**2023-24**
**B. TECH. (ODD) SEMESTER EXAMINATION**
**(ELECTRICAL ENGINEERING)**
**HIGHER MATHEMATICS**
**(AMS-2230)**

**Maximum Marks: 60** **Duration: Two Hours**

Note: (i) Answer all the questions
(ii) Programmable calculator is not allowed

| Q. No. | Question | CO | M.M. |
|---|---|---|---|
| 1(a) | Prove that $u = x^2 - y^2$ and $v = \frac{-y}{x^2+y^2}$ are harmonic functions of $f(x,y)$ but are not harmonic conjugates. | [CO1] | [07] |
| | **OR** | | |
| 1(a') | Find the value of the integral $\int_0^{1+2i}(3x^2 - y + ix^3)dz$ along the real axis from $z = 0$ to $z = 1$ and then along a line parallel to the imaginary axis for $z = 1$ to $z = 1 + 2i$ | [CO1] | [07] |
| 1(b) | State Cauchy's Integral Theorem and evaluate the following integral using Cauchy's Integral formula $$\int_C \frac{e^z}{z^2(z+1)^3}dz,$$ where $C: \lvert z\rvert = 2$. | [CO1] | [08] |
| 2(a) | Find the Laurent series of the function $f(z) = \frac{7z^2+9z-18}{(z^3-9z)}$ about the point $z = 3$ in the regions (i) $0 < \lvert z-3\rvert < 3$ (ii) $3 < \lvert z-3\rvert < 6$ | [CO2] | [08] |
| | **OR** | | |
| 2(a') | Evaluate the following integral, using Cauchy's residue theorem $$\int_C \frac{(z-3)}{(z^3+2z+5)}dz,$$ where (i) $C: \lvert z\rvert = 1$ (ii) $C: \lvert z+1-i\rvert = 2$. | [CO2] | [08] |
| 2(b) | Evaluate by contour integration $\int_{-\infty}^{\infty} \frac{x \sin \pi x \, dx}{(x^2+2x+5)}$ | [CO2] | [07] |

contd....2.

**3(a)** Using general iteration method, find a root of the equation $x^3 + x^2 - 1 = 0$ correct to four decimal places. [CO3] [07]

**3(b)** (i) Find the missing values in the following data [CO3] [4+4]

| $x$ | 45 | 50 | 55 | 60 | 65 |
|---|---|---|---|---|---|
| $y$ | 3.0 | --- | 2.0 | ---- | -2.4 |

(ii) Find the iterative formula for the cube root of a positive number N, using Newton Raphson method and hence find $\sqrt[3]{24}$.

**OR**

**3 (b')** Using Newton's backward interpolation formula, construct an interpolating polynomial for the data $f(-0.75) = -0.0718125$, $f(-0.5) = -0.02475$, $f(-0.25) = 0.3349375$, $f(0) = 1.10100$. Hence or otherwise obtain the value of $f(-1/3)$. [CO3] [08]

**4(a)** Using modified Euler's method, solve $y' = \sqrt{xy}$, $y(1) = 1$ in the range $1 \leq x \leq 1.2$ taking $h = 0.1$, correct to 4 decimal places. [CO4] [07]

**OR**

**4(a')** Use fourth order Runge-Kutta method to determine $y(1.2)$ with $h = 0.1$ if $y$ satisfies [CO4] [07]

$$\frac{dy}{dx} = x^2 + y^2, \quad y(1) = 1.5$$

**4(b)** Solve the boundary value problem by finite difference method $y'' + x^2 y = 0$ with boundary conditions $y(0) = 0$, $y(1) = 1$ and the step length $h = 0.25$. [CO4] [08]

Code No. 6467

2023-2024

**B. TECH. (ODD SEMESTER) EXAMINATION**

**ELECTRICAL ENGINEERING**

**Electrical Engineering Materials**

**APS2050**

**Maximum Marks: 60** **Credits:03** **Duration: Two Hours**

*Answer all questions. Symbols used have their usual meanings.*

| | | | |
|---|---|---|---|
| 1(a) | Categorize materials on the basis of their electrical resistivity. Derive an expression for the electrical conductivity of metals by considering Drude's assumptions. How does it depend on temperature? | CO1 | 8.0 |
| 1(b) | What do you understand by high $T_c$ superconductors? Give their examples along with $T_c$. | CO1 | 3.5 |
| | **OR** | | |
| 1(b') | Mention important properties of soldering materials. Give examples of any two soldering materials and also mention their melting points. | CO1 | 3.5 |
| 1(c) | Calculate the drift mobility and mean scattering time of the conduction electron in aluminium at room temperature, given that the electrical conductivity of aluminium is $3.8\times10^{5}\ (\Omega.cm)^{-1}$ .The density and atomic mass of aluminium are 2.7 g $cm^{-3}$ and 26.985 g $mol^{-1}$, respectively. [$m_e$=$9.1\times10^{-31}$kg, $N_A$=$6.023\times10^{23}$ $mol^{-1}$ and e=$1.6\times10^{-19}$ Coulomb ] | CO1 | 3.5 |
| 2(a) | What are the different contributions of polarization in the case of polyatomic molecules? Derive an expression for orientational contribution and discuss its temperature dependence. | CO2 | 7.5 |
| | **OR** | | |
| 2(a') | Derive an expression for the electronic polarizability of a dielectric in the alternating electric field and represent graphically its dependence on frequency for real as well as imaginary parts. | CO2 | 7.5 |
| 2(b) | What do you understand by the dielectric loss? Obtain an expression for the absorption of energy in the dielectric medium in the time-varying field, and on what factors does it depend? | CO2 | 4.5 |
| 2(c) | A solid contains $4\times10^{28}$ identical atoms per $m^3$, each with a polarizability of $2\times10^{-40}$ F. $m^2$. Assuming that internal field is given by Lorentz formula. Calculate ratio of the local field to the applied field . Also calculate relative permittivity of the material. [$\varepsilon_0$=$8.854\times\ 10^{-12}$ F/m ] | CO2 | 3.0 |

