VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY

TECHNICAL CAMPUS, KILIMANOOR

A Unit of Vidya International Charitable Trust

(Accredited by NAAC with "B++" Grade)

QUESTION BANK

S2 ELECTRONICS AND COMMUNICATION ENGINEERING

2019 SCHEME

Academic Year : 2023-27 (EVEN)

INDEX

Question Bank

Subject: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Module 1			
Sl. No	**Questions**	**Marks**	**KU/KTU**
1	(a) Find the parametric equation of the tangent vector of the curve $r(t) = t^2\,\hat{i} + 2t^3\,\hat{j} + 3t\hat{k}$ at $t = 1$. (b) Find the parametric equation of the tangent to the curve $\vec{r}(t) = 2cos\pi t\vec{i} + 2sin\pi t\vec{j} + 6t\vec{k}$ at $t = \frac{1}{3}$	3+7	KTU Jun 2022 JUNE 2023
2	Find the directional derivative of $f(x, y) = xe^y$ at (1,1) in the direction of the vector $\hat{i} - \hat{j}$	3	KTU JUNE 2023
3	Show that $F = (cosy + ycosx)\hat{i} + (sinx - xsiny)\hat{j}$ is a conservative vector field. Hence find a potential function for It?	7	KTU Apr-2018 Dec-2017, June 2023
4	Find the divergence and curl of the vector field $f(x,y,z) = yz\vec{i} + xy^2\vec{j} + yz^2\vec{k}$	7	KTU JUN 2023 ,KTU Dec-2017
5	(1) Show that $\int (3x^2e^y dx + x^3e^y\, dy)\, c$ is independent of the path and hence evaluate the integral from (0, 0) to (3, 2). (2) Evaluate $\int 3xy\, dy$ over the line segment C joining (0,0) and (1,2)	3+3	KTU Jun 2022 Jun 2023
6	(a) Show that the integral $\int_{(1,1)}^{(3,3)} (e^x logy - \frac{e^y}{x})dx + \left(\frac{e^x}{y} - e^y logx\right) dy$ where x and y are positive, is independent of path and find its value. (b) Show that the vector field $\vec{f}(x,y) = 2xy^3\vec{i} + 3y^2x^2\vec{j}$ is conservative and find ϕ such that $\vec{f} = \nabla\phi$. Hence evaluate $\int_{(2,-2)}^{(-2,0)} 2xy^3dx + 3y^2x^2dy$	7+7	KTU Dec-2017 June 2022
7	If $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = \lvert\vec{r}\rvert$, then show that $\nabla f(r) = \frac{f'(r)}{r}\vec{r}$.	5	KTU Dec-2017
8	Prove that the force field F = e^yi + x $e^y j$ is conservative in the entire xy- plane	7	KTU Dec-2017 June 2022
9	Find the work done by the Force field $F(x,y,z) = xy\vec{i} + yz\,\vec{j} + xz\,\vec{k}$ along C where C is the curve $r(t) = t\vec{i} + t^2\vec{j} + t^3\vec{k}$	7	KTU Dec-2017
10	Show that $f(x,y) = (cosy + ycosx)\vec{i} + (sinx - xsiny)\vec{j}$ is a	5	KTU Dec-2017

	conservative vector field. Hence find the scalar potential for it.		
11	Find the directional derivative of $f(x,y) = x^2 = 3xy + y^2$ at the point $P(2,1)$in the direction of $\vec{a} = \frac{1}{3}\vec{\imath} + \frac{2}{3}\vec{j}$	3	KTU-June 2022
12	a. Find the position and velocity vectors of the particle, given $\vec{a}(t) = (t+1)^{-2}\vec{j} + e^{-2t}\vec{k}$, $\vec{v}(0) = 3\vec{\imath} - \vec{j}, \vec{r}(0) = \vec{k}$ b. If $\vec{r} = x\vec{\imath} + y\vec{j} + z\vec{k}$, and let $\vec{F}(r) = f(r)\vec{r}$, then prove that $div\vec{F} = 3f(r) + \vec{r}f'(\vec{r})$	7+7	KTU-June 2022
	Module 2		
1	(a) Using Greens theorem evaluate $\int_C (xy + y^2)dx + x^2dy$, where C is the boundary of the common to the curve $y = x^2$ and $y = x$ and positively oriented. (b) Use Green's theorem to find the work done by the force field $\vec{f}(x,y) = xy\vec{\imath} + \left(\frac{x^2}{2} + xy\right)\vec{j}$ on a particle that starts at $(4,0)$ transverse the upper semicircle $x^2 + y^2 = 16$ and returns to the starting point along x-axis.	7+7	KTU June 2023, Apr-2018 June 2022
2	If σ is any closed surface enclosing a volume V and $F = x\vec{\imath} + 2y\vec{j} + 3z\vec{k}$, using divergence theorem show that $\iint_\sigma F.nds = 6\,V$.	3	KTU Apr-2018
3	Evaluate $\int_c (x^2 - 3y)dx + 3xdy$, where C is the circle $x^2 + y^2 = 4$	3	KTU Dec-2017
4	Evaluate the surface integral $\iint_\sigma\ z^2\,ds$, where σ is the portion of the cone $z = \sqrt{x^2 + y^2}$ between the planes $z = 1$ and $z = 3$.	7	KTU JUNE 2023
5	(a) Using stokes theorem evaluate $\int_c f.dr$ where $F = xz\,i + 4x^2y^2j + xy\,k$, C is the rectangle $0 \le x \le 1, 0 \le y \le 3$ in the plane $z = y$. (b) Use Stoke' s theorem to evaluate $\oint \vec{F}.d\vec{r}$over the circle $C: x^2 + y^2 = 1$ where $\vec{F}(x,y,z) = z^2\vec{\imath} + 3x\vec{j} - y^3\vec{k}$ and C is the circle in XY plane with counter clockwise orientation looking down the	7+7	KTU JUNE 2023 DEC-2017 June 2022

	positive Z axis		
6	(a) Determine whether the vector fields are free of sources and sinks, if it is not locate them. (i)$(y+z)i - xz^3j + x^2siny\ k$ (ii)$xy\ i - 2xyj + y^2\ k$ (b) Determine the sources and sinks of the vector field $\vec{f}(x,y) = x^2\vec{i} + y^2\vec{j} + z^2\vec{k}$	3+3	KTU Dec-2017 June 2022 June 2023
7	Evaluate the surface integral $\iint_\sigma xzds$, where σ is the part of the plane $x+y+z=1$ that lies in the first octant.	5	KTU Dec-2017
8	Using divergence theorem evaluate $\iint_S F.nds$ where $F = (x^2+y)i + z^2j + (e^y - z)k$ and S is the surface of the rectangular solid bounded by the co-ordinate planes $x=3,\ y=1,\ z=3$	5	KTU Apr-2018
9	(a) Use divergence theorem to find the out ward flux of the vector field $F = 2xi + 3yj + z^3$k across the unit cube bounded by $x=0, y=0, z=0, x=1, y=1, z=1$ (b) Use divergence theorem to evaluate $\iint \vec{f}.\vec{n}\,dS$ where $\vec{f} = 2x\vec{i} + 4y\vec{j} - 3z\vec{k}$ and S is the surface of the sphere $x^2+y^2+z^2=1$	7+7	KTU June 2022 June 2023
10	Find the mass of the lamina that is the portion of the cone $z = \sqrt{x^2+y^2}$ that lies between the planes $z=1\ and\ z=3$, if the density is $\phi(x,y,z) = x^2z$.	7	KTU-June 2022
11	a) Let σ be the portion of the surface $z = 1 - x^2 - y^2$ that lies above the XY plane and σ is oriented upwards. Find the flex of the vector field $\vec{F}(x,y,z) = x\vec{i} + y\vec{j} + z\vec{k}$ across σ.	7	KTU-June 2022
Module 3			
1	Show that the functions $x, xlnx$ are linearly independent.	3	KTU june 2023
2	Discuss the existence and uniqueness of solution of initial value problem $\frac{dy}{dx} = \frac{y}{\sqrt{x}}$, $y(1)=3$	3	KTU JUNE 2023
3	If $y_1(x) = x$ is a solution of $x^2y'' + 2xy' - 2y = 0$, find the general solution.	5	KTU JULY-2018

4	Examine whether e^{2x}, e^{3x} are linearly independent solutions of the differential equation $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$ in -$\infty < x < \infty$, What is its general solution?	3	KTU MAY-2017
5	Solve the Cauchy -Euler differential equation $(x^2D^2 - 3xD + 10)y = 0$	3	KTU MAY-2017
6	Solve $(D^3 + 8)y = \sin x \cos x + e^{-2x}$	6	KTU MAY-2017
7	Solve $y'' + y = \sec x$ by the method of variation of parameters	7	KTU JUNE 2023, June 2023
8	Solve $y''+4y'+4y= x^2 + e^{-x}\cos x$	7	KTU June 2023
9	Solve the initial value problem $y'' + 5y' + 6y = 0, y(0) = 1, y'(0) = 2$	3	KTU-June 2022
10	Solve $y''' - y' = 0$	3	KTU-June 2022
11	a)Using the method of undetermined coefficients solve, $y'' - 4y = xe^x$ b) Using the Method of variation of parameters solve, $y'' - 4y' + 5y = \frac{e^{2x}}{sinx}$	7+7	KTU-June 2022
12	a)Solve the initial value problem, by method of undetermined coefficients$y'' + 4y = 8x^2, y(0) = -3, y'(0) = 0$ b) Solve the initial value problem$x^2y'' + 3xy' + y = 0, y(1) = -3, y'(1) = 1$	7+7	KTU-June 2022
Module 4			
1	Find the inverse Laplace transform of $\frac{5}{(s^2+1)(s^2+25)}$, using convolution theorem.	7	KTU JUNE 2023,KTU-Dec 2018
2	Find the Laplace transform of i) sin^2t ii) $\cos(\omega t + \theta)$ iii) $\sin 3t \cos 2t$ iv) $e^{-2t}cos^2t$ v) $(t-1)^3$	3+3+3 +3	KTU June 2023, Dec 2018 July 2017
3	Solve the initial value problem $y'' - y' - 6y = 0, y(0) = 6,\ y'(0) = 13$ using Laplace transforms.	7	KTU-March 2017
4	Using Laplace transform solve $y'' + 5y' + 6y = e^{-2t}$ given that $y(0) = y'(0) = 1$	7	KTU JUNE 2023

