Question Bank

Subject: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Module 1				
SI. No	Questions	Marks	Κυ/ΚΤυ	
1	A particle moves along a circular helix in 3-space so that its position vector at any time 't' is $r(t) = (4\cos\pi t)\vec{i} + (4\sin\pi t)\vec{j} + t\vec{k}$. Find the displacement of the particle during the interval $1 \le t \le 5$.	7	KTU Feb-2017	
2	If $f(x, y, z) = x^2i - 3j + yz^2k$ find div F	2	KTU Apr-2018	
3	Find the work done by the force field $F = xy i + yz j + zx k$ on a particle that moves along the curve C: $x = t, y = t^2, z = t^3, 0 \le t \le 1$	3	KTU Apr-2018 & Dec-2017	
4	Find the divergence and curl of the vector field $f(x, y, z) = yz\vec{i} + xy^2\vec{j} + yz^2\vec{k}$	2	KTU Dec-2017	
5	Evaluate $\int_{c} (3x^2 + y^2) dx + 2xy dy$ along the circular arc C given by $x = cost$, $y = sint$ for $0 \le t \le \frac{\pi}{2}$	3	KTU Dec-2017	
6	Show that the integral $\int_{(1,1)}^{(3,3)} (e^x \log y - \frac{e^y}{x}) dx + (\frac{e^x}{y} - e^y \log x) dy$ Where x and y are positive, is independent of path and find its value	5	KTU Dec-20117	
7	If $\vec{r} = x\vec{\iota} + y\vec{J} + z\vec{k}$ and $r = \vec{r} $, then show that $\nabla f(r) = \frac{f'(r)}{r}\vec{r}$.	5	KTU Dec-2017	
8	Prove that the force field $F = e^{y}i + x e^{y}j$ is conservative in the entire xy- plane	7	KTU Model question	
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 Model Question	
10	Show that $f(x, y) = (cosy + ycosx)\vec{i} + (sinx - xsiny)\vec{j}$ is a conservative vector field. Hence find the scalar potential for it.	5	KTU Dec-2017	
11	Find the directional derivative of $f(x, y) = x^2 = 3xy + y^2$ at the point P(2,1)in the direction of $\vec{a} = \frac{1}{3}\vec{i} + \frac{2}{3}\vec{j}$	3	KTU-June 2022	
12	Evaluate $\int 3xy dy$ over the line segment C joining (0,0) and (1,2)	3	KTU-June 2022	

13	a)Find the parametric equation of the tangent to the curve $\vec{r}(t) = 2\cos\pi t\vec{i} + 2\sin\pi t\vec{j} + 6t\vec{k}$ at $t = \frac{1}{3}$ b) Show that the vector field $\vec{f}(x,y) = 2xy^3\vec{i} + 3y^2x^2\vec{j}$	7	KTU-June 2022	
	is conservative and find ϕ such that $\vec{f} = \nabla \phi$. Hence evaluate $\int_{(2,-2)}^{(-2,0)} 2xy^3 dx + 3y^2 x^2 dy$	7		
14	a. Find the position and velocity vectors of the particle, given $\vec{a}(t) = (t+1)^{-2}\vec{j} + e^{-2t}\vec{k}, \vec{v}(0) = 3\vec{i} - \vec{j}, \vec{r}(0) = \vec{k}$	7	KTU-June 2022	
	b. If $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$, and let $\vec{F}(r) = f(r)\vec{r}$, then prove that $div\vec{F} = 3f(r) + \vec{r}f'(\vec{r})$	7		
	Module 2			
1	Using Greens theorem, find the work done by the force field $\vec{f}(x, y) = (e^x - y^3)\vec{i} + (cosy + x^3)\vec{j}$ on a particle that travels once around the unit circle $x^2 + y^2 = 1$ in the counter clockwise direction	5	KTU Apr-2018	
2	If σ is any closed surface enclosing a volume V and $F = x\vec{i} + 2y\vec{j} + 3z\vec{k}$, 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	Using line integral evaluate the area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	2	KTU Dec-2017	
5	Using Greens theorem evaluate $\int_C (xy + y^2) dx + x^2 dy$, where C is the boundary of the common to the curve $y = x^2$ and $= x$.	5	KTU Apr-2018	

6	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 $z = y$.	5	KTU DEC-2017
7	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) $xy i - 2xyj + y^2 k$	5	KTU Dec-2017
8	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
9	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
10	Use stokes theorem to evaluate the integral $\int_C F dr$ where $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\vec{j}$ and C is the rectangle in the xy - plane bounded by the lines $x = 0$, $y = 0$, $x = a$ and $y = b$.	5	KTU Apr-2018
11	Find the circulation of $F = (x - z)i + (y - x)j + (z - xy)k$ using Stokes theorem around the triangle with the vertices A(1,0,0),B(0,1,0) and C(0,0,1).	7	KTU MODEL QUESTION
12	Use divergence theorem to find the out ward flux of the vector field $F = 2xi + 3yj + z^3k$ across the unit cube bounded by $x = 0, y = 0, z = 0, x = 1, y = 1, z = 1$	7	KTU MODEL question
13	Determine the sources and sinks of the vector field $\vec{f}(x,y) = x^2\vec{\iota} + y^2\vec{j} + z^2\vec{k}$	3	KTU-June 2022
14	Use divergence theorem to evaluate $\iint \vec{f} \cdot \vec{n} dS$ where	3	KTU-June 2022
	$\vec{f} = 2x\vec{i} + 4y\vec{j} - 3z\vec{k}$ and S is the surface of the sphere $x^2 + y^2 + z^2 = 1$		