contd...2.

| | | | |
|---|---|---|---|
| 3(a) | Classify the insulating materials on the basis of maximum working temperature. Name different materials belonging to such classification and their applications in electrical instruments, accessories and equipment. | CO3 | 6.0 |
| 3(b) | In what essential respects high voltage ceramics differ from low voltage ceramics. Give specific examples to support your answer. | CO3 | 4.0 |
| 3(c) | What should be properties of transformer oil? Discuss briefly two transformer oil tests. | CO3 | 5.0 |

**OR**

| | | | |
|---|---|---|---|
| 3(c') | What is the effect of moisture on insulation? Discuss briefly about the methods used to purify transformer oil. | CO3 | 5.0 |
| 4(a) | The magnetic flux density within a bar of some material is 0.63 T at an H field of $5\times10^5$ A/m. Compare the following for this material:<br>(a) Magnetic Permeability<br>(b) Magnetic Susceptibility<br>Type of magnetism that you suggest being displayed by the material | CO4 | 5.0 |
| 4(b) | Give an account of Weiss theory of ferromagnetism and show from the plot of Langevin function, spontaneous magnetization exists below the Curie temperature and vanishes above the Curie temperature. | CO4 | 5.0 |
| 4(c) | Draw B-H curve and define the hysteresis. Discuss corecivity and retentivity of a ferro magnetic material. | CO4 | 5.0 |

**2023-24**

**B.Tech. (ODD SEMESTER) EXAMINATION**
**(ELECTRICAL ENGINEERING)**
**ELECTRICAL MACHINE-1**
**(EEC2110)**

**Maximum Marks: 60** **Credits: 04** **Duration: Two Hours**

***Answer all questions.***
***Assume suitable data if missing.***
***Notations and symbols used have their usual meaning.***

| Q.No. | Question | CO | M.M. |
|---|---|---|---|
| 1(a) | A single-phase 3200/440 V transformer has the following winding resistance and reactance:<br>$R_1 = 0.6\ \Omega$, $R2 = 0.015\ \Omega$, $X_1 = 4.6\ \Omega$, $X2 = 0.035\ \Omega$<br>The secondary is connected to a coil having a resistance of 4.2 Ω and inductive reactance 3.6 Ω. Calculate the secondary terminal voltage and the power consumed by the coil. | CO-1 | 06 |
| 1(b) | A 110 kVA, 50 Hz, 440/12000 V, 1-phase transformer has an efficiency of 98.2% when supplying full-load current at 0.9 power factor lagging, and an efficiency of 98.9% when supplying half full-load current at unity power factor. Find the core losses and the copper losses corresponding to full-load current. At what value of load current will the maximum efficiency be attained? | CO-1 | 09 |
| | OR | | |
| 1(b') | Open-circuit and short-circuit tests on a 8 kVA, 220/440 V, 50 Hz, single-phase transformer gave the following results :<br><br>O.C. test: 200 V, 2.2A, 150 W (L.V. side)<br>S.C. test : 50 V, 11.5 A, 220 W (H.V. side)<br><br>Determine the efficiency and approximate regulation of the transformer at full load 0.8 power factor lagging. | CO-1 | 09 |
| 2(a) | Derive an expression for the approximate relative weights of conductors material in an autotransformer and a 2-winding transformer, the primary voltage being $V_1$ and the secondary voltage $V_2$. | CO-2 | 07 |
| | OR | | |
| 2(a') | Explain with the help of connection and phasor diagrams, how Scott connections are used to obtain two-phase supply from 3-phase supply mains. | CO-2 | 07 |
| 2(b) | A 500 KVA, 1-phase Transformer having resistance & reactance of 0.015 p.u and 0.06 p.u is connected in parallel with 240 KVA 1-phaseTransformer having (0.01 + j0.04) p.u impedance to share a load of 750 KVA at 400V and 0.8P.f lag. Their no load emf are 405 V & 420V respectively. Find<br>(a) Circulating current on no load. | CO-2 | 08 |

Contd...2.