5	Find the Inverse Laplace Transform of: $(i)\ \frac{s-4}{s^2-4}$ $(ii)\ \frac{4}{s^2-2s-3}$	7	KTU JUNE 2023,KTU- April 2018
6	Find the inverse Laplace transform of $\frac{1}{(s+\sqrt{2})(s-\sqrt{3})}$	7	KTU- July 2017
7	Solve the initial value problem, using Laplace transforms. $y'' + y' + 9y = 0, y(0) = 0.16,\ y'(0) = 0$	8	KTU-July 2017
8.	Find the inverse Laplace transform of $F(s) = \frac{2(e^{-s}-e^{-3s})}{s^2-4}$	7	Model Question KTU
9	Find the Laplace Transform of $(sint + cost)^2$	3	KTU-June 2022
10	Find the inverse Laplace Transform of $\frac{e^{-3s}}{(s+2)^2}$	3	KTU-June 2022
11	a)Using Laplace Transform solve $y'' + 5y' + 6y = e^{-t}0,\ y(0) = 0, y'(0) = 1$ b) Using convolution theorem, find the Inverse Laplace Transform of $\frac{s^2}{(s^2+a^2)(s^2+a^2)}$	7+7	KTU-June 2022
12	a)Find the inverse Laplace Transform of $\frac{s+8}{(s^2+4s+5)}$ b) Using Laplace Transform solve $y'' + 16y = 4\delta(t-3\pi)\ , y(0) = 2,\ y'(0) = 0.$	7+7	KTU-June 2022
Module 5			
1	Determine the Fourier sine Transform of $f(x) = 3x, 0 < x < 6.$	3	KTU JUNE 2023
2	Find the complex Fourier sine transform of $f(x) = \begin{cases} sinx, 0 < x < \pi \\ 0, \quad x > \pi \end{cases}$	7	KTU JUNE 2023
3	Find the Fourier transform and integral representation of f(x) = $\begin{cases} 1, \text{ if } \lvert x\rvert < 1 \\ 0, \text{ otherwise} \end{cases}$. Hence show that $\int_0^\infty \frac{\sin w}{w} = \pi/2$	7	KTU June 2023
4	Use Fourier integral to show that $\int_0^\infty \frac{cosx\omega+\omega sinx\omega}{1+\omega^2}\ d\omega =$ $\begin{cases} 0, \ if\ x < 0 \\ \frac{\pi}{2}, \ if\ x = 0 \\ \pi e^{-x}, \ ifx > 0 \end{cases}$	7	KTU-May 2017
5	Represent $f(x) = \begin{cases} x^2, & 0 < x < 1 \\ 0, & x > 1 \end{cases}$ as a Fourier cosine integral	7	KTU-May 2017
6	(a) Find the Fourier sine integral of $f(x) = \sin x$ if $0 < x < \pi$. (b) Find the Fourier Cosine Transforms of $f(x) = \sin x$ if $0 < x < \pi$.	3	KTU JUNE 2023 June 2022
7	Find the Fourier Sine Transform of $f(x) = e^{-\lvert x\rvert}$. Hence evaluate	7	KTU-April 2018 June 2022

	$\int_0^\infty \frac{\omega sin\omega x}{1+w^2}\, d\omega$.		
8	Using Fourier integral representation show that $\int_0^\infty \frac{sin\omega - \omega cos\omega}{\omega^2} = \begin{cases} \frac{\pi x}{2}, & if\ 0 < x < 1 \\ \frac{\pi}{4}, & if\ x = 1 \\ 0, & if\ x > 1 \end{cases}$	7	KTU-July 2017 June 2022
9	Find the Fourier sine transform of e^{-x} (x > 0)	3	KTU-June 2022
10	a) Find the Fourier transformation of f(x) $= \begin{cases} e^x, & if\ -a < x < a \\ 0, & otherwise \end{cases}$ b) Find the Fourier cosine Integral of f(x) $= \begin{cases} cosx, & if 0 < x < \frac{\pi}{2} \\ 0, & otherwise \end{cases}$	7+7	KTU-June 2022
11	a) Find the Fourier cosine transformation of f(x) $= \begin{cases} x^2, & if\ 0 < x < 1 \\ 0, & x > 1 \end{cases}$ b) Find the Fourier transform of f(x) $= \begin{cases} a - \lvert x \rvert, & if\ \lvert x \rvert < a \\ 0, & otherwise \end{cases}$	7+7	KTU JUNE 2023,KTU-June 2022

PHT 100- ENGINEERING PHYSICS A

MODULE 1

Sl. No	Questions	Marks	KTU, Year
1	Frame and solve the differential equation of a damped harmonic oscillator. Derive the expression of displacement for underdamped, critically damped and over damped conditions and plot the results in a time - displacement graph.	10	KTU AUG 2023 KTU AUG 2022
2	Derive an expression for the fundamental frequency of transverse vibrations of a stretched string.	10	KTU JUNE 2023 KTU AUG 22 KTU AUG 21
3	Write down the differential equation of a forced harmonic oscillator and obtain its solution.	10	KTU DEC 2023 KTU DEC 22
4	The amplitude of an underdamped harmonic oscillator reduces to 1/10th of its initial value after 100 oscillations. Its time period is 1.15s. Calculate the damping constant and relaxation time.	4	KTU DEC 2023 KTU AUG 23
5	The amplitude of an underdamped harmonic oscillator reduces to 1/10th of its initial value after 100 oscillations. Its time period is 1.15s. Calculate the damping constant and relaxation time.	4	KTU JUNE 2022 KTU DEC 23
6	The equation of a wave travelling in a string is given by $y = 3.5x10\text{-}3 \sin 2\pi(0.2x - 50t)$ where x is measured in meters and t in seconds. Evaluate the amplitude, wavelength, frequency and velocity of propagation	4	KTU AUG 2023 KTU DEC 2023
7	State the laws of transverse vibration of a stretched string.	8	KTU DEC 2023
8	What do you meant by resonance in forced oscillations? Give one example.	3	KTU AUG 2023
9	List any six points to compare electrical oscillator with a mechanical oscillator.	3	KTU AUG 2021
10	Write down the one dimensional wave equation and its solution	3	KTU AUG 2021

MODULE-2

1	Explain the formation of Newton's rings and show that the radius of dark ring is proportional to the square root of natural numbers. How can we use Newton's rings experiment to determine the refractive index of a liquid.	3	KTU AUG 2023
2	(a) Derive grating equation with proper diagram. What is the effect of increasing the number of lines on the dispersive power of grating?	10	KTU AUG 2023 KTU AUG 2022 KTU DEC 2022

	(b) At what angle will 650nm light produce a second order maximum when falling on a grating whose grating element is 1.2 x10-3 cm.	4	
3	Describe the experiment to find the refractive index of a liquid using Newtons rings arrangement	8	KTU DEC 2023
4	a) Give the theory of plane transmission grating and explain intensity distribution. b) Explain with neat diagram Rayleigh criterion of resolution.	10 4	KTU AUG 2023
5	With necessary diagram, write the formation of interference pattern in an air wedge and derive an expression for the diameter of a thin wire.	10	KTU AUG 2021
6	A wedge air film is enclosed between glass plate separated at one edge by a wire of 0.06x10-3m diameter at a distance of 0.15m from the edge. Calculate the fringe width. The wavelength of light used is 6x10-7m.	4	KTU AUG 2022
7	In Newton's ring experiment the radius of the 10th dark ring is 0.75cm. When the air film is replaced by a drop of liquid, the radius reduces to 0.65cm. Find the refractive index of the liquid.	4	KTU JULY 202
8	Why interference fringes of newton's rings arrangement are circular in shape?	3	KTU DEC 2023
9	How can you test the optical planeness of a glass plate by air wedge method?	3	KTU AUG 2023
10	Distinguish between Fresnel and Fraunhoffer classes of diffraction	3	KTU AUG 2023 KTU DEC 22
	MODULE -3		
1	a) What are matter waves? Obtain an expression for de Broglie wavelength. Derive expressions for the de Broglie wavelength of an electron (i) accelerated from rest through a potential of V volts (ii) having kinetic energy T. b) An electron is confined to one dimensional potential box of width 25Å. Calculate the energies corresponding to the first and second quantum states in eV.	10 4	KTU AUG 2023
2	Explain optical, electrical and mechanical properties of nanomaterials. Write any four applications of nanomaterials in the medical field.	3	KTU DEC 2023 KTU DEC 22
3	a) Write down Schrodinger's time dependent equation and hence derive Schrodinger's time independent equation. b) An electron is moving in a one dimensional box of infinite height and width $10A^0$. Calculate the first three permitted energy levels.	10 4	KTU DEC 2023 KTU DEC 22

4	a) Mention any eight applications of nano materials. b) What are zero dimensional, one dimensional and two dimensional nano structures?	5 9	KTU AUG 2023 KTU DEC 22
5	Write a note on quantum confinement and based on this explain Nano sheets, Nano wire and quantum dots.	10	KTU AUG 2023
6	State Heisenberg's uncertainty principle. Write its mathematical form with different pairs of variables. With the help of it, explain the absence of electrons inside the nucleus of an atom.	10	KTU AUG 2022
7	Calculate the voltage that must be supplied to an electron microscope to produce an electron of wavelength 3 Å.	4	KTU DEC 2023
8	Why do nanomaterials exhibit properties different from those of their classical counter parts?	5	KTU DEC 2023
9	What is meant by quantum mechanical tunneling? Name two electronicdevices based on this phenomenon	3	KTU AUG 2023
10	An electron and a Proton are moving with same kinetic energy. Which one has shorter wavelength? Why ?	4	KTU DEC 2021
	MODULE -4		
1	Compare the properties of dia, para, and ferro magnetic materials.	3	KTU AUG 2023 KTU AUG 22
2	Derive Maxwell's equations in differential form starting from the fundamental laws in electricity and magnetism. Derive equation of continuity.	3	KTU AUG 2023 KTU AUG 22
3	Differentiate between Magnetic susceptibility and Magnetic permeability. Write the relation between them?	3	KTU AUG 2023
4	Explain the terms (i)Magnetization (ii)Magnetic permeability (iii)Relative permeability and (iv) Susceptibility. Derive the relation between magnetic susceptibility and relative permeability.	10	KTU AUG 2023
5	The magnetic flux through a closed circuit with resistance 2.5Ω varies with time obeying the equation $\phi = 5t2 + 2t + 6$. What will be the induced emf and current in it at time = 5 seconds.	4	KTU AUG 2022
6	Define Divergence of a vector function. Give its physical significance	3	KTU AUG 2022
7	The maximum value of the permeability of the material is 0.126 N/A^2 . What is the relative permeability and magnetic susceptibility?	4	KTU AUG 2023