15	a) Use Green's theorem to find the work done by the force field	7	
	$\vec{f}(x,y) = xy\vec{\imath} + \left(\frac{x^2}{2} + xy\right)\vec{\jmath}$ on a particle that starts at (4,0)		KTU-June 2022
	transverse the upper semicircle $x^2 + y^2 = 16$ and returns to the		
	starting point along X axis.		
	b) 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 $z = 3$,	7	
	if the density is $\phi(x, y, z) = x^2 z$.		
16	a) Let σ be the portion of the surface $z = 1 - x^2 - y^2$	7	
	a_j Let o be the portion o_j the surface $z = 1 - x^2 - y$		KTU-June
	that lies above the XY plane and σ is oriented upwards.	-	2022
	Find the flex of the vector field $\vec{F}(x, y, z) = x\vec{i} + y\vec{j} + z\vec{k}$ across σ .	/	
	b) Use Stoke's theorem to evaluate $\oint \vec{F}.d\vec{r}$ over the circle		
	$C: x^2 + y^2 = 1$ where $\vec{F}(x, y, z) = z^2 \vec{\iota} + 3x \vec{j} - y^3 \vec{k}$ and		
	C is the circle in XY plane with counter clockwise orientation looking		
	down the positive Z axis		
	Module 3		
1	Consider the initial value problem $y'' - x^3y' + 6x = sinx$,	3	KTU
	y(0) = 3, $y'(0) = -1$.Can this problem have unique solution in an interval containing zero? Explain		JULY-2018
2	Find any three independent solutions of the differential equation $y''' - y' =$	3	KTU
2			JULY-2018
5	Discuss the existence and uniqueness of solution of initial value problem $\frac{dy}{dx} = \frac{y}{dx}$	3	JULY-2018
	$\frac{1}{\sqrt{x}}$, $y(1) = 3$		
4	Prove that $y_1(x) = e^x$ and $y_2(x) = e^{\pm x}$ form a fundamental system (basis) for the differential equation $y'' = 5y' \pm 4y = 0$ Can $5e^x = 2e^{4x}$ be a solution	5	KTH
	(do not use verification code) of the differential equation ?Explain.	J	JULY-2018
5	Discuss the existence and uniqueness of solution of the initial value problem		
	$\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ in the rectangle	6	KTU
	$ x \le 1, y-1 \le 1.$		JULY-2018

6	If $y_1(x) = x$ is a solution of $x^2y'' + 2xy' - 2y = 0$, find the general solution.	5	KTU JULY-2018
7	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	3	KTU
	solution?		MAY-2017
8	Find the particular integral of $(D^2+4D+10)y = e^x \sin 3x$	3	KTU MAY-2017
			10777 2017
9	Solve $(D^3 + 8)y = sinx cosx + e^{-2x}$	6	KTU MAY-2017
10	Solve y"+y= <i>sec x</i> by the method of variation of parameters	7	KTU MODEL QUESTION
11	Solve $y'' + 4y' + 4y = x^2 + e^{-x} \cos x$	7	KTU MODEL QUESTION
10		2	
12	Solve the initial value problem $y''+5y'+6y=0$, $y(0) = 1$ y'(0)=2	3	2022
13	Solve y'''-y'=0	3	KTU-June 2022
14	a)Using the method of undetermined coefficients solve, $y''-4y=xe^x$	7	KTU-June 2022
	b) Using the Method of variation of parameters solve,		
	y''-4y+5y= $\frac{e^{2x}}{\sin x}$	7	
15	a)Solve the initial value problem, by method of undetermined coefficients $y'' + 4y = 8x^2$, $y(0) = -3$, $y'(0) = 0$	7	KTU-June 2022
	b) Solve the initial value problem $x^2y'' + 3xy' + y = 0$, y(1) = -3, $y'(1) = 1$	7	
	Module 4		
1	Find the inverse Laplace transform of $\frac{5}{(s^2+1)(s^2+25)}$, using convolution	7	KTU-Dec 2018
2	Find the Laplace transform of	7	KTU-Dec
-	i)		2018
	ii) $\cos(\omega t + \theta)$		

	Solve the initial value problem $y'' - y' - 6y = 0$, $y(0) = 6$, $y'(0) = 13$	7	KTU-March
3	using Laplace transforms.		2017
		8	KTU- Apr
4	Solve, by using Laplace Transform: $y''+y=3cos 2t$; (0)=0,		2018
	v'(0)=0.		
5		8	KTU- April
	Find the Inverse Laplace Transform of		2018
	$(i) \stackrel{S-4}{\longrightarrow} (ii) \stackrel{4}{\longrightarrow} $		
	$(l)\frac{1}{s^2-4}$ $(ll)\frac{1}{s^2-2s-3}$		
6		8	KTU-April
	Find the Laplace Transform of :		2018
	(i) $sin3tcos2t$ (ii) $e^{-2t}cos^2t$		
7		7	KTU- July
	Find the inverse Laplace transform of $\frac{1}{\sqrt{1-1}}$		2017
	$\frac{(s+\sqrt{2})(s-\sqrt{3})}{(s+\sqrt{2})(s-\sqrt{3})}$		
8	Solve the initial value problem, using Laplace transforms. $y'' + y' + 9y = 0$,	8	KTU-July
	y(0) = 0.16, y'(0) = 0		2017
9	Find the Laplace transform of	8	KTU-July
	(i) $\sinh t \cos t$ (ii) $(t-1)^3$		2017
10	Find the Laplace transform of	8	Ktu- May
	i) $cost - tsint$ ii) $4te^{-2t}$		2017
11.	Eind the images logic set transform of $E(s) = \frac{2(e^{-s} - e^{-3s})}{2(e^{-s} - e^{-3s})}$	7	Model
	Find the inverse rapiace transform of $F(s) = \frac{1}{s^2 - 4}$		Question
			кти
12	Find the Laplace Transform of $(sint + cost)^2$	3	KTU-June
		_	2022
13	e^{-3s}	3	KTU-lune
	Find the inverse Laplace Transform of $\frac{1}{(s+2)^2}$	5	2022
14	a) Using Laplace Transform solve $y''+5y'+6y-e^{-t}$ $y(0) = 0$	7	
	u/0 sing Eupheer Hanstorm solve $y + 5y + 0y = c$, $y(0) = 0$,	KTH-lune
	b) Using convolution theorem find the Inverse Lonlose		2022
	c^2	7	2022
	Transform of $\frac{3}{(c^2+a^2)(c^2+a^2)}$	· ·	
	(5 1 4)(5 1 4)		
45			
15	a)Find the inverse Laplace Transform of $\frac{5+8}{(c^2+4c+5)}$	7	
	(5-+45+5)		KTU-June
	b) Using Lanlage Transform solve		2022
	b) Using Laplace Hanstonni solve $x^{2} + 16x - 4\delta(t - 2\pi) + \alpha(0) - 2 - x^{2}(0) - 0$		
	$y +10y=40(t-5\pi), y(0) = 2, y(0)=0$	7	
	BA-Jul-P		l
1	Module 5	-	
11	π π π π π	/	KTU-Dec
	Using Fourier cosine integral, show that $\int_0^{\infty} \frac{\cos \omega x}{1+\omega^2} d\omega = \frac{\pi}{2}e^{-x}$, if $x > 0$		2018
2		8	KTU-Dec
	Find the Fourier sine transform of $f(x) = f(x) = f(x)$		2018
	Find the Fourier sine transform of $f(x) = \{0, x > \pi\}$		
3	Eind the Fourier transform of $f(x) = \int e^{kx} x < 0$	7	KTU-Dec
	Find the Fourier transform of $f(x) = \{0, x > 0\}$		2018