| | | | |
|---|---|---|---|
| | (b) Current supplied by each transformer.<br>(c) KVA, KW & P.f of each transformer. | | |
| 3(a) | Develop the equivalent circuit for a 3-phase induction motor and explain how the mechanical power developed is taken care in the equivalent circuit. | CO-3 | 08 |
| | OR | | |
| 3(a') | Sketch the torque-slip characteristic of a 3-phase induction motor indicating there in the starting torque, maximum torque and the operating region. How do starting and maximum torques vary with the rotor resistance? | CO-3 | 08 |
| 3(b) | A 4-pole, 50 Hz, 3-phase induction motor develops a maximum torque of 100 Nm at 1250 r.p.m. The resistance of the star-connected rotor is 0.22 Ω/phase. Calculate the value of resistance that must be inserted in series, with each rotor phase to produce a starting torque equal to half the maximum torque. | CO-3 | 07 |
| 4(a) | (a)Using double-revolving field theory, explain why a single-phase induction motor is not self starting.<br>(b) Explain working principle of split phase induction motor in details. | CO-4 | 08 |
| 4(b) | The following data relates to tests on 110 V, 150W, 50Hz,6-pole, 1-phase induction Motor<br>No load test: 110V, 63W, 2.7amp<br>Blocked rotor test: 55V, 212W, 5.8Aamp<br>Stator winding resistance is 2.5Ω. And during the blocked rotor test the starting winding is open.<br>Determine the equivalent parameters. Also find the core, friction & windage losses. | CO-4 | 07 |

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**2023-24**

**B.Tech. (ODD SEMESTER) EXAMINATION**

**(ELECTRICAL ENGINEERING)**

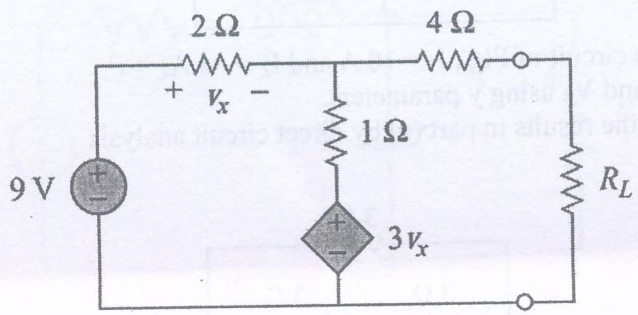
**CIRCUIT THEORY**

**(EEC2710)**

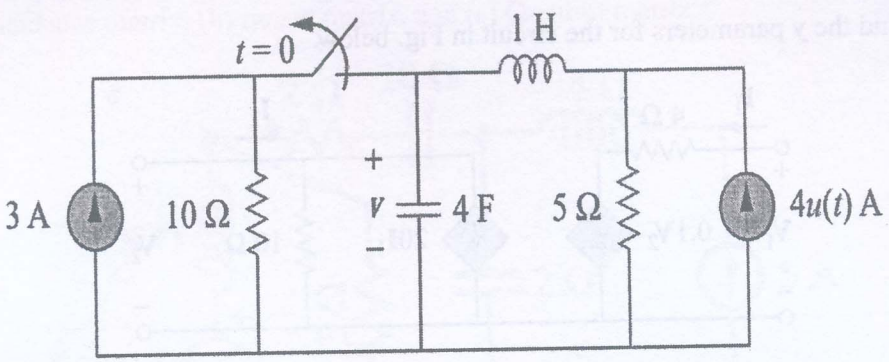
**Maximum Marks: 60** **Credits: 04** **Duration: Two Hours**

***Answer all questions.***
***Assume suitable data if missing.***
***Notations and symbols used have their usual meaning.***

| Q.No. | Question | CO | M.M. |
|---|---|---|---|
| 1(a) | Determine the value of $R_L$ that will draw the maximum power from the rest of the circuit in Fig.below. Also calculate the maximum power absorbed. | CO-1 | [7] |



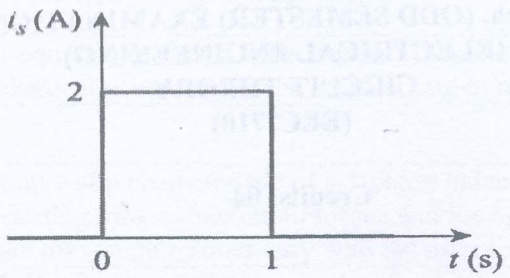

| | | | |
|---|---|---|---|
| 1(b) | In the circuit shown below the switch S is closed for a long time, it was opened at t=0. Determine the expression for voltage v(t) across the capacitor after the switch is opened. | CO-1 | [8] |



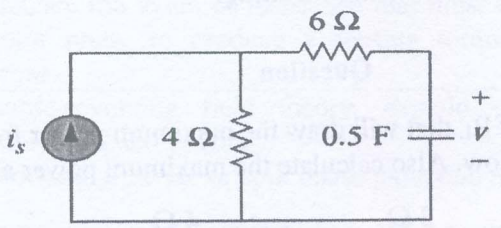

**OR**

| | | | |
|---|---|---|---|
| 1(b') | A pulsed current waveform is applied to the circuit shown below. Determine the expression for the voltage *v(t)* across the capacitor. | CO-1 | [8] |

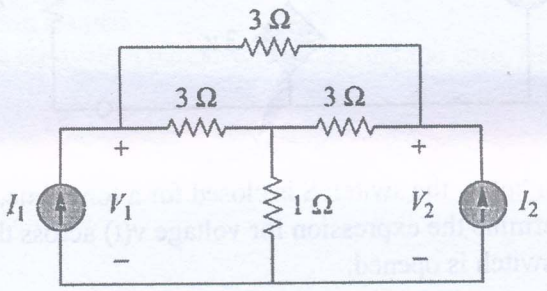
contd.... 2.