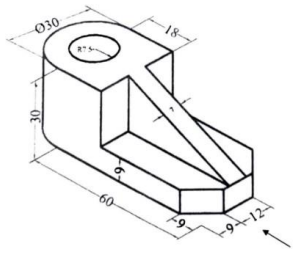
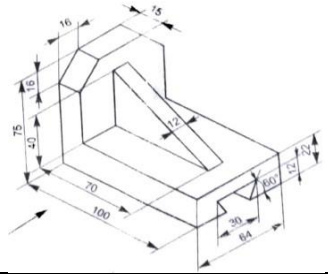
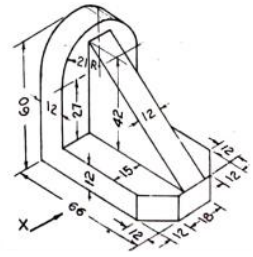
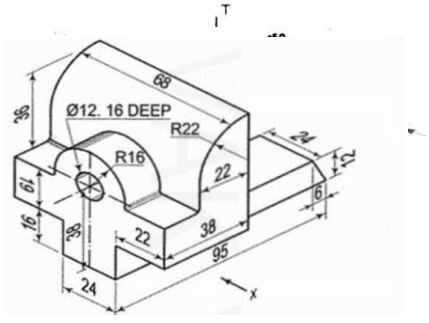
8	State Faraday's laws of Electromagnetic induction. What is Lenz's law?	4	KTU AUG 2023
9	Differentiate between Magnetic susceptibility and Magnetic permeability. Write the relation between them.	3	KTU AUG 2023
10	The magnetic flux through a closed circuit with resistance 2.5Ω varies with time obeying the equation $\phi = 5t2 + 2t + 6$. What will be the induced emf and current in it at time = 5 seconds.	4	KTU AUG 2021
	MODULE -5		
1	Explain BCS theory of superconductivity. Describe high temperature superconductors. Write three applications of superconductors.	10	KTU AUG 2023 KTU AUG 2022 KTU AUG 2019
2	a)Explain how light is propagated through an optical fibre. Define numerical aperture of an optical fibre and derive the expression for numerical aperture of a step index fibre. b) In an optical fibre, the core material has refractive index 1.43 and refractive index of the cladding material is 1.4. Find numerical aperture and acceptance angle.	10 4	KTU AUG 2023 KTU DEC 2022
3	Explain Meissner effect and show that superconductors are perfect diamagnets. Discuss BCS theory of superconductivity.	10	KTU AUG 2022
4	a)Explain construction and working of a solar cell and draw its I-V characteristics. Mention any two applications of solar cells. b)Explain the working of intensity modulated fibre optic sensor	10 4	KTU AUG 2022
5	Describe fibre optic communication system with a block diagram. List four advantages of fibre optic communication.	10	KTU AUG 2022
6	Mention three advantages of fibre optic communication system.	3	KTU AUG 2023 KTU DEC 2022
7	A light emitting diode is made of GaAsP having a band gap of 1.9eV. Determine the wavelength of the radiation emitted.	4	KTU AUG 2023
8	The numerical aperture of an optic fibre is 0.38. If the difference in the refractive indices of the material of its core and the cladding is 0.05, calculate the refractive index of material of the core.	4	KTU AUG 2022
9	Distinguish between Type I and Type II superconductors with appropriate graphs.	8	KTU AUG 2022
10	The numerical aperture of an optic fibre is 0.38. If the difference in the refractive indices of the material of its core and the cladding is 0.05, calculate the refractive index of material of the core.	4	KTU AUG 2022

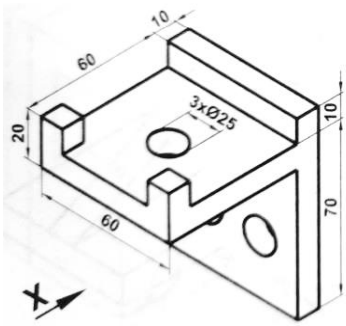
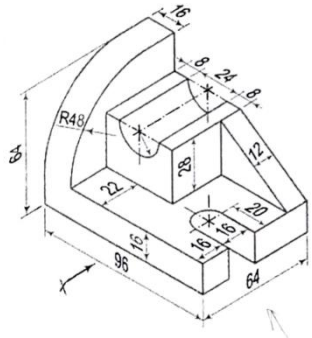
CODE: EST 110	COURSE NAME: ENGINEERING GRAPHICS	Credit: 3	
Qn. No.	**Module-1**	**Marks**	**Year**
1	The front view of line AB is 50° inclined to XY line and is 55 mm long while its top view is 60º inclined to XY line. If end A is 10 mm above HP and 20 mm in front of VP, draw its projections. Find the true length and inclinations of line with HP and VP.	20	KTU-July 2021
2	The end point A of a line is 20 mm above HP and 10mm in front of VP. The other end of the line is 50 mm above HP and 15 mm behind VP. The distance between the end projectors is 70 mm. Draw the projections of the line. Find the true length and true inclinations of the line with the principal planes. Also locate the traces of the line.	20	KTU-July 2021
3	The front view of the line MN is 55 mm long. The point M is 15 mm above HP and 20 mm in front of VP. The point N is 35 mm above HP. Draw the projections of the line if its true length is 70 mm. Measure the true inclinations of the line with respect to the reference planes.	20	KTU-Dec 2020
4	A line AB is in the first quadrant. Its ends A and B are 20 mm and 60 mm in front of to VP respectively. The distance between the end projectors is 75 mm. The line is inclined at 30° to the HP and its HT is 10 mm above XY line. Draw the projections of AB and determine its true length and mark VT.	20	KTU-Dec 2020
5	One end point of a line AB is 12 mm above HP and is 15 mm in-front of VP. Other end point is 50 mm above HP and is 42 mm in front of VP. Draw the projections of the line AB if its elevation measures 70 mm. Find out its true length and the true inclinations with respect to the reference planes.	20	KTU-June 2022
6	One end point P of a line PQ, 75 mm long, is 10 mm above HP and 20 mm in front of VP. The line is inclined 45° to HP and its plan is inclined 35° to x-y line. Draw the projections of the line PQ and find out true inclination of the line with respect to VP.	20	KTU-June 2022
7	The distance between the end projectors through the end points of line AB is 60 mm. The end A is 20 mm above HP and 15 mm in front of VP. The end B is 45 mm in front of VP and above HP. Front view of the line measures 75 mm. Draw the projections of line AB and find its true length and true inclinations with HP and VP.	20	KTU-Dec 2021
8	The top view of a line PQ is 70 mm long and makes an angle of 45 with XY. The end P is in VP and 15 mm above HP. The end Q is 30 mm above HP and the whole line is located in first quadrant. Draw its projections and find its true length, length of its elevation, inclinations with reference planes and also locate its traces.	20	KTU-Dec 2021
9	A line PQ is 60 mm long has one of its ends on HP and 30 mm in front of VP. Draw the projections of the line if it is inclined at 30 degrees to HP and 45 degrees to VP. Locate the traces of the line and determine its apparent lengths and apparent inclinations.	20	KTU-Dec 2022
10	The point M of a line MN is 15 mm above HP and 10 mm in front of VP and the other end N is 50 mm in front of the VP. The front view of the line has a length of 70 mm. The distance between the end projectors is 60 mm. Find the true length, plan length, true inclinations, and apparent inclinations of the line by drawing its projections. Also locate its traces.	20	KTU-Dec 2022
11	The elevation of a straight line CD is 65 mm long. C is 15 mm below HP and is 30 mm in front of VP. D is 55mm below HP and' is in third quadrant. Draw the projections of line CD if the line is inclined 30° to HP. Find out its true length and true inclination with respect to VP.	20	KTU – Dec 2023
12	The front view of a straight line MN which is 75 mm long is 70 mm and is inclined 40" to x-y line. The end point M is 20 mm above HP and is 35 mm behind VP. The other end N is 25 mm below HP and is in the third quadrant. Find out the true length and true inclinations of the line with HP and VP.	20	KTU – Dec 2023
Qn. No.	**Module- 2**	**Marks**	**Year**

1	A square pyramid of base 25 mm side and axis 60 mm long, has a corner of the base on the ground such that the square base is inclined at 30° to the ground and the two base edges containing that corner are equally inclined to HP. Draw the projections of the pyramid if its axis is inclined at 60° to the VP.	20	KTU-July 2021
2	A cylinder 40 mm diameter and 50 mm axis is resting on a point of its base circle on VP while its axis makes 45° with VP and front view of the axis makes 35° with XY line. Draw its projection.	20	KTU-July 2021
3	A pentagonal prism 30 mm base edge and 60 mm height is on HP on one of its base edges so that the axis is inclined at 45° with HP and the base edge on which it rests is inclined at 30° with VP. Draw the projections of the solid.	20	KTU-Dec 2020
4	A square pyramid base 40 mm side and axis 60 mm long is freely suspended from one of the comers of its base. Draw its projections when the axis makes an angle of 50° with the VP.	20	KTU-Dec 2020
5	A hexagonal prism base 20 mm side and axis 40 mm long is placed with one of its base edges on the HP such that the axis is inclined at 30° to HP and 45° to VP. Draw the projections of the prism.	20	KTU-June 2022
6	A cone of base diameter 50 mm and axis length 60 mm is resting on VP on one of its generators with the front view of the axis inclined at 40° to HP. Draw its projections.	20	KTU-June 2022
7	A pentagonal pyramid of base edge 30 mm and axis length 60 mm is resting on VP on one of its base edges. The axis of the pyramid is inclined at 35° to VP and the resting base edge is inclined at 45° to HP. Draw the projection of the pyramid.	20	KTU-Dec 2021
8	A right circular cone, 40 mm base diameter and 60 mm long axis is resting on HP on one point of base circle such that its axis makes 45° inclination with HP and 40° inclination with VP. Draw its projections.	20	KTU-Dec 2021
9	A rectangular prism of base 25 x 35 mm and height 50 mm is resting on VP on one of its longer base edges. Draw the projection of the solid when its axis inclined at 35 degrees to VP and the base edge resting on VP is inclined at 45 degrees to HP. Also assume that end face of the solid visible in front view is away from HP and located right side of the viewer.	20	KTU-Dec 2022
10	Draw the projection of a pentagonal pyramid of 30 mm base side and 65 mm long axis is resting on one of its corners of the base on HP. The axis is inclined at 30 degrees to HP and top view of the axis is inclined at 35 degrees to XY line. Consider that apex is away from VP and is on the right side of the viewer.	20	KTU-Dec 2022
11	A pentagonal pyramid, base 30 mm side and height 80mm has a triangular face on the ground and the vertical plane containing the axis make an angle of 30° with VP. Draw the projections of the solid.	20	KTU-Dec 2023
12	A cone of base 50 mm diameter and axis 75mm long has one of its generators on the HP. A plane containing that generator and the axis is perpendicular to the HP and is inclined at 60° to the VP. Draw the projections of the cone when the base is nearer to the VP than the apex.	20	KTU-Dec 2023
Qn. No.	**Module- 3**	**Marks**	**Year**
1	A hexagonal pyramid side of the base 30 mm and axis 70 mm rests with its base on the HP and an edge of the base inclined at 30° to VP. A section plane inclined at 45° to VP and perpendicular to HP passes through the pyramid at a distance of 10 mm from the axis and in front of it. Draw its top view, sectional front view and true shape of section.	20	KTU-July 2021
2	A pentagonal prism side of base 25 mm and altitude 50 mm, rests on its base on the HP such that an edge of the base is parallel to VP and nearer to the observer. It is cut by a plane inclined at 45° to HP, perpendicular to VP and passing through the centre of the axis. Draw the development of the surface of the truncated prism.	20	KTU-July 2021
3	A pentagonal pyramid side of base 25 mm, height 70 mm has its base on the ground and a side of the base parallel to VP. The pyramid is cut by a section plane passing through a point on the axis which is 25 mm below the apex and making an angle of 60° with the axis. Draw the projections and obtain	20	KTU-Dec 2020