4	(0 if x < 0)	7	KTU-May
	Use Fourier integral to show that $\int_0^\infty \frac{\cos x \omega + \omega \sin x \omega}{1 + \omega^2} d\omega = \begin{cases} \frac{\pi}{2} if x = 0 \end{cases}$		2017
	$\pi e^{-x} if x > 0$		
5	Represent $f(x) = \begin{cases} x^2, & 0 < x < 1 \\ 0, & x > 1 \end{cases}$ as a Fourier cosine integral	8	KTU-May
	(0, x > 1)		2017
6	Find the Fourier transform of $f(x) = \begin{cases} 1, & x < 1 \\ 0, & otherwise \end{cases}$	7	KTU-May 2017
7	Express $f(x) = 1, 0 < x < \pi$	7	KTU-July
	$0, x > \pi,$		2017
	a Fourier sine integral and evaluate $\int_0^\infty \frac{1-\cos n\omega}{\omega} \sin x\omega d\omega$		
8		8	KTU-April
	Find the Fourier Sine Transform of $(x)=e^{- x }$. Hence evaluate		2018
	$\int_0^\infty \frac{\omega \sin \omega x}{1+w^2} d\omega .$		
9		7	KTU-April
	Find the Fourier Cosine Transform of $f(x) = \sin x$; $0 < x < \pi$.	(3)	2018,
			KTU-June
10		8	ZUZZ KTU-July
10	Using Equation integral representation show that $\int_{0}^{\infty} \frac{\sin\omega - \omega \cos\omega}{\omega} =$	Ũ	2017
	$\int \frac{\pi x}{\omega^2} = \int \frac{\pi x}{\omega^2} = \frac{1}{\omega^2}$		
	$\left(\begin{array}{c} \frac{2}{x} \\ \frac{2}{x} \end{array}\right)$, if $0 < x < 1$		
	$\begin{cases} \frac{n}{4}, & \text{if } x = 1 \end{cases}$		
	(0, if x > 1)		
11	Does the Fourier sine transform $f(x) = x^{-1}sinx$ for o <x<∞ exist?<="" td=""><td>4</td><td>Ktu model</td></x<∞>	4	Ktu model
	Justify your answer.		question
13	Find the Fourier sine transform of e^{-x} (x > 0)	3	KTU-June
1.4		7	
14	a)Find the Fourier transformation of $f(x) =\begin{cases} e^{t}, t & j = a < x < a \\ 0 & otherwise \end{cases}$	/	2022
	(0, otherwise		2022
	b) Find the Fourier cosine Integral of		
	$(\cos x, if 0 < x < \frac{\pi}{2})$	7	
	$f(x) = \begin{cases} 2 \\ 0 & otherwise \end{cases}$		
15	a)Find the Fourier cosine transformation of	7	KTU-June
	$f(x) = \{x^2, if 0 < x < 1\}$		2022
	$(x)^{-1}(x)^{-1}(x) = 0, x > 1$		
	b) Find the Fourier transform of $f(x) = \begin{cases} a - x , & \text{if } x < a \\ a - x + b = x \\ a - x $	7	
	(0, otherwise	,	

EST110 ENGINEERING GRAPHICS

Q.No	MODULE 1	Mark	Year
1.1	A line RS having length 90 mm is inclined 30° to HP and 45° to VP. The point R is 10 mm above HP and 15 mm in front of VP and the end S is in second quadrant. Draw the projections of the line	20	Dec 2019
1.2	A line AB inclined at 45° to VP has its ends 20 mm and 50 mm above HP. The length of its front view is 70 mm and its VT is 10 mm above HP. Draw its projections and find its true length, true inclination with HP and also locate its traces.	20	Dec 2019
1.3	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	Dec 2020
1.4	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	Dec 2020
1.5	A line AB 60 mm long has its end A 30 mm above HP and 25 mm in front of VP. The top view and front view have lengths of 40 mm and 55 mm respectively. Draw its projections and find the true inclinations of the line with HP and VP. Also locate its traces.	20	Jan 2021
1.6	The projectors drawn from VT and end A of line AB are 40 mm apart. End A is 15 mm above HP and 25 mm in front of VP. VT of line is 10 mm below HP. If line is 75 mm long, draw its projections and find inclinations with HP and VP.	20	Jan 2021
1.7	The front view of line AB is 50° inclined to XY line and is 55 mm long while its top view is 60° 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	July 2021
1.8	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	July 2021
1.9	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	Dec 2021

1.10	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	Dec 2021
1.11	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	June 2022
1.12	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	June 2022
1.13	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	Dec 2022
1.14	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	Dec 2022

Q.No	MODULE 2	Mark	Year
2.1	A cone with base diameter 40 mm and axis 60 mm long touches the VP on a point of its base circle. The axis is inclined at 30° to VP and the front view of its axis inclined at 45° to XY line. Draw its projections	20	Dec 2019
2.2	A square pyramid of base edge 30 mm and the height 60 mm is resting on HP on its triangular face such that the square face edge on HP is inclined 30° to VP. Draw its projections	20	Dec 2019
2.3	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	Dec 2020
2.4	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	Dec 2020
2.5	A square pyramid side of base 35 mm and altitude 65 mm is kept with a side of base parallel to VP and the triangular face containing that side of base being vertical. Draw the projections of the pyramid such that the base is visible in the front view.	20	Jan 2021