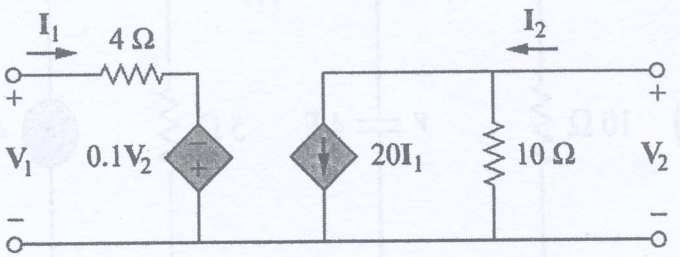

(a)




**2(a)** In the bridge circuit of Fig., $I_1 = 10$ A and $I_2 = -4$ A. CO-2 [7]
(a) Find $V_1$ and $V_2$ using y parameters.
(b) Confirm the results in part (a) by direct circuit analysis



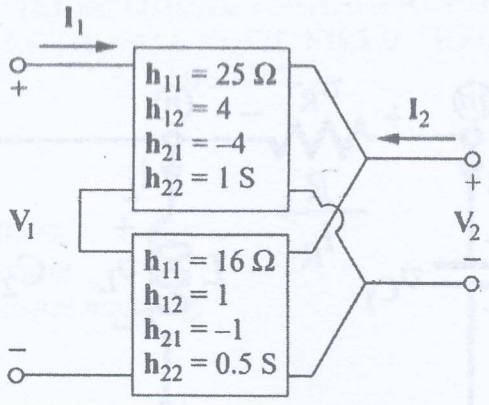

**2(b)** Find the y parameters for the circuit in Fig. below. CO-2 [8]



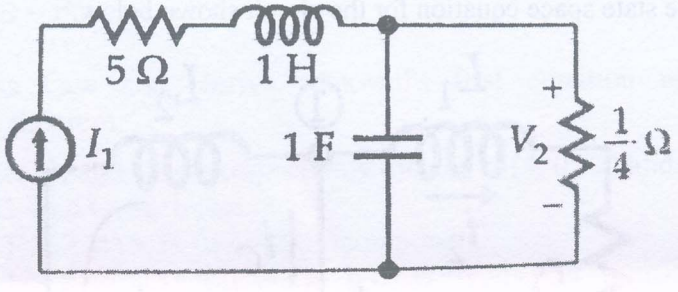

**OR**

**2(b')** A series-parallel connection of two two-ports with h parameters is shown in Fig. Determine the z parameter representation of the network. CO-2 [8]

Contd....3.




**3(a)** Find the pole-zero plots of the driving point and transfer impedances of the network shown below CO-3 [8]

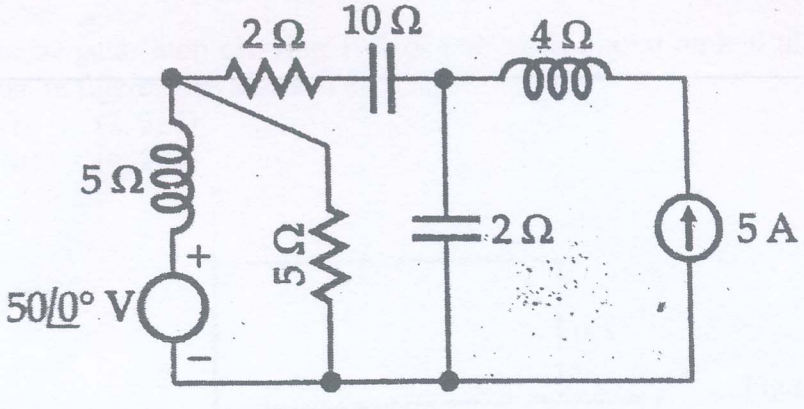



**3(b)** Differentiate between low pass and high pass filters. Design a T and π section constant-Khigh pass filter having cut-off frequency of 12 kHz and nominal impedance $R_0 = 500\Omega$. Also find : CO-3 [7]

(i) Itscharacteristic impedance and phase constant at 24 kHzand

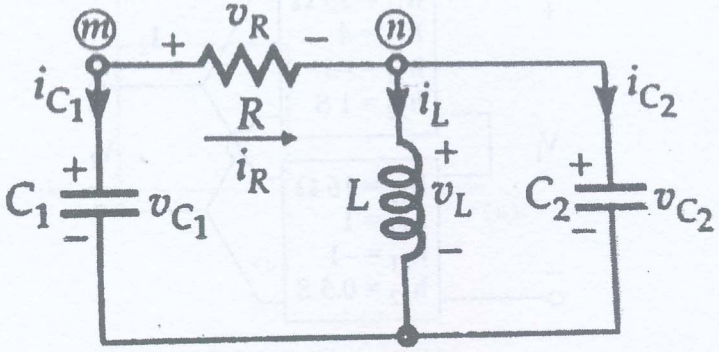
(ii) (ii) Attenuation at 4 kHz.