	the front view, sectional top view and true shape of the section.		
4	Draw the development of the lower portion of a cylinder of diameter 50 mm and axis height 70 mm when it is sectioned by a plane inclined at 40° to HP, perpendicular to VP and bisecting the axis.	20	KTU-Dec 2020
5	A cylinder with a 60 mm base diameter and 70 mm axis is resting on its base in the HP. It is cut by an auxiliary inclined plane which makes a angle of 60° with the HP and perpendicular to VP and passes through the top end of the axis. Draw its front view, sectional top view and true shape of the section.	20	KTU-Dec 2021
6	. A pentagonal prism of base 30 mm and axis 60 mm long is kept with its base on HP with a base edge perpendicular to VP. It is cut by a plane inclined at 45° to HP. perpendicular to VP and passing through the mid-point of the axis. Draw the development showing the remaining portion of the solid.	20	KTU-Dec 2021
7	A hexagonal pyramid, side of base 25 mm and altitude 70 mm long, rests with its base on HP with two of its base sides parallel to VP. It is cut by a section plane perpendicular to VP, inclined at 45° to HP and passing through the axis 15mm from the base. Draw the sectional top view and true shape of the section. (June-2022)	20	KTU-June 2022
8	A pentagonal pyramid, side of base 50 mm and height 80 mm rests on its base on the ground with one of its base sides parallel to VP. A section plane perpendicular to VP and inclined at 30° to HP cuts the pyramid, bisecting its axis. Draw the development of the truncated pyramid.	20	KTU-June 2022
9	A hexagonal prism of base side 35 mm and height 65 mm rests on its base on HP with one of the base edges parallel to VP. It is cut by a section plane inclined towards right at an angle of 30 degrees to HP and perpendicular to VP. The section plane meets the axis of the prism at a height of 45 mm from the base. Draw the front view, sectional top view, and true shape of the section.	20	KTU-Dec 2022
10	Draw the development of the lateral surface a truncated right circular cone of base diameter 46 mm and height 64 mm, which is cut by a section plane inclined towards right at 30 degrees to HP and perpendicular to VP. Assume that the section plane is meeting the axis of the cone at 35 mm above the base. The cone is resting on HP on its base.	20	KTU-Dec 2022
11	A square prism of base side 30mm and height 75 mm rests on the HP on its base with two of its rectangular faces equally inclined to VP. It is cut by a plane perpendicular to VP and inclined at 60° to HP meeting the axis at 15 mm from top. Draw its elevation. sectional plan and true shape of section.	20	KTU-Dec 2023
12	Draw the development of the lateral surfaces of the hexagonal pyramid of base of side 25 mm and altitude 60 mm which is resting vertically on its base on the ground with two of the sides of the base perpendicular to the VP.	20	KTU-Dec 2023
Qn. No.	**Module- 4**	**Marks**	**Year**
1	Draw the isometric projection of a hexagonal prism, 25 mm side of base and 60 mm height, which is resting on a rectangular face on HP.	20	KTU-Dec 2020
2	A hemisphere of diameter 70 mm is placed centrally over a cylinder of diameter 50 mm and height 80 mm, with its flat surface facing upward. Draw the isometric view of the combination.	20	KTU-Dec 2020
3	Draw the isometric view of a pentagonal pyramid, side of base 20 mm and height 50 mm which rests centrally with base on a cylinder of diameter 60 mm and height 40 mm.	20	KTU-July 2021
4	A hollow cylinder of inside diameter 40 mm, outside diameter 60 mm and 80 mm long is resting on its generator on the top of a rectangular slab of 80 mm x 60 mm and height 30mm. Draw the isometric view of the combination if the axis of the cylinder is parallel to the longer edges of the slab.	20	KTU-July 2021
5	A sphere of 50 mm diameter is placed centrally on the top of the frustum of a square pyramid of 30 mm base side, 20 mm top side and the axis 50 mm long. Draw the isometric projection of the solids.	20	KTU-Dec 2021

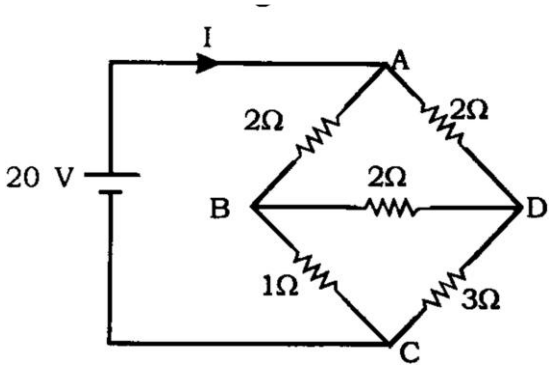
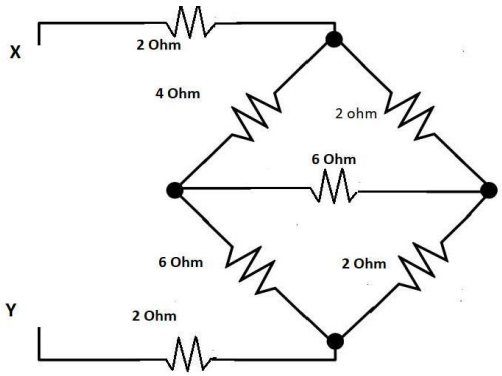
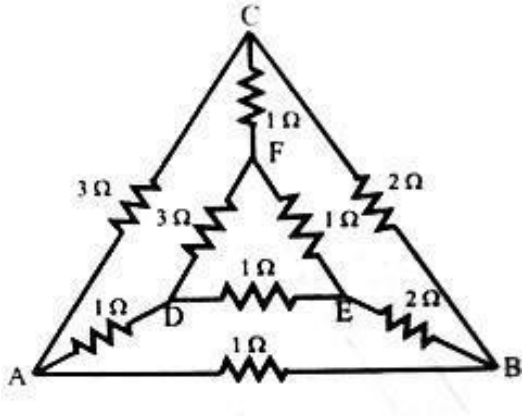
6	A hexagonal pyramid of base edge 25 mm and height 60 mm is surmounted centrally over a square slab of 70 mm side and 30mm thickness lying with its square side on HP so that one side of the square slab and one base edge of the pyramid are parallel to VP. Draw the isometric view of the combination.	20	KTU-Dec 2021
7	A square pyramid of base edge 20 mm and height 40 mm is mounted centrally on a face of a cube of base edge 50 mm. Draw the isometric projection of the objects.	20	KTU-June 2022
8	Draw the isometric projections of a hexagonal prism with edge of base 30 mm and axis 60	20	KTU-June 2022
9	Draw the isometric view of a triangular prism resting vertically on a circular disc with the axes of both the solids coinciding each other. The triangular prism is having a base edge of 30 mm and height 50 mm. The circular disc is of 60 mm diameter and 40 mm thick. Assume that one of the base edges of the triangular prism is parallel to VP, which is nearer to it and the combination of the solids is lying on the ground on one of the end faces of the circular disc.	20	KTU-Dec 2022
10	A sphere of diameter 60 mm is resting centrally on top of a pentagonal prism which is on HP on one of its end faces. Prism is having a base edge of 30 mm and altitude 40 mm. If the axes of both the solids are coinciding with each other, draw the isometric view of the combination of solids. One of the base edges of the prism is perpendicular to VP and it is on the left side of the viewer.	20	KTU-Dec 2022
11	A cylindrical slab, 60 mm in diameter and 20 mm thick is surmounted by a cube of 30 mm side. The axes of the solids are in the same vertical line. Draw the isometric projection of the solids	20	KTU-Dec 2023
12	A waste paper basket is in the form of a frustum of hexagonal pyramid with base 100 mm hexagon and top 150 mm hexagon. Draw the isometric view if its height is 40 cm.	20	KTU-Dec 2023
Qn. No.	**Module- 5**	**Marks**	**Year**
1	A square pyramid of base sides 30 mm and height 45 mm rests on its base on the ground with two base edges parallel to the Picture Plane (PP). The nearest edge of the base is 20 mm behind PP. The station point is situated at a distance of 70 mm in front of the PP, 40 mm to the right of the axis of the pyramid, and 60 mm above the ground. Draw the perspective view of the pyramid.	20	KTU-Dec 2021
2	A square pyramid of base side 30 mm and height 45 mm is resting on the ground plane. The nearest edge of the base is parallel to and 20 mm behind the Picture Plane (PP). The station point is situated at a distance of 70 mm in front of the PP, 40 mm to the right of the axis of the pyramid, and 60 mm above the ground. Draw the perspective view of the pyramid.	20	KTU-June 2022
3	A rectangular box of 50 mmx 30 mm x 25 mm size rests on the ground on one of its 50x30 mm rectangular face on the ground plane. The box is located behind the PP with a vertical edge touching it and a face containing the largest edge making an angle of 30° to the PP. The station point is located 45 mm in front of PP and 55 mm above the ground plane. The central plane passes through the centre of the box. Draw the perspective view of the box.	20	KTU-Dec 2020
4	A pentagonal prism of base sides 30 mm and length 70 mm is resting on one of its rectangular faces on the ground, behind the Picture Plane (PP) and one pentagonal face touching the PP. The station point is 65 mm in front of the PP, 30 mm above the ground, and 80 mm to the right of the axis of the prism. Draw its perspective view.	20	KTU-July 2021
5	A rectangular prism of 40 mm x 20 mm x 15 mm size is lying on its 40 mm x 20 mm rectangular face on the ground plane with a vertical edge parallel and 10 mm behind picture plane and end faces inclined at 30 degrees with the picture plane. The central plane is 60 mm away from the axis of the prism towards left. The station point is situated 50 mm in front of the picture plane and 45 mm above the ground plane. Draw the perspective view of the prism.	20	KTU-Dec 2022