2.6	A pentagonal prism base side 20mm and height 60mm is resting on one of the base edges in such a way that the base makes an angle of 30° with HP and the edge on which the prism rests makes an angle 30° with the VP. Draw its projections.	20	Jan 2021
2.7	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	July 2021
2.8	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 projections	20	July 2021
2.9	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	Dec 2021
2.10	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	Dec 2021
2.11	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	June 2022
2.12	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	June 2022
2.13	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	Dec 2022
2.14	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	Dec 2022

Q.No	MODULE 3	Mark	Year
3.1	A square prism having a base of 40 mm side and 60 mm long axis rests on its base on the HP such that one of the vertical faces makes an angle of 30° with the VP. A section plane perpendicular to the VP, inclined at 45° to the HP and passing through the axis at a point 20 mm from its top end, cuts the prism. Draw the front view, sectional top view and true shape of the section	20	Dec 2019

3.2	Draw the development of a right circular cone of base diameter 60 mm and height 64 mm resting on HP on its base. An insect moves from a point on the base circle and returns to the same point after travelling through the shortest path along the curved surface. Mark the shortest path in the front and top views of the cone	20	Dec 2019
3.3	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 (note: 30° with HP). Draw the projections and obtain the front view, sectional top view and true shape of the section	20	Dec 2020
3.4	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	Dec 2020
3.5	A pentagonal pyramid having base with 30 mm side and axis 70 mm long is resting on its base in the HP with an edge of the base nearer to the VP and parallel to it. A vertical section plane inclined at 45° to the VP cuts the pyramid at a distance of 8 mm from the axis. Draw its sectional front view, top view and true shape of the section	20	Jan 2021
3.6	A cone with 50 mm base diameter and 70 mm long axis rests on its base on the HP. Draw the development of its lateral surface when it is cut by an auxiliary inclined plane bisecting the axis and inclined at 45° to the HP.	20	Jan 2021
3.7	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	July 2021
3.8	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	July 2021
3.9	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 an 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	Dec 2021
3.10	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	Dec 2021
3.11	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	20	June 2022

	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.		
3.12	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	June 2022
3.13	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	Dec 2022
3.14	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	Dec 2022

Q.No	MODULE 4	Mark	Year
4.1	A sphere of 20 mm radius is placed centrally over a hexagonal slab of side length 30 mm and thickness 20 mm. Draw the isometric view of the combination	20	Dec 2019
4.2	A hemisphere of diameter 30 mm rests centrally on its circular base on the top of a frustum of a cone of base diameter 60 mm, top diameter 30 mm and height 60 mm. Draw isometric view of the combination.	20	Dec 2019
4.3	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	Dec 2020
4.4	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	Dec 2020
4.5	A cylinder 50mm base diameter and axis 60mm long is resting on its base on the HP. It is surmounted centrally by a sphere of 40 mm diameter. Draw the isometric view of the solids	20	Jan 2021
4.6	A hemisphere of diameter 80mm is resting on the ground with its flat surface facing upwards. A square pyramid having side of base 40mm and axis 60mm is resting on its base centrally on the top of the flat face of the hemisphere. Draw the isometric view of the combination of the solids	20	Jan 2021
4.7	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	July 2021

Q.No	MODULE 5	Mark	Year
4.14	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 40mm. 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	Dec 2022
4.13	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	Dec 2022
4.12	Draw the isometric projections of a hexagonal prism with edge of base 30 mm and axis 60 mm when it rests on a rectangular face on the ground	20	June 2022
4.11	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	June 2022
4.10	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	Dec 2021
4.9	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	Dec 2021
4.8	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 30 mm. Draw the isometric view of the combination if the axis of the cylinder is parallel to the longer edges of the slab.	20	July 2021

	perspective view.			
5.2	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	Dec 2019	

	So to		
5.3	A rectangular box of 50 mm x 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	Dec 2020
5.4	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. $\int \int \int \int \frac{d^2 t}{dt} dt = \int \frac{dt}{dt} dt = \int $	20	Dec 2020
5.5	A hexagonal prism 25 mm side and 50mm long is lying on one of its rectangular face on the ground plane. The station point is 80 mm in front of the picture plane, 65mm above the ground plane and lies in a central plane which is 70 mm to the right of the axis of the prism. Draw the perspective view of the prism if one of the hexagonal faces of the prism is on the picture plane.	20	Jan 2021
5.6	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	Jan 2021

5.7	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	July 2021
5.8	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	July 2021
5.9	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	Dec 2021
5.10	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	Dec 2021

	21-1-1-00 20-1-21-1-00 20-1-		
5.11	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	June 2022
5.12	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. $ \begin{array}{c} $	20	June 2022
5.13	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	Dec 2022
5.14	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	Dec 2022

ENGINEERING CHEMISTRY(CYT100)

MODULE I

Sl.	Questions	Marks
No:		
1.	State & explain Nernst equation ? (KTU DEC 2015,2017)	(4)
2.	What is meant by single electrode potential? MAY2019	(3)
3.	Explain Helmholtz double layer? MAY2019, DEC 2021Dec 2021	(3)
4.	How will you determine the pH of a solution using glass electrode? (KTU MAY ,2018,DEC2018)	(10)
5.	Explain the construction of Li-Ion cell?	(4)
6.	Explain different types of electrodes?(KTU 2019,2018,DEC2018)	(10)
7.	Explain potentiometric titration?	(3)
8.	Explain the process involved in H2-O2 fuel cell? (KTU MAY 2016,DEC2017)	(4)
9.	.Explain the process involved in calomel electrode and SHE? (KTU 2016,2017)	(10)
10	Briefly explain the variation of emf with temperature?	(4)
11	How will you measure the conductivity of a solution ?	(3)
12	Distinguish between electro chemical series and galvanic series?	(10)
13	Briefly explain Copper and Nickel plating?	(4)
14	Explain the mechanism of electro chemical corrosion?	(10)
15	What is galvanic series? How is galvanic series	(3)
	advantageous overelectrochemical series in corrosion chemistry?Dec	
	2020	
16	Why full charging is not allowed in Li-ion cell?Dec 2020	(3)
17	Derive Nernst equation and apply it for the emf of Daniel cell.	(8)
18	How is electroless nickel plating done? Write the reactions involved.	(6)
	Give anytwo applications of it.	
19	With the help of electrochemical equations, show that rusting of iron is	(8)
	more severe in oxygen rich acidic medium than alkaline medium.	
20	Δ glass electrode, calomel electrode assembly shows an emf of 212 mV	(6)
20	r glass electrone- calonier electrone asseniory shows an enn of 212 my	(0)
	with $pH=4$ buffer solution and $-30mV$ with $pH=9.2$ buffer solution. Find	
	the pH of the test solution if it shows an emf of 120 mV. Also find E^{0}_{G} if	
	$E_{SCE} = 0.2422 \text{ V(Dec 2021)}$	