**4(a)** For the circuit shown below, draw the oriented graph and write the (a) incidence matrix, (b) tie-set matrix, and (c) Q-cutset matrix. CO-4 [7]



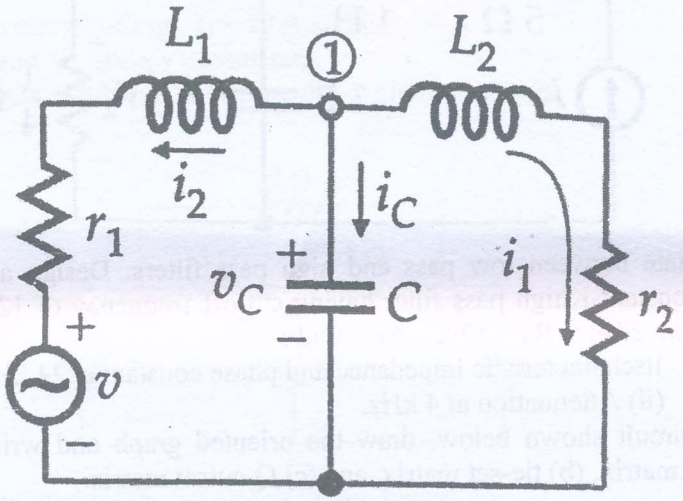

**4(b)** Form the state space matrix for the network shown below. CO-4 [8]

contd....4.




**OR**

**4(b')** Obtain the state space equation for the circuit shown below. CO-4 [8]



Paper Code: 6559

**2023-2024**
**B.Tech. (ODD SEMESTER) EXAMINATION**
**(ELECTRICAL ENGINEERING)**
**ELECTROMAGNETIC FIELD THEORY**
**(EEC2720)**

**Max Marks: 60**
**Duration: 2 Hours**

***Note: Answer all the questions.***
***Assume suitable data if missing.***
***Notations used have their usual meaning.***

| Q.No | Questions | M.M | CO |
|---|---|---|---|
| 1(a) | Express the following vectors in Cartesian coordinates:<br>(i) $A = \rho z \sin \Phi a_\rho + 3 \rho \cos \Phi a_\Phi + \rho \cos \Phi \sin \Phi a_z$<br>(ii) $B = r^2 a_r + \sin \theta a_\Phi$ | 5 | CO1 |
| 1(b) | State Gauss Law and Derive Maxwell's first equation using the Divergence theorem. | 5 | CO1 |
| 1(c) | Point charges $Q_1$ and $Q_2$ are respectively located at (4, 0, -3) and (2, 0, 1). If $Q_2 = 4$ nC, find $Q_1$ such that<br>(i) The E at (5, 0 ,6) has no z component<br>(ii) The force on a test charge at (5, 0, 6) has no x-component. | 5 | CO1 |
| | **OR** | | |
| 1(c') | A conducting sphere of radius 10 cm is centered at the origin and embedded in a dielectric material with $\varepsilon = 2.5\varepsilon_o$. If the sphere carries a charge of 4 nC/m$^2$ . Find E at (-3cm, 4cm, 12 cm). | 5 | CO1 |
| 2 (a) | State Amperes circuital law and determine magnetic field intensity (H) for an infinite line current along z axis using Amperes circuital law. | 5 | CO2 |
| 2 (b) | A rectangular loop carrying 10A of current is placed on z=0 plane as shown in figure 1. Evaluate H at<br>(i) (2, 2, 0)<br>(ii) (4, 2, 0) | 5 | CO2 |

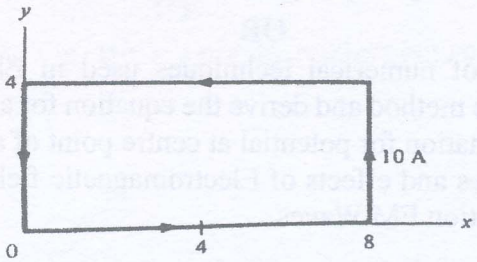



Figure 1

Contd ....2.

| | | | |
|---|---|---|---|
| 2 (c) | A conducting bar can slide freely over the two conducting rails as shown in Figure 2. Calculate the induced voltage in the bar<br>(i) If the bar is stationed at y = 8 cm and B = 4 cos $10^6$t $a_z$ mWb/m$^2$<br>(ii) If the bar slides at a velocity u = 20 ay m/s and B= 4$a_z$ mWb/m$^2$ | 5 | CO2 |