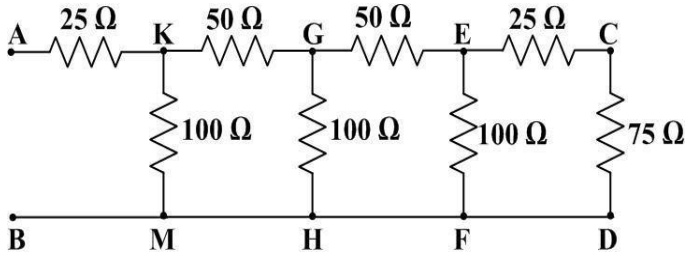
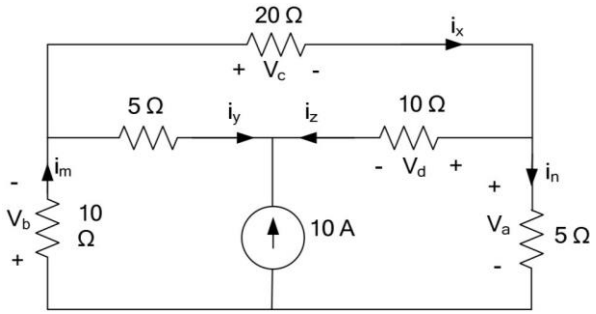
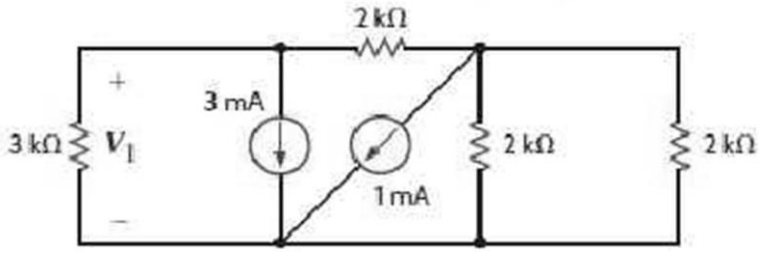
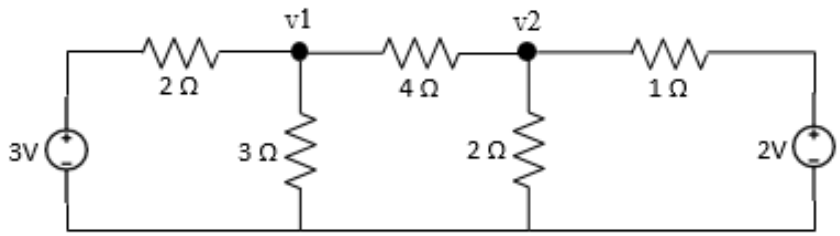
6	A rectangular prism of size 20 x 20 x 40 mm is lying on the ground plane on one of its largest faces. A vertical edge is in the Picture Plane (PP) and the longer face containing that edge makes an angle of 30° with PP. The station point is 50 mm in front of the PP. 30 mm above the ground plane, and lies in a central plane which passes through the centre of the prism. Draw the perspective view of the prism.	20	KTU-Dec 2023
7	Draw the top view, front view and any one side view of the figure shown below. The front view direction is marked with a long arrow. Any missing dimension may be suitably assumed. 	20	KTU-Dec 2020
8	Draw the top view, front view and any one side view of the figure shown below. The front view directions marked with a long arrow. Any missing dimension may be suitably assumed. 	20	KTU-July 2021
9	Draw the top view, front view and any one side view of the figure shown below the front view direction is marked as X. Any missing dimension may be suitably assumed. 	20	KTU-Dec 2021
10	Draw the front view, top view, and side view of the object given below. Front view should be drawn as seen in the direction of the arrow X. 	20	KTU-June 2022

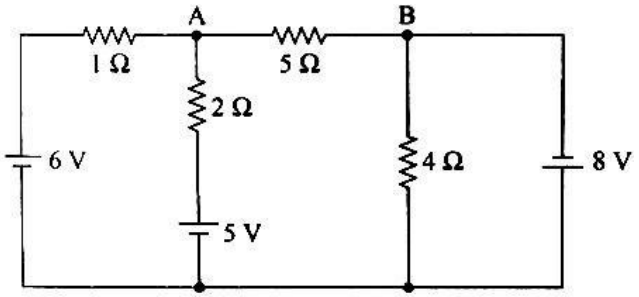
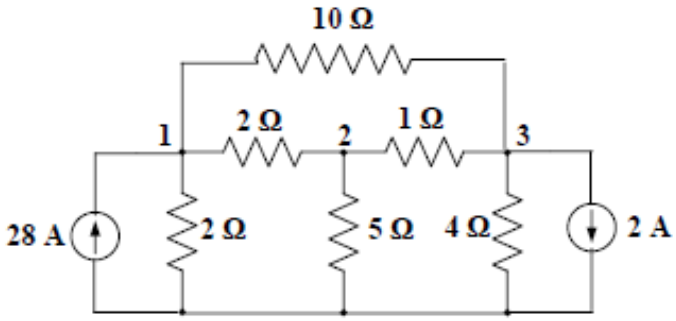
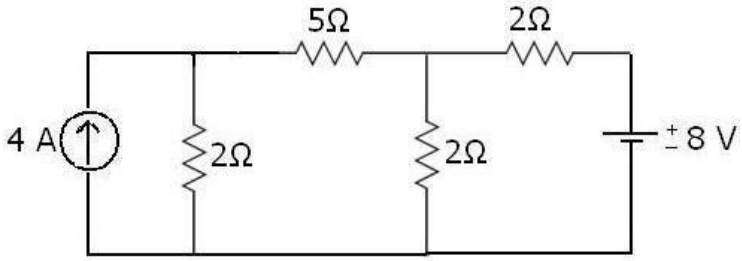
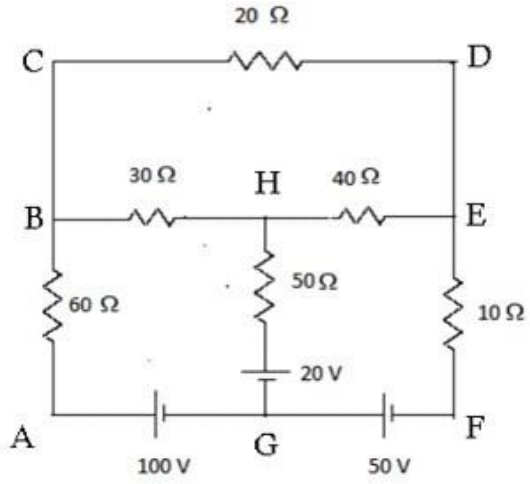
11	 Draw the front view, top view, and left side view of the object given below. Front view should be drawn as seen in the direction of the arrow X. Assume dimensions suitably if found missing.	20	KTU-Dec 2022
12	Draw the front view, top view, and side view of the object given below. Front view should be drawn as seen in the direction of the arrow X. 	20	KTU-Dec 2023

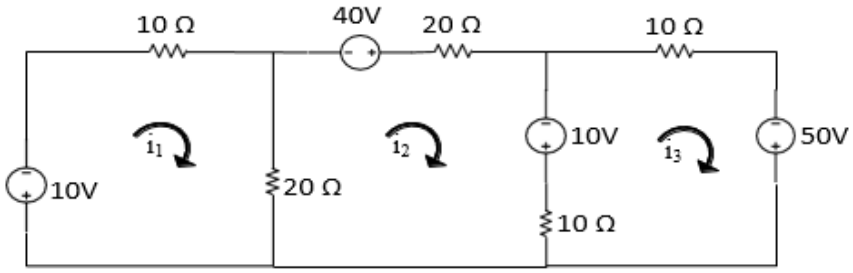
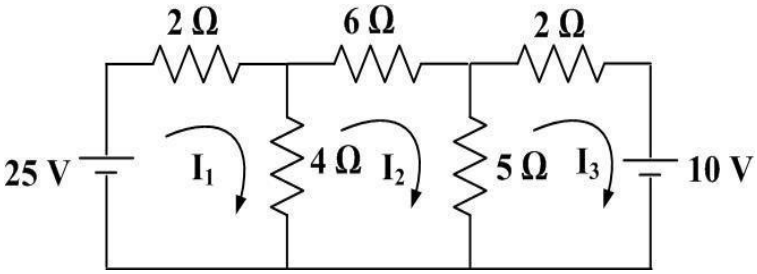
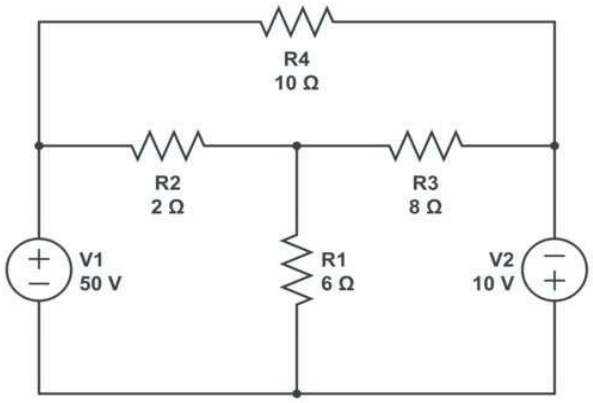
QUESTION BANK

EST130. BASIC ELECTRICAL ENGINEERING
(2019 Scheme)

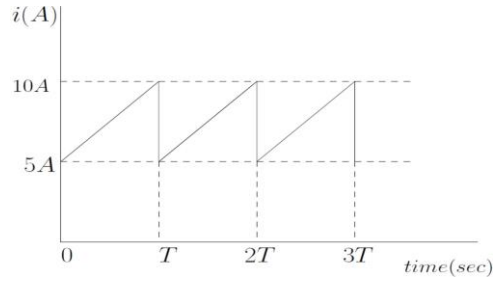
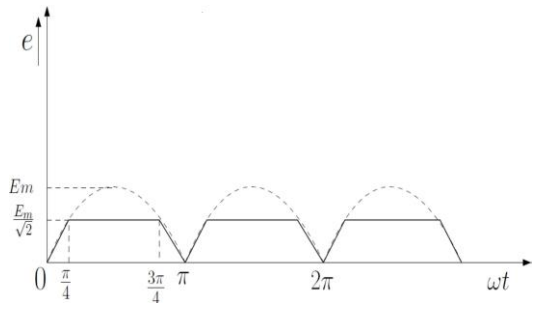
Sl No:	Questions	Marks	Year
	Module - 1		
1.	Find the source current I in the below figure using star-delta transformation. 	10	December 2020 (2019 Scheme)
	Find the equivalent resistance between terminal X-Y in the network 	10	December 2021 (2019 Scheme)
	Find the resistance between points A and B in network shown. 	10	December 2022 (2019 Scheme)