MODULEII

Sl. No:	Questions	Marks
1.	Distinguish between absorption spectrum & emission spectrum?	(3)
2.	State and explain Beer Lamberts law? (KTU 2016,2017)	(3)
3.	What are different types of electronic transitions are possible in UV- Visible spectroscopy?	(3)
4.	Give the applications of UV visible spectroscopy?(KTU DEC 2015,2017)	(4)
5.	Explain the various modes of vibration possible for CO2, which of them are IR active(KTU MAY2018,DEC2018	(3)
6.	Explain the various modes of vibration possible for H2O, which of them are IR active?	(3)
7.	Give the mechanism of interaction of electromagnetic radiation with oscillating dipole of a molecule? (KTU DEC2018)	(4)
8.	Write the basic principle of MRI imaging? Explain the process in NMR?	(10)
9.	Write the basic principle of IR spectroscopy ? (KTU MAY 2017,2018,DEC2018)	(4)
10	.Briefly explain energy level diagram of ethane,butadiene,benzene,hexatriene ?	(10)
11	The vibrational frequency of HCl molecule is 2886cm-1.Calcualte the force constant if the reduced mass is 1.63x 10 -37 Kg.? (KTU DEC2017)	(10)
12	CHCl ₃ gives a singlet at 7.26 ppm, while CH ₃ Cl shows singlet at 3.06 ppm in the ¹ H NMR spectrum. Give reason. (KTU, DEC 2020)	(3)
13	Explain the reason for broadening of UV-Visible (electronic) spectrum. (KTU,JULY 2021)	(3)
14	Explain the origin of spin-spin splitting and draw the splitting pattern	(8)
	in CH ₃ -CH ₂ -CH ₂ -Cl. (KTU, DEC 2020)	
15	Discuss the principle of IR spectroscopy. Arrive at the expression for	(6)
	vibrationalenergy states of a diatomic molecule. Draw the potential	
	energy diagram. (KTU, JULY 2021)	
16	Draw the molecular orbital energy diagram of i) Ethene, ii) 1, 3-	(8)
	butadiene iii)1,3,5 hexatriene and iv) benzene to explain their UV-Vis	
	absorption(KTU, DEC 2020)/ Dec(20221)	
17	An organic compound C ₃ H ₆ O contains a carbonyl group. How will	(6)
	its NMRspectrum decide whether it is an aldehyde or a ketone? (KTU,	
	JULY 2021)	
18	An absorption spectrum is obtained for a compound A of 2.5×10^{-6} M	(6)
	concentration, when measured using 1 cm cuvette in a UV-Visible	
	spectrometer. Calculate the unknown concentration of a test sample of	
	compound A if he absorbance is 0.518,	
	when measured in the same condition(KTU, DEC 2021)	

I	19	Recognize the atoms showing NMR phenomenon among the	
		following Givereason. $1^{11}H_{14}$ 72, $3^{11}H_{16}H_{18}$ 80, 80(KTU, DEC 2021)	(3)
L			

MODULEIII

Sl.	Questions	Marks
No:		
1.	Explain the principles of HPLC? (KTU MAY 2019,2018,DEC2018)	(4)
2.	Distinguish between TGA & DTA? (KTU MAY 2016,2018,DEC2018)	(10)
3.	Explain the various methods of thermal analysis ?(KTU	(10)
	MAY2018, DEC2018)	(10)
4.	MAY2015,DEC2015,2018) (KTU	(10)
5.	Explain the process TLC? (KTU DEC2018)	(4)
6.	Give the principle of column chromatography? List the various steps involved in it?(KTU MAY 2019,2018)	(3)
7.	.Explain the major differences between GC & HPLC? (KTU DEC2018)	(10)
8.	.Explain the decomposition of hydrated Calcium Oxalate? (KTU DEC2016)	(3)
9.	Explain the advantages of differential thermal analysis? (KTU MAY2018,DEC2018)	(4)
10	Explain the term 'retention factor'? (KTU MAY 2018)	(3)
11	Write note on nano material? (KTU MAY 2019,2018,DEC2018)	(4)
12	Give the applications of nano materials? (KTU MAY2018,DEC2018)	(3)
13	What are fullerene?	(3)
14	Write note on sol gel process? (KTU MAY 2016,DEC2017)	(4)
15	Briefly explain the principle and characterisation of SEM?	(10)
16	Write any three applications of TGA(KTU,JULY 2021)	(3)
17	Explain the terms retention time (t_R) and relative peak area (RPA) in GC. (KTU, DEC 2020)	(10)
18	Discuss the principle and procedure in column chromatography	(8)
	Discuss the principle and procedure in column enromatography.	
	Explain howTLC is useful in checking the purity of each fraction. (KTU,	
	JULY 2021)	
19	Sketch the Derivative TG graph of Calcium oxalate monohydrate(KTU	(6)
	sketen the Derivative 10 graph of Calcium oxalate mononyurate(K10,	
	DEC 2020)	
20	Explain the various chemical methods used for the synthesis of	(8)
	nanomaterials. (KTU, JULY 2021)	
21	Explain the experimental procedure of TLC(KTU, DEC 2020)	(6)