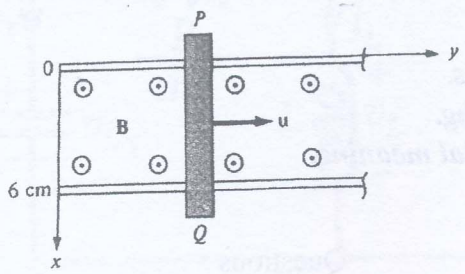



Figure 2

**OR**

| | | | |
|---|---|---|---|
| 2 (c') | For the boundary between two different media. Given that $H_1 = -2a_x + 6a_y + 4\ a_z$ A/m in region $y - x - 2 \leq 0$ where $\mu_1 = 5\ \mu_0$, Calculate<br>(i) Magnetization ($M_1$) and Magnetic flux density ($B_1$)<br>(ii) Magnetic field intensity ($H_2$) and Magnetic flux density ($B_2$) in region $y - x - 2 \geq 0$ where $\mu_2 = 2\ \mu_0$ | 5 | CO2 |
| 3 (a) | The electric field in free space is given by<br>$E = 50\cos(10^8 t + \beta x)\ \hat{a}_y$ V/m<br>(i) Find the direction of wave propagation<br>(ii) Calculate $\beta$ and the time it takes to travel a distance of $\lambda/2$.<br>(iii) Sketch the wave at t = 0, T/4, and T/2. | 6 | CO3 |
| 3(b) | Define skin depth. Calculate skin depth for medium with conductivity 100 mho/m, relative permeability of 2 and relative permittivity of 3 at 50 Hz. | 3 | CO3 |
| 3 (c) | In a lossless medium for which $\eta = 60\pi$, $\mu_r = 1$, and H = -0.1 cos ($\omega$t – z) $a_x$ + 0.5 sin ($\omega$t – z) $a_y$ A/m. Calculate $\varepsilon_r$, $\omega$ and E. | 6 | CO3 |

**OR**

| | | | |
|---|---|---|---|
| 3 (c') | An air line has characteristic impedance of 70 Ω and a phase constant of 3 rad/m at 100 MHz. Calculate the inductance per meter and the capacitance per meter of the line. | 6 | CO3 |
| 4(a) | Explain Electromagnetic interference and compatibility, and Discuss the Grounding and Shielding Techniques to control EMI with examples. | 8 | CO3 |

**OR**

| | | | |
|---|---|---|---|
| 4(a') | Explain the types of numerical techniques used in Electromagnetics. Discuss the iterative method and derive the equation for a five-node finite difference approximation for potential at centre point of a square mesh. | 8 | CO3 |
| 4(b) | What are the sources and effects of Electromagnetic fields. And discuss in detail the application EM Waves. | 7 | CO3 |

**2023-2024**
**B. TECH. (ODD SEMESTER) EXAMINATION**
**(ELECTRICAL ENGINEERING)**
**SIGNALS & SYSTEMS**
**(EEC2730)**

**Maximum Marks: 60** **Credits: 03** **Duration: Two Hours**

***Answer all the questions.***
***Assume suitable data if missing.***
***Notations and symbols used have their usual meaning.***

| Q.No. | Question | COs | M.M. |
|---|---|---|---|
| 1(a) | Find the even and odd components of the following signals:<br>(i) $x(t) = (te^{-2t} + 1)u(t)$<br>(ii) $x(n) = u[n] + (n-2)u[n-2] + 2(n+3)\,u[n+3]$<br>Also, sketch $x(t)$ and $x[n]$. | (CO1) | [09] |
| 1(b) | The trapezoidal pulse $x(t)$, shown in Fig. 1(b), is applied to a differentiator, defined by $$y(t) = \frac{d}{dt}x(t)$$ and maximum value of $x(t)$ is 1. | (CO1) | [06] |

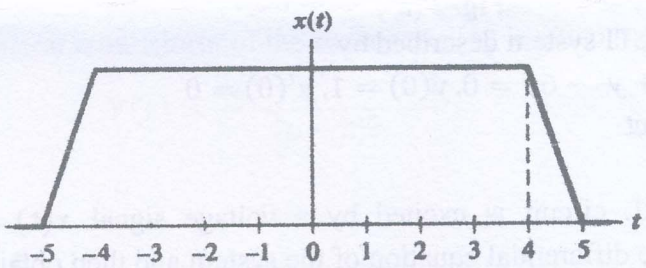



Fig. 1(b)

(i) Determine the resulting output $y(t)$ of the differentiator.
(ii) Determine the total energy of $y(t)$

**OR**

| | | | |
|---|---|---|---|
| 1(b') | For the system shown in Fig. 1(b'), write the relation between $h_1(t)$ and $q_0(t)$ | (CO1) | [06] |

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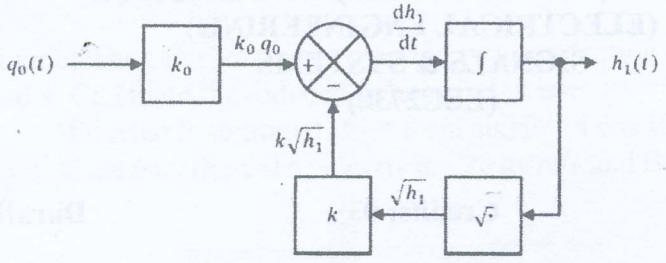



Fig. 1(b')

Also, comment on the memory of the system.