	Three resistors, 6Ω, 10Ω and 15Ω are connected in star configuration. Obtain the equivalent resistance in a delta configuration.	4	June 2022 (2019 scheme)
	Find the equivalent resistance across AB.  	4	June 2023 (2019 scheme)
2.	Use the nodal analysis to find voltages Va , Vb , Vc , Vd.  	10	December 2020 (2019 Scheme) December 2021 (2019 Scheme)
	Use nodal analysis to find V_1 in the given circuit.  	10	July 2021 (2019 scheme)
	Find the node voltages v1 and v2 in the circuit given in Fig. 2. Also find the power dissipated in the 4Ω resistor.  figure 2	10	June 2022 (2019 scheme)

	Calculate the current flowing through 5Ω resistor using the nodal method. 	10	December 2022 (2019 Scheme)
	Determine the node voltages in the given circuit. 	10	June 2023 (2019 scheme)
	Find the current through 5 Ω resistor using Nodal Analysis. 	10	December 2023 (2019 Scheme)
3.	Find the current in each branch of the following circuit using mesh analysis? 	10	July 2021 (2019 scheme)

	Find the mesh currents i_1, i_2, i_3 in the circuit shown in Figure 1 by performing mesh analysis  **Figure 1**	10	June 2022 (2019 scheme)
	Solve for the mesh currents in the given circuit.  	10	June 2023 (2019 scheme)
	Find the current through 10 Ω resistor using Mesh Analysis.  	10	December 2023 (2019 Scheme)
4.	State and explain Kirchhoff's laws with examples	4	July 2021 (2019 scheme) December 2022 (2019 Scheme) June 2023 (2019 Scheme)
5.	Differentiate between ideal and real current sources with circuit representation.	4	December 2022 (2019 Scheme)

Module - 2			
1.	What are statically and dynamically induced emfs? Explain. **OR** Distinguish between statically induced EMF and dynamically induced EMF.	4	December 2020 (2019 Scheme) December 2021 (2019 scheme) December 2022 (2019 scheme) June 2023 (2019 scheme) December 2023 (2019 Scheme)
	Explain the concept of statically induced emf in a magnetic circuit.	4	June 2022 (2019 scheme)
2.	Derive an expression for the energy stored in an inductor	4	December 2020 (2019 Scheme) December 2021 (2019 scheme)
3.	Derive the expression for average value of a sinusoidal wave form.	4	December 2020 (2019 Scheme)
	Define rms value and average value of a time varying wave form.	4	December 2020 (2019 Scheme)
4.	The instantaneous value of an alternating voltage is given by v=110 sin 314t. Find the angular velocity, frequency, and time period of the voltage.	6	December 2021 (2019 scheme)
	An alternating current is given by 14.14Sin377t. Find the (a) rms value of current (b) Average value of current (c) frequency (d) form factor (e) peak factor (f) instantaneous value of current when t=3ms.	6	December 2022 (2019 scheme)
	An alternating current is given by $I = 50 \sin(314t)$. Find (a) the maximum value (b) frequency (c) time period of the current.	4	June 2023 (2019 Scheme)
	Sketch the current and voltage waveform, if I = I sin (ωt – 60), v = V cos (ωt +30). What is the Phase difference between the two waveforms.	4	December 2023 (2019 scheme)

	Determine the average value and rms value of the current waveform shown in figure below. 	10	December 2020 (2019 Scheme)
	A full wave rectified sine function is clipped at 0.707 of its maximum value as shown in figure. Find the average and rms values of the function. 	10	July 2021 (2019 scheme)
	Show that for a sinusoidal voltage RMS value is 0.707 times its maximum value.	4	December 2023 (2019 scheme)
	A sinusoidal voltage of V= 325 sin314t when applied across an L-R series circuit causes a current of I = 14.14 sin (314t – 60^o) flowing through the circuit. Calculate the value of L and R of the circuit. Also calculate the power consumed.	6	December 2023 (2019 scheme)
5.	A coil of 50 Ω resistance is placed in a magnetic field of 1mWb. The coil has 50 turns and a galvanometer of 400 Ω resistance is connected in series with it. Find the average induced emf and the resulting current if the coil is moved in 0.1 second from the given field to another field of 0.2mWb.	6	December 2020 (2019 Scheme)
	Two coils A and B of 500 and 750 turns respectively are connected in series on the same magnetic circuit of reluctance 1.55×106 AT/Wb. Assuming that there is no flux leakage, calculate (i) self-inductance of each coil and (ii) mutual inductance between coils.	4	June 2022 (2019 scheme)

	A conductor of length 0.5m kept at right angles to a uniform magnetic field of flux density 2Wb/m^2 moves with a velocity of 75 m/s at an angle of 60^0 to the field. Calculate the emf induced in the conductor.	4	July 2021 (2019 scheme)
	Define mutual inductance. Two coupled coils of self- inductance 0.8H and 0.35H have a coefficient of coupling 0.9. Find the mutual inductance between the coils.	4	July 2021 (2019 scheme)
	A coil of 180 turns is linked with a flux of 0.03 Wb when carrying a current of 10A. Calculate the inductance of the coil. If the current is uniformly reversedin 0.04 sec, calculate the emf induced in the coil.	4	December 2021 (2019 scheme)
	A coil of 200 turns carries a current of 4A. The magnetic flux linkage with thecoil is 0.02Wb. Calculate the self-induced emf in the coil.	4	December 2022 (2019 Scheme)
	Two identical coils 1 and 2 are wound on the same magnetic core. Current in coil 1, which is changing at the rate of 600 A/s, induces emf of 12 V in coil 2. Calculate the mutual inductance between the coils. If the self-inductance of each coil is 50mH, calculate the coefficient of coupling between coils.	7	December 2022 (2019 Scheme)
	A rectangular shaped core wound with a coil of 150 turns and 1.2A is made of mild steel plate 10 mm × 20 mm cross-section. The mean length of the magnetic path is 15cm. Calculate i. magnetizing force ii. flux density iii. reluctance iv. flux of magnetic circuit. Assume relative permeability of mild steel as 940.	6	June 2023 (2019 Scheme)
	An air solenoid has 300 turns, its length is 25 cm and cross sectional area of 3 cm^2. Calculate the self-inductance. If the coil current of 10A is completely interrupted in 0.04 s, calculate the induced emf in the coil.	6	June 2023 (2019 Scheme)
	A rectangular shape iron core has an air gap of 0. 9cm.The mean length of the flux path through iron is 39.99 cm. The relative permeability of iron is 2000. The coil has 1000 turns. The cross-sectional area of the core is 9 cm^2. Calculate the current required to produce a flux of 1 mWb in the core.	10	December 2023 (2019 Scheme)

6.	An iron ring of cross sectional area 1cm^2 is wound with a coil of 2000 turns. Calculate the magnetizing current required to produce a flux of 0.1 mWb in the iron path if mean length of the path is 30cm and relative permeability of iron is 2500. Neglect magnetic leakages and fringing.	10	July 2021 (2019 scheme)
	A core forms a closed magnetic loop of path length 32 cm. Half of this path has a cross-sectional area of 2cm^2 and relative permeability 800. The other half has a cross-sectional area of 4 cm^2 and relative permeability 400. Find the current needed to produce a flux of 0.4 Wb in the core if it is wound with 1000 turns of insulated wire. Ignore leakage and fringing effects.	6	June 2022 (2019 scheme)
	An iron ring of cross-sectional area 6 cm^2 is wound with a wire of 100 turns and has a saw cut of 2 mm. Calculate the magnetising current required to produce a flux of 0·1 mWb. if mean length of magnetic path is 30 cm and relative permeability of iron is 470.	8	June 2022 (2019 scheme)
	An iron ring has a cross section area of 3 cm^2 and a mean diameter of 25 cm. An air gap of 0.5mm is cut across the section of the ring. The ring is wound with a coil of 200 turns through which a current of 3A is passed. If the total magnetic flux is 0.28 mWb, find the relative permeability of iron, assuming no magnetic leakage.	10	December 2021 (2019 scheme)
7.	Compare electric and magnetic circuits with circuit diagram	4	June 2022 (2019 scheme), December 2022 (2019 Scheme), December 2023 (2019 Scheme)
8.	Define the terms relative permeability and flux density and give the relation between the two terms.	2	June 2022 (2019 scheme)
	Define a) MMF b) Field Strength c) Flux Density	3	December 2022 (2019 Scheme)
	Explain the following terms : a) Reluctance b) Flux Density c) MMF d) Permeability	4	December 2023 (2019 Scheme)
9.	State and explain Faraday's laws of electromagnetic induction.	4	June 2023 (2019 Scheme)

Module - 3			
1.	Prove that in a purely capacitive circuit the current leads the applied voltage by 90degrees and the power consumed is zero.	4	December 2020 (2019 Scheme)
	Explain with phasor diagram instantaneous power when alternating current is supplied through a series R-L circuit. Also draw the impedance triangle and write an expression for active, reactive and apparent power in R-L circuit.	10	June 2022 (2019 scheme)
	Derive the expression for the current in an ac series RLC circuit.	4	December 2021 (2019 scheme)
	Explain the phasor diagram and impedance triangle of a series resistive inductive circuit excited by an AC source.	4	June 2023 (2019 scheme)
2.	Derive the relation between line and phase currents in a 3 phase delta connected system.	4	December 2020 (2019 Scheme) June 2022 (2019 scheme)
3.	Show that the power consumed by three identical single-phase loads connected in delta is equal to three times the power consumed when the phase loads are connected in star.	10	December 2022 (2019 Scheme)
4.	A resistor of 50Ω, an inductor of 0.1H and a capacitor of 40μF are connected in series and the combination is connected across 220V, 50 Hz supply. Calculate (i)the circuit impedance (ii) resulting current (iii) power factor (iv) phase angle and (v) power consumed by the circuit.	10	December 2020 (2019 Scheme)
	A sinusoidal voltage V=230∠15 of frequency 50 Hz is applied to a series RL circuit consisting of R=5 Ω and =0.1 H. Calculate (i) rms current and its phase angle (ii) power factor (iii) average power (iv) reactive power and (v) apparent power drawn by the circuit.	10	July 2021 (2019 scheme)
	An alternating current is represented by i(t)=14.14 sin (377t). Find (i)rms value (ii) frequency (iii)time period and (iv)instantaneous value of the current at t=3ms.	4	December 2021 (2019 scheme)
	A resistance of 10Ω, an inductance of 0.3 H, and a capacitance of 100μF are connected in series across 230V, 50 Hz single phase	10	December 2021 (2019 scheme)