Sl. No:	Questions	Marks
1.	Explain the different classifications of polymers?	(4)
2.	What are co-polymers? Explain the properties of random, alternating, block and graft polymer?	(10)
3.	Give the applications of conducting polymers? Explain the preparation properties of Poly pyrrole, poly aniline? (KTU MAY 2016,DEC2017)	(10)
4.	Explain the structure of OLED? (KTU MAY2018, DEC2018)	(4)
5.	.Explain various types of isomerism?	(10)
6.	Explain the Newman configuration of methane and ethane?	(4)
7.	.Explain Sawhorse representation of methane and ethane?	(4)
8.	Briefly explain the rules and examples of RS notation	(3)
9.	Define the term chirality?	(3)
10	Differences between enantiomers and diastereo isomers	(4)
11	.Draw the conformational analysis of ethane, butane, cyclo hexane,	(10)
12	Explain the preparation and structure of Kevlar ? (KTU MAY 2016,DEC2017)	(3)
13	Draw the Fischer projection formula for the meso form of the	(3)
	following and convert it into Saw-Horse structure. C ₆ H ₅ -CH(Cl)- CH(Cl)-	
	C ₆ H ₅ (KTU, JULY 2020)	
14	Write the synthesis of polypyrrole. (KTU, DEC 2021)	(3)
15	How many optical isomers are possible for H ₃ C-CH(OH)-CH(OH)-	(8)
	CHO? Draw the Fischer projection formula of all the isomers. Which	
	among them are opticallyactive(KTU, DEC 2020)	
16	What are OLEDs? Give the construction and working. (KTU, JULY 2020)	(6)
17	What is meant by structural isomerism? What are the different types of	(8)
	structuralisomerism in organic molecules? Explain with examples. (KTU, DEC 2021)	
18	Write the structure of ABS and its monomers. Also list any two applications of ABS. (KTU, DEC 2020)	(6)

MODULEIV

1	What is hard water? What are the different units in which hardness is	(4)
	expressed? (KIU MAY 2016,2018,DEC2018)	
2	2 Describe EDTA method for the estimation of hardness? (KTU MAY 2016.DEC2017)	
3	How are ion exchange resins useful in removing hardness?	(10)
4	Explain reverse osmosis process? (KTU MAY 2016,2018,DEC2018)	(3)
5	Explain with flow chart , how water is purified for drinking purposes? MAY2019	(10)
6	.Explain trickling filter method for water purification??	(4)
7	Explain the process chlorination?	(3)
8	Explain BOD & COD ? (KTU MAY 2016,DEC2017)	(4)
9	Explain UASB process? (KTU MAY2018,DEC2018)	(3)
10	Write a note on aerobic & anaerobic waste water treatment (KTU, DEC 2020)	(10)
11	Which buffer is used in EDTA method? What is its role in titration? (KTU, JULY 2020)	(3)
12	Explain break point of chlorination. (KTU, DEC 2021)	(3)
13	Explain trickling filter and UASB processes in waste water treatment. (KTU, JULY 2020)	(8)
14	Discuss the procedure for the determination of DO in water. (KTU, DEC 2020)	(6)
15	Define reverse osmosis. Explain the method for the desalination of	(8)
	water usingreverse osmosis. Give its advantages. (KTU, JULY2020)	
16	Explain the ion exchange process in water treatment. How is the	(6)
	exhausted resinregenerated? (KTU, JULY 2021)	

MODULE V

Course Code: EST 102

Course Name: Programming in C

Module I			
SI. No	Questions	Marks	Years
1.	Differentiate between system software and application software	3	July 2021 (AN&FN)
2.	Write an algorithm to find the largest of three numbers	3	July 2021(AN)
3.	Differentiate between compiler and interpreter	3	July 2021(FN)
4.	Write an algorithm to find the sum of digits of a number.	7/8	July 2021(FN) June 2022
5.	Explain bubble sort with an example. Draw a flowchart and write	14	July 2021(FN)
6.	Explain different types of memory used in a computer.	7	July 2021(FN)
7.	Draw a flowchart to find the factorial of a number.	6	July 2021(FN)
8.	With the help of a neat diagram explain the functional units of a computer	8	July 2021(FN)
9.	List five important registers in CPU. Also state the purpose of each register.	6	July 2021(FN) June 2022
10.	Write algorithm and draw flowchart to perform swapping of two numbers	8	July 2021(FN)
11.	What are the functions of ALU and CU?	3	June 2022
12.	Draw a flowchart to find the sum of first N numbers.	3	June 2022
13	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
	Module II		
1.	What is the importance of precedence and associativity? Write the table for operator precedence	3	July 2021(FN)
2.	Discuss the differences between break and continue statements in C.	3	July 2021(FN)
3.	Write a C program to find the sum of first and last digit of a number	7	July 2021(FN)
4.	Write a C program to check if a number is present in a given list of numbers. If present, give location of the number otherwise	7	July 2021(FN) June 2022

	insert the number in the list at the end.		
5.	What is type casting? Name the inbuilt typecasting functions available in C language. What is the difference between type casting and type conversion?	7	July 2021(FN)
6.	Explain different data types supported by the C language with their memory requirements.	7	July 2021(FN) June 2022
7.	What is the difference between assignment and equality operators?	3	July 2021(AN)
8.	What is a static variable? When should it be used?	3	July 2021(AN)
9.	Explain arithmetic, logical and bitwise operators with examples.	7	July 2021(AN)
10.	Write a C Program to check if a given number is a strong number or not. A strong number is a number in which the sum of the factorial of the digits is equal to the number itself. Eg:- I 45:1 !+4 !+5 !:I +24+120=1 45	7	July 2021(AN)
11.	Write C program to convert the given decimal number into binary number	7	July 2021(AN)
12.	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(AN)
13.	Differentiate between while and do-while loops using an example.	3	June 2022
14.	Why is the use of goto statements discouraged in C programs?	3	June 2022
15	Explain formatted and Unformatted I/O functions of C language with syntax and example	7	June 2022
16	Write a C program to read a character from the user and check whether it is a vowel or consonant	7	June 2022
	Module III		
1.	Explain any 3 string handling functions using examples	3	July 2021(FN)
2.	Write a C program to find the occurrence of each element in an array.	3	July 2021(FN)
3.	Write a C program to reverse a string without using string handling functions	7	July 2021(FN) June 2022
4.	Write a C program to perform linear search on an array of numbers.	7	July 2021 (FN & AN)
5.	Write a C program to print the number of vowels and consonants in a string.	7	July 2021(FN)

