of BJT. 10M

Q.6 Write short note on following. **(Any TWO)** 20M

(a) Zener Diode as voltage Regulator.

(b) Hartley Oscillator.

(c) re-model used in Transistor

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(2)

SE-sem-III - CBSGS- Electrical

17/12/18

Paper / Subject Code: 49405 / ELECTRICAL NETWORKS

(Time: 3 Hours) **[Total marks: 80]**

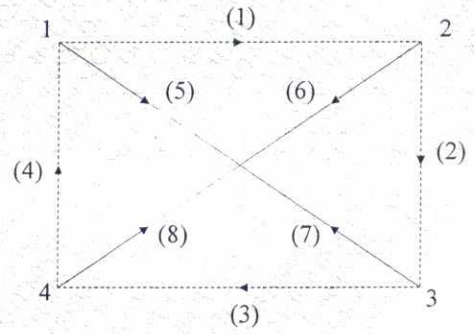
N.B:- (1) **Question 1 is compulsory**
(2) Solve any **three** questions from remaining **five** questions.
(3) Figures to the right indicate **full** marks.
(4) Assume suitable data if necessary.

Q1 Attempt the following 20

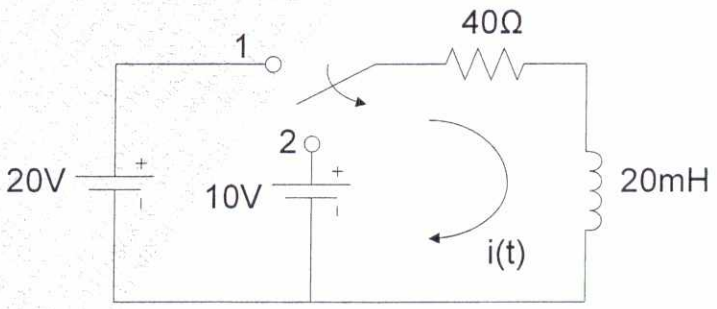
a) Derive the response on unit step signal in case of series RL circuit.
b) Explain Millman's theorem.
c) What do you understand by tree, link and twig. Explain with example

d) Test whether $P(s) = s^5 + 2s^4 + 4s^3 + 6s^2 + 2s + 5$ is hurwitz

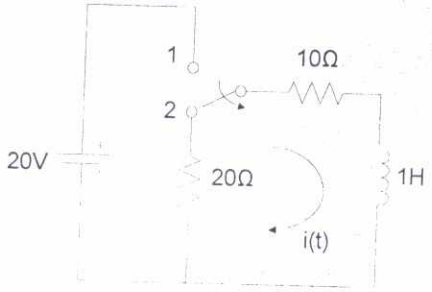
Q2 a) For a given graph, write incidence matrix, f-cutset and f-tieset matrix. 10



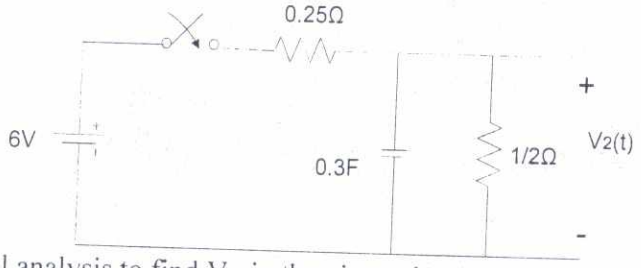
Q2 b) The network shown is under steady state with switch at position 1. At t=0, switch is moved to position 2. Find i(t). 10



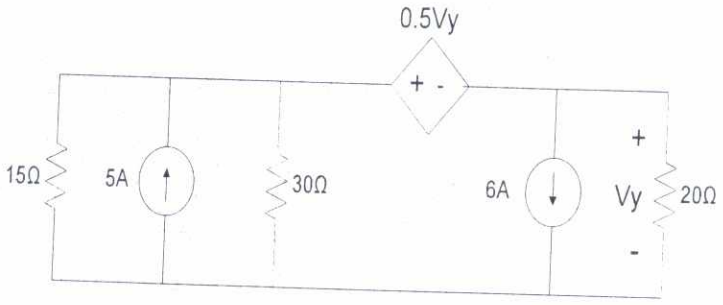
Q3 a) In the network shown in figure, the switch is changed from position 1 to 2 at t=0, steady state condition having reached before switching. Find the values of $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t=0^+$. 10



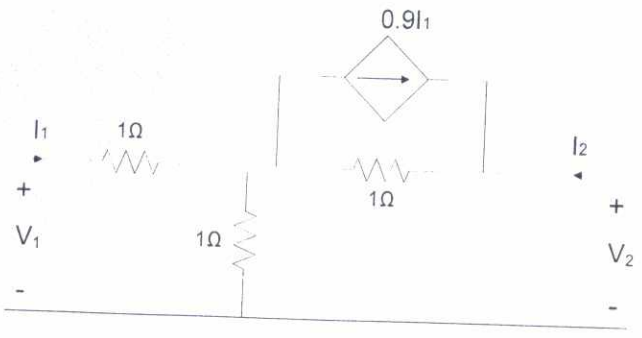
Q3 b) In the network shown, the switch is open for a long time and at t=0, it is closed. Determine $V_2(t)$. 10



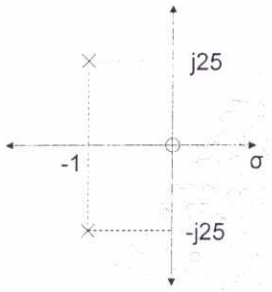
Q4 a) Use nodal analysis to find Vy in the given circuit. 10



Q4 b) Find the Z parameters for the network shown. Hence find h parameters. 10



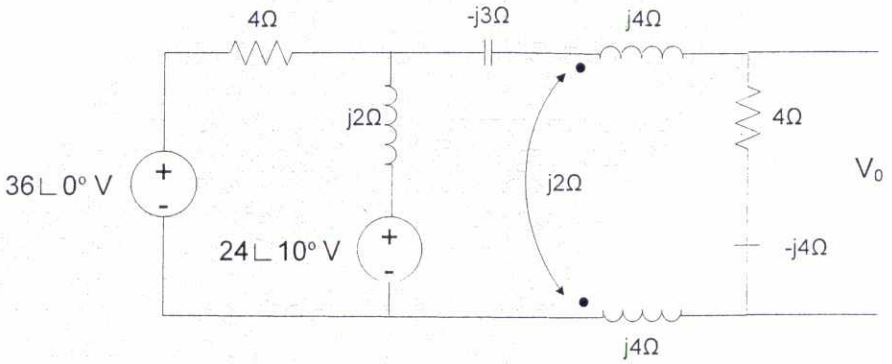
Q5 a) For a series RLC circuit H=1, for its driving point admittance. Pole diagram is given in figure. Find values of R, L and C. 10



Q5 b) Realize Foster I and Foster II for following impedance function 10

$$Z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)}$$

Q6 a) Find V_0 in the network shown 10



Q6 b) Find h_{12}, Z_{12}, Y_{12} and h_{22} for the given two port network . 10