**2(a)** Find $y[n] = x[n] * h[n]$ for all integer values of $n$, if (CO2) **[08]**

$$x[n] = 2\delta[n+1] + \delta[n-1] + 3\delta[n-2]$$

$$h[n] = \frac{1}{2}(\delta[n] + \delta[n-1])$$

**OR**

**2(a')** For the signals given in Fig. 2(a'), find $f_1(t) * f_2(t)$. (CO2) **[08]**

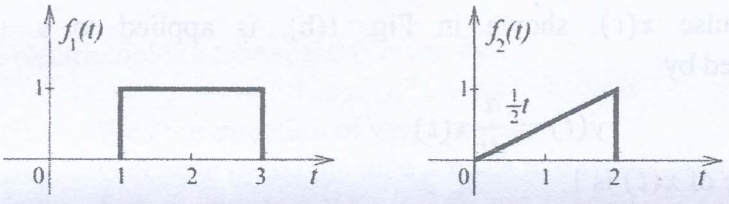



Fig. 2 (a')

**2(b)** Find solution of an LTI system described by: (CO2) **[07]**

$$y'' + y' - 6y = 0, y(0) = 1, y'(0) = 0$$

where $y$ is the output.

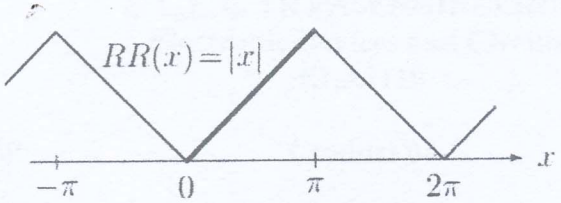
**3(a)** A simple series RL circuit is excited by a voltage signal $x(t) = \cos(\omega_0 t)$. Write the differential equation of the system and then obtain the output response $i(t)$ of the system by taking the FT on both sides of the equation. Assume the parameters are $R = 1\Omega, L = 1mH$. (CO3) **[07]**

**OR**

**3(a')** Determine the DTFS coefficients of the signal $x[n] = \cos\left(\frac{\pi}{10}n\right) + \sin\left(\frac{7\pi}{10}n\right) + 1$. Plot the magnitude and phase angle of DTFS coefficients. (CO3) **[07]**

**3(b)** Find the trigonometric Fourier Series coefficients of the repeating ramp $RR(x)$ shown in Fig. 3(b). (CO3) **[08]**

contd....3.




**Repeating Ramp** $RR(x)$

Fig. 3(b)

**4(a)** Determine the response $y(t)$ of the system given in Fig. 4 (a) using Laplace Transform when the input is $u(t)$. (CO4) **[07]**

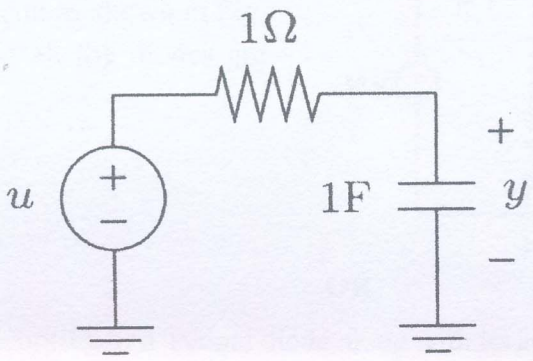



Fig. 4 (a)

**4(b)** Given the unilateral z-transform of the sequence $y[n]$ is given by (CO4) **[08]**

$$Y(z) = \frac{2z^3 + z^2 - z + 4}{(z-2)^3}$$

find $y[n]$.

**OR**

**4(b')** Consider the following linear constant coefficient difference equation. (CO4) **[08]**

$$y[n+2] - \frac{3}{2}y[n+1] + \frac{1}{2}y[n] = \left(\frac{1}{3}\right)^n u[n],$$

$$y[0] = 4, \qquad y[1] = 0$$

Find $Y(z)$.

2023-24

B. TECH. (ODD SEMESTER) EXAMINATION

ELECTRICAL ENGINEERING

Electronic Devices and Circuits

ELA2110

**Maximum Marks: 60** **Credits: 04** **Duration: Two Hours**

***Answer all questions.***
***Assume suitable data if missing.***
***Notations and symbols used have their usual meaning.***

| Q.No. | Question | CO | M.M. |
|---|---|---|---|
| 1(a) | Find the output voltage ($V_o$) for the given circuit as shown in Fig. 1(a). Assume all the diodes are ideal. | (CO1) | [6] |

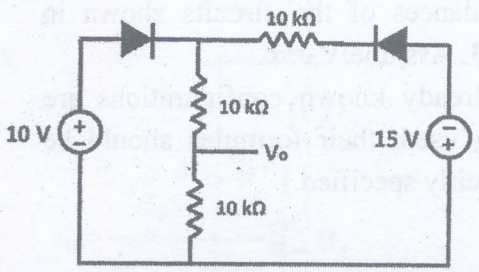



Fig 1(a)