6.	Write a C program to find the transpose of a matrix.	7	July 2021(AN) June 2022
7.	Write a C program to find length of a string without using string handling functions.	3	July 2021(AN)
8	What is an array? Illustrate using an example, how a single dimensional array is initialized	3	July 2021(AN)
9.	Explain any 4 string handling functions in C programming.	7	July 2021(AN) June 2022
10	Write a C program to find second largest element in an array	7	July 2021(AN)
11	Write a C program to check whether a string is palindrome or not without using string handling functions	7	July 2021(AN)
12	Write a C program to compare any two strings using string handling functions	3	June 2022
13	Write a C program to find the largest element in an array	3	June 2022
14	Write a C program to sort an array of numbers using bubble sort	7	June 2022
Module IV			
1.	Define formal parameters and actual parameters. Illustrate with an example.	3	July 2021(FN)
2.	With examples show how: (i) an array is passed as an argument of a function. (ii) individual elements of an array are passed as arguments of a function.	3	July 2021(FN)
3.	What are different storage classes in C? Give examples for each	7	July 2021 (FN & AN) June 2022
4.	Write a C program to find sum and average of an array of integers using user defined functions	7	July 2021(FN)
5.	Write a C program to : (i) Create a structure containing the fields: Name, Price, Quantity, Total Amount. (ii) Use separate functions to read and print the data	7	July 2021(FN) June 2022
6.	What is the purpose of function declaration and function definition and function call? With examples illustrate their syntax	7	July 2021(FN)
7.	Differentiate between structure and union using an example	3	July 2021(AN)
8.	Illustrate the purpose of return statement using an example	3	July 2021(AN)
9.	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	7	July 2021(AN)

	the details		
10.	What is recursion? Write a C program to display Fibonacci series using recursive function	7	July 2021(AN) June 2022
11.	Write a C program to sort N numbers using functions	7	July 2021(AN)
12.	Name the different types of parameter passing. Illustrate each of them with an example	3	June 2022
13.	What are the advantages of modular programming?	3	June 2022
14.	What are the main differences between structures and unions? Which is preferred in what situation? Give examples.	7	June 2022
	Module V		
1.	Explain the different modes of operations performed on a file in C language.	7	July 2021(FN)
2.	Explain how pointers can be passed to functions in C	7	July 2021(FN) June 2022
3.	Write any three/five file handling functions in C.	3/7	July 2021 (FN & AN) June 2022
4.	Differentiate between address operator(&) and indirection(*) operator	3	July 2021(FN)
5.	Explain any 5 file handling functions in C?	7	July 2021(FN)
6.	Write a program in C to copy the contents of one file into another.	7	July 2021(FN)
7.	Differentiate between char name[] and char *name in C	3	July 2021(AN)
8.	Explain the use of fseek0 function	3	July 2021(AN)
9.	Write a C program to reverse a string using pointers	7	July 2021(AN)
10.	Differentiate between array of pointers and pointer to an array	7	July 2021(AN)
11.	Write a C program to count number of lines in a text file	7	July 2021(AN)
12.	Distinguish between text mode and binary mode operation of a file	3	June 2022
13.	What do you mean by a pointer variable? How is it initialized?	3	June 2022
14.	Write a C program to replace vowels in a text file with character 'x'	7	June 2022
15	Write a C program to print the elements of an array in reverse order using pointers	7	June 2022

EST 120: BASICS OF CIVIL AND MECHANICAL ENGINEERING MODULE 1

QUESTION	MONT	MARK
S	HAND	
1. Emploin the self of similar since we to service	YEAR	2
1. Explain the role of civil engineers to society	Dec 2021	3
2. List out & explain any 6 disciples of civil engineering	April2022	6
3. Factors effecting site selection	April2021	6
4. What are the conditions for selection of site for residential building	April2021	3
5. How can you classify the buildings based on occupancy	April2022	3
according to National Building Code ? Explain briefly explain.		
6. Describe the components of a residential building with neat figure	April2021	4
7. Details to be included in <u>SITE PLAN</u>	Dec 2021	4
8. List the steps in setting out of a foundation in centre line method	Dec 2021	5
9. What are the principles of planning? Explain	Dec 2021	3
10. What are the points to be considered in selecting position of doors & windows inside a building?	Dec 2021	7
11. Define the following: <i>COVERED AREA</i> , Plinth area, <i>FLOOR</i> <i>AREA</i> , Carpet area	Dec 2021	3
12 What are the major disciplines of civil engineering	Dec 2022	4
13. Classify buildings based on National Building Code (NBC) of India	Dec 2022	6
14. Explain the functions of various components of a residential building.	Dec 2022	10
15. Explain (a) Plinth area, (b) built-up area, (c) floor area, (d) floor area ratio (FAR) for a building as per Kerala Building Rules (KBR).	Dec 2022	4
2 What are the norms of Coastal Regulatory Zone (CRZ)?	Dec 2022	4

1. What is surveying & what are the principles of surveying?	April2021	7
2. What are the classifications of surveying? Explain primary	April2021	5
classification		
3. What are the objectives or Purpose of surveying:	April2021	6
4. What is ranging, explain	April2022	3
5. What is leveling? What are the purposes of leveling.	April2021	4
6. What are the instruments used for ranging or surveying	April2021	3
7. Write short note on total station, GPS, EDM & digital level	April2021	7
8. What are the Properties of good bricks	April2022	4
9. What are constituents of good brick earth?		3

10. Explain quality classification of bricks.	April2021	3
11. What are the Stages in manufacturing of cement blocks	Dec 2021	4
12. What is the composition of OPC?	Dec 2021	3
13. Explain the grades of cement	Dec 2021	4
	Dec 2021	5
14. What are the different types of cement available & their use?		
	Dec 2021	6
15. What are the Market Forms of STEEL available?		
16. List out any two examples for prefabricated building	Dec 2022	4
components stating any two advantages of using them in		
construction.		
17. Classify bricks, and explain the characteristics of each type.	Dec 2022	6
18. Differentiate plain cement concrete and reinforced cement	Dec 2022	4
concrete.		
19. Explain the types of rolled steel sections and steel	Dec 2022	6
reinforcements		
	Dec 2022	4
20. State the objectives of Surveying		