	power supply. Calculate the (i)impedance (ii) current through the circuit (iii) power factor of the circuit (iv) Voltage across R, L and C (v) Power consumed by the circuit.		
	A capacitor having a capacitance of 20μF is connected in series with a non – inductive resistance of 200Ω across 220V, 50 Hz supply. Calculate the following 1) Impedance 2) Current 3) Power Factor 4) Power drawn from supply.	10	December 2022 (2019 scheme)
	A resistor of 10Ω, an inductor of 0.3 H and a capacitor of 100 μF are connected in series across a 230 V, 50 Hz, single phase ac supply. Determine (a) impedance (b) current (c) power in watts (d) circuit power factor.	10	June 2023 (2019 scheme)
	Two impedances Z_1 and Z_2 when connected separately across 220 V, 50Hz supply, consume 300W and 150W at a power factor of 0.4 lagging and 0.7 leading respectively. When the two impedances are connected in series across the same supply, find total power consumed and overall power factor.	10	December 2023 (2019 scheme)
	The impedance of an R-L series circuit is 50 + j100 Ω. When the supply frequency is increased from 50 Hz to100 Hz, what will be the value of impedance?	4	December 2023 (2019 scheme)
5.	Three inductive coils, each with a resistance of 22 Ω and an inductance of 0.05 H are connected in first in star and then in delta, to a 3 phase 415 V, 50 Hz supply. Calculate for both star and delta connections, (i) phase current and line current and (ii) total power absorbed.	10	December 2020 (2019 Scheme)
	A balanced 3 phase load consists of 3 coils each of resistance 6 Ω and inductive reactance of 8 Ω. Determine the line current and power absorbed when the coils are (i) star connected (ii) delta connected across 400V, 3 phase supply	10	July 2021 (2019 scheme)
	A balanced three phase load has per phase impedance of (30 + j50) ohm. if the load is connected across 400 V, 3 phase supply, find (i) Phase current (ii) line current (iii) power supplied to the load when it is connected in (a) star (b) delta.	10	June 2022 (2019 scheme)

	A balanced delta connected 3 phase load is fed from a 3 phase, 400 V, 50 Hz power supply. The line current is 20A and the total power absorbed by the load is 10kW. Calculate (i) the impedance in each branch (ii) the power factor and (iii) the total power consumed if the same impedances are star connected.	10	December 2021 (2019 scheme)
	A delta-connected load of 12Ω resistance and 16-Ω reactance are connected across a 100V, 50 Hz supply. Find line current, phase current and power factor.	4	December 2022 (2019 scheme)
	Three impedances each having resistance 20Ω and an inductive reactance of 15Ω are connected in star across a 400V, 3 phase, AC supply. Calculate (a) the line current (b) power factor (c) total power. If the load is connected in delta, determine the total power consumed by the load.	10	June 2023 (2019 scheme)
	Three similar coils each having a resistance of 5 Ω and an inductance of 0.02H are connected across 440V, 3-phase, 50Hz supply. Calculate the line current and total power absorbed when connected in (a)star and (b) Delta	10	December 2023 (2019 scheme)
6.	Find the trigonometrical, exponential and polar forms of the vector 8+j6.	4	July 2021 (2019 scheme)
	Two impedances, Z1 = (4+j3) Ω, Z2 = (6 - j9) Ω are connected in series. Find the equivalent impedance in polar form.	4	June 2023 (2019 scheme)
7.	Define (i) active power, (ii) reactive power, (iii) apparent power and (iv) powerfactor of an ac circuit.	4	July 2021 (2019 scheme)
	Define the following terms with an example: a) Phase b) Phase difference	4	June 2022 (2019 scheme)

EST 130 BASICS OF ELECTRONICS ENGINEERING (PART-2) QUESTION BANK			
Qn. No	**MODULE – 4**	**Marks**	**Year**
1	Distinguish between active and passive electronic components with examples for each	4	KTU DEC 2020
2	a. Draw the symbol of the resistor and explain any four specifications. b. Explain the colour coding of the resistor. Illustrate with examples. What are the merits and demerits of resistor colour coding schemes? c. In a 4-band resistor the last colour in the colour band is gold. If the upper range of resistance is 3.465Ω find its colour code. Write down the colour code for a given resistor of 47 kilo-ohmswith a tolerance of 10%.	4 6 4	KTU DEC 2022 & JAN 2024 KTU JUN 2023 & JAN 2024 KTU JUL 2021
3	a. What is an inductor? How does an inductor work What are the different types of inductors? Give two typical applications of inductors. b. What do you mean by permeability tuning? Identify and sketch any one electronic component that employs permeability tuning and explain the tuning mechanism.	5 4	KTU DEC 2022 KTU JUN 2023
4	a. What is a variable capacitor? List any two applications of variable capacitors. b. Write the significance of specifying the tolerance value of a component. Find the capacitance values for the following codes (i) 2n2 (ii)104K (iii)103J	4 4	KTU JAN 2024 KTU DEC 2021
5	a. What is the depletion region of a diode? How is it formed? b. Draw and explain the VI characteristics of a PN junctiondiode under forward and reverse bias	4 4	KTU JAN 2024 KTU JUN 2023
6	a. Compare the three transistor configurations. b. Discuss the parameters ‘alpha’ and ‘beta’ of a transistor and quote the relationship between them. (OR) Derive the	4 6	KTU DEC 2022 KTU DEC 2022 &

	relation between common base current gain and common emitter current gain.		JAN 2024
	c. The collector current of a transistor varies by 1.987 mA when its emitter current is varied by 2 mA. Compute the alpha and beta of the transistor.	4	KTU DEC 2022
	d. For an NPN transistor, α=0.95 and IE=10mA. Find I_B and I_C.	4	KTU JUN 2022
7	Draw and explain the circuit diagram, and input and output characteristics of a transistor in common emitter configuration. With a neat diagram, mention any one application of the transistor in common emitter configuration.	10	KTU JUN 2023 & JAN 2024

Qn. No	MODULE – 5	Marks	Year
1	a. Draw the block diagram of the DC power supply and explain the function of each block	10	KTU JUN 2022
	b. Sketch and explain the working of a full wave bridge rectifier with a capacitor filter. Draw its input and output waveforms. Suggest methods to reduce the ripple content of the output.	10	KTU JUN 2023 & JAN 2024
	c. Draw the circuit diagram of a simple zener voltage regulator and explain its working. Define the terms line regulation and load regulation.	6	KTU JUN 2023
2	Draw and explain the block diagram of a public address system	6	KTU JUN 2023 & JAN 2024
3	a. Draw the circuit diagram of a CE amplifier (RC-coupled) and discuss the role ofeach component used in it. Draw its frequency response and mark the 3dB bandwidth. Give reasons for the decrease in transistor amplifier voltage gain at low frequencies and high frequencies	10	KTU JUN 2022, JUN 2023 & JAN 2024
	b. Draw the circuit of voltage divider biasing arrangement and mention the functions of various components used in the circuit.	6	KTU DEC 2022
4	Explain the block diagram of an instrumentation system.	6	KTU JUN 2023

Qn. No	MODULE - 6	Marks	Year
1	a. What is modulation? Compare AM and FM.	4	KTU JUN 2023 & JAN 2024
	b. Explain the term 'modulation index' in a radio communication system. An AM-modulated carrier wave has maximum and minimum amplitudes of 600 mV and 450 mV respectively. Find the modulation index.	6	KTU JUN 2023
	c. Write the expression for an AM wave and comment on the bandwidthrequirement and modulation index.	5	KTU DEC 2020
	d. Draw the frequency spectrum of an amplitude-modulated (AM) wave. Given that the modulating signal is of frequency fm and amplitude Vm and the carrier is of frequency fc and amplitude Vc. Take the modulation index as m. What is the bandwidth requirement of this AM wave?	5	KTU JUL 2021
	e. State the merits and demerits of Amplitude Modulation.	4	KTU JUN 2022
	f. Write the frequency range and typical applications of VHF andUHF frequency bands	4	KTU JUN 2022
2	With the necessary block diagram explain the principle of a superheterodyne receiver or AM Superheterodyne receiver. Explain the relevance of intermediate frequency in a superheterodyne receiver	6	KTU DEC 2022
3	Describe the principle and working of an antenna	6	KTU JUN 2022 KTU JAN 2024
4	a. What is the basic principle of cellular communication?	4	KTU DEC 2022
	b. Draw the block diagram of a GSM system and explain its working principle.	10	KTU JUN 2023 & JAN 2024
	c. Discuss the concepts of cell splitting and frequency reuse in a cellular communication system.	6	KTU JAN 2024

Course Code: EST 102

Course Name: PROGRAMMING IN C

(Common for all branches)

Module I			
Sl. No	**Questions**	**Marks**	**Years**
1.	With the help of a neat diagram explain the functional units of a computer	8	July 2021
2.	List five important registers in CPU. Also state the purpose of each register.	6	July 2021 June 2022
3.	Write algorithm and draw flowchart to perform swapping of two numbers	8	July 2021
4.	What are the functions of ALU and CU?	3	June 2022
5.	Draw a flowchart to find the sum of first N numbers.	3	June 2022
6.	Explain linear search with an example. Draw a flowchart and write pseudo code to perform linear search on an array of numbers	14	June 2022
7.	Differentiate among compiler, interpreter and assembler.	3	June 2023
8.	What is a flowchart? Draw the flow chart to check whether the given number is positive or negative.		June 2023
9.	Write the algorithm and draw the flow chart to calculate the roots of a quadratic equation, take the coefficients as inputs	10	June 2023
10.	Differentiate between system software and application software.	4	June 2023
	Explain bubble sort algorithm with an example	10	June 2023
11.	Explain different types of memories used in a computer	4	June 2023
Module II			
1.	Write C program to convert the given decimal number into binary number	7	July 2021
2.	What do you mean by Formatted Input? Explain in detail the prototype of 'scanf()' function in C including its argument list and return type	7	July 2021
3.	Differentiate between while and do-while loops using an example.	3	June 2022
4.	Why is the use of goto statements discouraged in C programs?	3	June 2022
5.	Explain formatted and Unformatted I/O functions of C language with syntax and example	7	June 2022
6.	Write a C program to read a character from the user and check whether it is a vowel or consonant	7	June 2022