**OR**

| | | | |
|---|---|---|---|
| 1(a') | Explain the working of a Tunnel diode along with its applications. Also draw its V/I characteristics with suitable circuit diagram. | (CO1) | [6] |
| 1(b) | Explain in detail, with suitable circuit diagram, the input and output characteristics of Common Emitter (CE) configuration. | (CO1) | [6] |

**OR**

| | | | |
|---|---|---|---|
| 1(b') | What do you understand by Early effect. Explain with the help of appropriate diagram and its effect on the output characteristic of CE configuration | (CO1) | [6] |
| 2(a) | Determine all the node voltages and currents of the network shown in Fig. 2(a). Where $R_1$=100KΩ, $R_2$=50K, $R_C$=5K and $R_E$=3K, $V_{CC}$=15V, $V_{BE}$=700mV and β=100. | (CO2) | [6] |

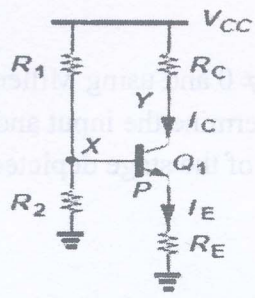



Fig. 2(a)

contd....2.

**2(b)** For the MOS transistors, as shown in Fig. (2b), $\mu_n C_{ox} = 100\mu A/V^2$ and $V_{th}$=1V. Find out the voltage (Vx) at the source of the upper MOS transistor. (CO2) [6]

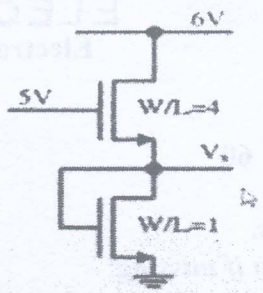



**Fig. 2(b)**

**3** Compute the voltage gain and I/O impedances of the circuits shown in Fig. 3. Assume $V_A$=∞.
(If already known configurations are being used, their formulas should be explicitly specified.). (CO3) [4+4+4]

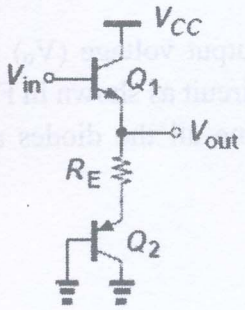



**Fig. 3**

**OR**

**3'** Assuming the MOSFET is in saturation, calculate the small-signal voltage gain and input impedance of the circuit in Fig. 3' ($\lambda \neq 0$).
(If already known configurations are being used, their formulas should be explicitly specified.). (CO3) [10+2]

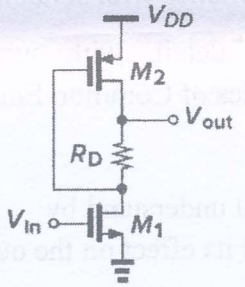



**Fig. 3'**

**4(a)** Assuming $\lambda \neq 0$ and using Miller's theorem, determine the input and output poles of the stage depicted in Fig. 4a. (CO3) [06]

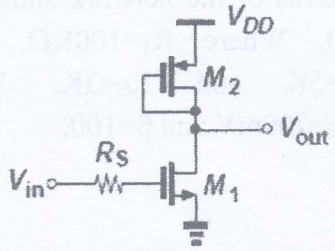



**Fig. 4 (a)**

Contd ....3.

**4(b)** Use Miller's theorem to estimate the input and output poles of the circuit. (Assume $V_A=\infty$ and neglect all other capacitances) (CO3) [06]

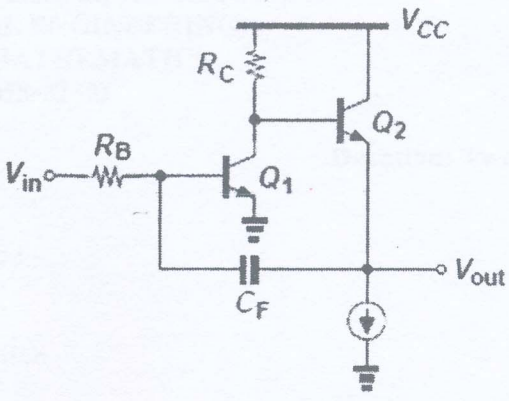



**Fig. 4(b)**

**5 (a)** Determine the polarity of the feedback in the given stage as illustrated in Fig. 5(a). (CO2) [6]

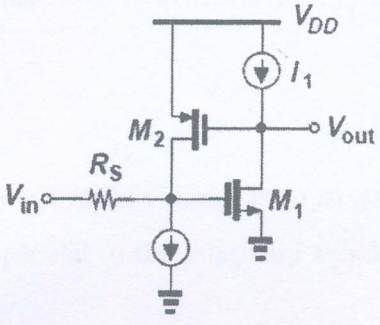



**Fig. 5(a)**

**5(b)** What do you understand by the feedback in amplifiers. Explain in detail the advantages of negative feedback in circuits. (CO2) [6]