7.	Write the difference between ‘while’ and ‘do -while’ statements.	3	June 2023
8.	Explain various formatted I/O statements in C.	3	June 2023
9.	Write a menu driven program to find the area of square, triangle, circle and rectangle according to the choice given.	10	June 2023
10.	Differentiate between break and continue statements using an example.	4	June 2023
11.	Explain any four types of operators used in C	7	June 2023
12.	Write a program to generate the following pattern 1 1 2 1 2 3 1 2 3 4	7	June 2023
	Module III		
1.	Explain any 4 string handling functions in C programming.	7	July 2021 June 2022
2.	Write a C program to find second largest element in an array	7	July 2021
3.	Write a C program to check whether a string is palindrome or not without using string handling functions	7	July 2021
4.	Write a C program to compare any two strings using string handling functions	3	June 2022
5.	Write a C program to find the largest element in an array	3	June 2022
6.	Write a C program to sort an array of numbers using bubble sort	7	June 2022
7.	What are the different ways of declaring and initialising a single dimensional array?	3	June 2023
8.	Write a C program to check whether the given number is Armstrong or not. (A number is Armstrong if the sum of the cubes of the digits equals to the number)	3	June 2023
9.	Implement string concatenation without using built in functions.	8	June 2023
10.	Write a C program to accept a 2-D integer matrix and check whether it is symmetric or not (A matrix ‘A’ is symmetric if $A=A^T$).	6	June 2023
11.	Explain any four string handling functions used in C using example. Write the syntax also.	6	June 2023
12.	Write a program to print the product of two matrices	8	June 2023
	Module IV		
1.	Write a C program to: (i) Create a structure with fields: Name, Address, Date of birth. (ii) Read the above details for five students from user and display the details	7	July 2021

2.	What is recursion? Write a C program to display Fibonacci series using recursive function	7	July 2021 June 2022
3.	Write a C program to sort N numbers using functions	7	July 2021
4.	Name the different types of parameter passing. Illustrate each of them with an example	3	June 2022
5.	What are the advantages of modular programming?	3	June 2022
6.	What are the main differences between structures and unions? Which is preferred in what situation? Give examples.	7	June 2022
7.	Define function prototype. Why is it used? Differentiate formal and actual parameters.	3	June 2023
8.	Mention the difference between structure and union using suitable examples	3	June 2023
9.	Explain different storage classes used in C by providing suitable examples.	8	June 2023
10.	What is meant by recursion? Write a program to find the factorial of a number using recursion.	6	June 2023
11.	Implement linear search using function. Reading the inputs and printing the result must be done in the main function.	10	June 2023
12.	Compare User defined functions with library functions.	4	June 2023
	Module V		
1.	Write a C program to reverse a string using pointers	7	July 2021
2.	Differentiate between array of pointers and pointer to an array	7	July 2021
3.	Write a C program to count number of lines in a text file	7	July 2021
4.	Distinguish between text mode and binary mode operation of a file	3	June 2022
5.	What do you mean by a pointer variable? How is it initialized?	3	June 2022
6.	Write a C program to replace vowels in a text file with character ‘x’	7	June 2022
7.	Write a C program to print the elements of an array in reverse order using pointers	7	June 2022
8.	What is meant by the scale factor of a pointer variable? Explain using examples.	3	June 2023
9.	List out the various modes of opening a file in C language.	3	June 2023
10.	Write a program to read and store the details (the name, employee code (integer) and salary) of ‘n’ employees in a company into a file using structure. Print the details of the employee whose employee code is given as input	14	June 2023
11.	What is meant by passing arguments into a function by reference? Write a program to swap two numbers using pass by reference.	8	June 2023
12.	Write a program to copy the content of a file to another.	6	June 2023

HUN 102 PROFESSIONAL COMMUNICATION

Module 1			
Sl No	Questions	Marks	KTU,Year
1	Find the misspelt words from each set of words given here. a) Defendant, defendant, difendent, defandent b) Assumption, assumption, assumption, accumption c) Appreciation, appreciation, appreciation, appreciation d) Superintendent, superantendant, superintendent, superintendent	4	July 2021 (FN)
2	Write the definition of the compound words of the following.a)Swimming pool b)Paddle boat C)Neck tie d)Black bird e)Foot print f) Sunset	3	July 2021 (FN)
3	In each of the following sentences there are two blank spaces.Find out which pair of words from the options can be filled up inthe blanks in the sentence in the same sequence to make the sentence meaningfully complete. (i) A committee has been ---------- to ---the transformation of thecity into an International Finance Center. a) Constituted, convert b)appointed, oversee c) Convergent , evaluate d)inaugurated, determent (ii) Keeping in mind the --------- to develop the sector the Govt has ---- --solicited foreign investment. a) Importance, never b) proposal, forcibly c) objective, wanted d) need, actively (iii) In his speech he vowed to----------the four billion unbanked individuals across the world into the---------- of financial inclusion. a) Represent, sphere b) Target, area c) bring, realm d) convince, era (iv) Although he puts in---------- of overtime and takes few holidays,he- --------- cannot support his family. a) Sufficient, however b) Lot, besides	5	July 2021 (FN)

	c) Plenty, still d) Frequency, yet (v) They have been ------ on incentives to-------these practices are implemented at grass root level. a) Relying, ensure b) Improving, secure c) advocating, confirm d) debating, necessitate		
4	Complete the sentence as directed. a) He said, " I shall go as soon as it is possible." (Change into Indirectspeech) b) He proposed that they should wait for the award. (Change into Directspeech) c) The guard refused him admittance. (Rewrite thesentence using "Admittance…..")	3	July 2021 (FN)
5	Find the misspelt words from each set of words given. 1) a) acomodate b) accommadate c) acommodate d) accommodate 2) a) deductible b) deductable c) deductuble d) deductabe 3) a) license b) licence c) licens d) lisence	3	June 2022
6	Write the definition for the following compound words. a) Wild life b) Son-in- law	1	June 2022
7	Write the correct sequence words and fill in the blanks.(First, Next, Then, Finally, First, After that) a._____, I heard a loud boom._____, the lights went out. I tried to use my TV, but it was dead. I wondered what was happening._____, I realized I had forgotten to pay my electricity bill. b. Let me tell you about how terrible last night was._____, I lost my wallet. I was so upset I almost cried._____, I spilled a drink on my favourite shirt. The night got even worse.	6	June 2022
8	Find the error in the sentences given below. He drank once again (a)/ as he was (b)/ feeling thirsty (c)/ No error(d)	1	June 2022
9	Write down two numerical adjectives and use it in a sentence	2	June 2022

10	Rewrite as directed. a) She said: "They had left the place when I arrived" (Change into indirect speech.) b) A sound outside woke us all up (Change the voice)	2	June 2022
11	In each of the following questions, find the correctly spelt word. a) a) Accidentally b) Acidentally c) Accidentaly d) Accedentally b) a) Mischievis b) Misschievious c) Mischievous d) Mischivious c) a) Voluntiers b) Volenteers c) Volunteers d) Volantiers d) a) Nuisance b) Nuisense c) Nooisense d) Nooisance	4	June 2023
12	Choose the right answer. 1. TEN: DECIMAL a. SEVEN: SEPTET c. TWO: BINARY b. FOUR: QUARTET d. FIVE: QUINCE	3	June 2023
13	Fill in the blanks with suitable form of the words given in brackets. [because, really, is, laugh, at, too, interesting, should] One of my favorite vacation places (a) ___ Mexico. I really like the weather there (b) _____ it never gets cold. The people are very nice too. They never (c)____ at my bad Spanish. The food is (d)___ good. Mexico City is a very (e)_____ place to visit. It has some great museums and lots of fascinating old buildings. The hotels are (f) _____expensive to stay but there are more affordable options. For example, you can stay (g) __ one of the beach resorts like Acapulco. If you are planning to visit Mexico, you (h)_____ definitely see the Mayan temples near Merida.	4	June 2023
14	Complete the passage using "was/were' in the blanks. Write the answer in your answer book against the correct blank number. Last summer I visited London. The voyage by plane a) _____ long and tiring. I b) _____ surprised by the size of Heathrow Airport. There c) _____ many people. My friend d) _____ waiting to receive me. In a few minutes we e) _____ in a cab. The city f) _____ fantastic. I g)_____ perplexed by the posh cars and shops in the city. There h) _____ many people walking down the streets.	4	June 2023

Module 2

Sl No	Questions	Marks	KTU Year
1	Help your friend by suggesting and explain SQ3R methods and PQRST method to improve his reading skills?	6	July 2021 (FN)
2	What is reading and what are the four kinds of readingstyles. When these styles are used?	6	June 2022
3	Explain Brain storming.	2	June 2023

4	Explain different techniques for speed reading.	4	June 2023
5	What are the different types of reading styles?	2	June 2023
	Module 3		
Sl No	Questions	Marks	KTU Year
1	You are asked to make a presentation on a tough subject to 10thstandard school students. Share your strategies to make your presentation interesting and effective?	4	July 2021 (FN)
2a	Point out the differences between debate and groupdiscussion?	2	July 2021 (FN)
2b	How body language could help you in a group discussion. Writedown6 points.	3	July 2021 (FN)
3a	Differentiate Group Discussion (GD) and debate	3	June 2022
3b	Explain the etiquettes one must follow in GD?	4	June 2022
4	You need to make a Project presentation as a part ofyour internal evaluation. What preparation do you need to make for presenting visuals effectively?	4	June 2022
5	Describe in detail the basic elements of an effective presentation.	3	June 2023
	Module 4		
Sl No	Questions	Marks	KTU Year

1a	How we can develop effective listening skills?	3	July 2021 (FN)
1b	How active listening plays an important role in communication?	3	July 2021 (FN)
2	What are the advantages and disadvantages of telephonicor videointerviews?	5	July 2021 (FN)
3	Differentiate between active and passive listening.	3	June 2022
4	List the barriers in listening	3	June 2022
5	Explain various Note making strategies.	3	June 2023
6	Explain any two types of interview.	4	June 2023

Module 5			
Sl No	Questions	Marks	KTU,Year
1	Write a letter to the HR manager of a leading company, requestingpermission to do two-weeks internshipat his company as a part of your academic curriculum.	6	July 2021 (FN)
2a	What is technical communication?	1	July 2021 (FN)
2b	What are the different types of reports?	2	July 2021 (FN)
3	What is a report? Explain its structure and types.	6	June 2022
4	Bring out the differences among CV, Resume and Biodata.	6	June 2023
5	Write a letter to your Principal to grant you permission to attend a seminar on Climate Change at IIT Madras. Give all the information regarding the programme and benefits of attending the same.	6	June 2023

6	You are required to apply for a job and submit your details to afirm. In what context you decide to submit a CV or Biodata or Resume. Write your answer explaining the structure of each and focusing on the differencesbetween them.	6	June 2022