1. What do you mean by bearing capacity of soil? What are the	April2021	7
functions of foundations.		
2. Differentiate between shallow & deep foundations	April2022	5
3. Difference between header & stretcher bonds in brick masonry	April2021	5
(draw elevations of both bonds)		
4. Different types of roof (figures)	April2021	4
5. Different types of roofing materials	April2021	4
6. What is the purpose of plastering	Dec 2021	3
7. Explain procedure for finishing of wall using plastering or	Dec 2021	5
How to prepare surface for plastering		
8. Explain any 5 types of paints with their functions	Dec 2021	5
9. Explain the procedure Painting on NEW WOOD WORK,	Dec 2021	4
OLD WOOD WORK, NEW IRON ORSTEEL WORK		
10. Write note on lift, ramp, elevators & escalators	April2021	6
11. Different methods to sound proof a building	April2021	4
12. Different types of air conditioning	April2022	4
13. Write note on: chimney, towers, water tank	April2021	4
14. Explain the concept of intelligent building	April2022	6
20. Define the terms in the context of brick masonry - (a) frog, (b)	Dec 2022	4
perpend, (c)Quoin, and (d) bond		
21. Sketch the plan of odd and even courses and elevation of one	Dec 2022	6
brick thick English bond wall.		

22. Select a suitable floor covering material and roof covering material for a warehouse storing chemicals. State valid reasons for your selection.	Dec 2022	4
23. What is a green building? What are the main characteristics of a green building?	Dec 2022	6
21. Compare combined footing and isolated column footing based on nature of construction site.	Dec 2022	4
22. Explain the civil engineering aspects of escalators and ramps	Dec 2022	5

- 1 Expand the following words. SI Engine and CI Engine.
- 2 Name the process which is almost in equilibrium
- 3 "Entropy of universe is increasing". Comment
- 4 Draw the p-v and T-s diagram of a Carnot, Diesel and Otto cycle explain
- 5 State Clausius theorem, Clausius inequality and Principle of increase of entropy
- Explain the experiment which led to the formation of first law of thermodynamics.Statethe first law of thermodynamics when applied to a process and a cycle
- 7 State two classical statements of second law of thermodynamics. Also analyze these statements and prove that they are equivalent.
- 8 Explain the working of a gas turbine with its schematic and p-v and T-s diagrams. Nameany four areas where they are used.
- 9 Explain about hydraulic and steam turbines. List the examples
- 10 Compare the working of two stroke, petrol and diesel engine along with its thermodynamic cycle.
- 11 Identify and explain the engine that gives one power stroke for two revolutions of crankshaft.
- 12 Sketch a centrifugal pump and label its parts. Explain its working
- 13 Describe the working of CRDI and MPFI.
- 14 Bring out the concept of hybrid vehicles

MODULE 5

- 1 Explain the working of a winter air conditioner and summer air conditioner.
- 2 Explain the working of a house hold refrigerator. KTU
- 3 Explain about the different refrigerants used and their impacts on environment
- 4 Sketch the different process in a psychometric chart and explain
- 5 Differentiate between comfort and industrial air conditioning
- 6 Demonstrate the working of a vapour compression refrigeration system with an example
- 7 Distinguish window air conditioner and split air conditioner. Draw their respective diagrams and label the parts
- 8 Define: DBT, WBT, Dew point temperature, Specific humidity, Relative humidity, andSaturated air.
- 9 Using a layout diagram show how the power is transmitted from engine to wheels in anautomobile. Label important components and its functions.
- 10 What are the different systems used in automobiles. Explain any three in detail
- 11 Explain the different types of power transmission drives
- 12 A good fuel for an SI engine will be a bad fuel for a CI engine. Comment
- 13 Categorize power transmission device along with its application
- 14 Explain the working of cone clutch in an automobile.
- 15 Discuss any two types of breaking mechanisms used in automobile
- 16 What are the different types of gears used for power transmission

- 1 Briefly describe Rolling process.
- 2 Describe the forging process with sketches
- 3 Differentiate between soldering and brazing
- 4 Briefly describe different types of rolling mills with sketches
- 5 List and explain the steps involved in casting process
- 6 Discuss with figures, commonly used forming operation.
- 7 Explain about Gas Welding
- 8 Explain about conventional metal joining process
- 9 Explain the working of a drilling machine the help of a neat sketch.

- 10 Differences between a shaper and a planer.
- 11 Describe a shaper with a neat diagram.
- 12 List any six machining operations that are performed on a lathe
- 13 Draw a diagram of centre lathe, label its important parts along with its functions
- 14 Differentiate NC and CNC machines
- 15 Sketch a milling machine and indicate the important components of it.
- 16 Differentiate the following:(i)Shaper, Planer and Slotter(ii)Milling Machine, Grinding



VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY **TECHNICAL CAMPUS, KILIMANOOR** (Accredited by NAAC with "B++" Grade)

Course Code: HUN102 Course Name: PROFESSIONAL COMMUNICATION

Questions	Marks	Years
MODULE 1		
Find the misspelt words from each set of words given here.	4	KTU- July 2021
a) Defendant, defendant, difendent, defandent		
b) Assumption, assumption, accumption		
c) Appreciation, appreciation, appreciation		
d) Superintendent, superantendant, superintendent, superintendent		
Find the misspelt words from each set of words given.	3	KTU- June 2022
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		
Write the definition of the compound words of the following.	3	KTU- July 2021
a. Swimming pool		
h Paddle boat		
c Neck tie		
d. Black bird		
e. Foot print		
f. Sunset		
Write the definition for the following compound words	1	KTU- June 2022
a) Wild life		
a) which the		
0) Soli-III- Iaw		
In each of the following sentences there are two blank spaces. Find out	5	KTU- July 2021
which pair of words from the options can be filled up in the blanks in		
the sentence in the same sequence to make the sentence meaningfully		
complete.		
i. A committee has been to the transformation of the		
city into an International Finance Center.		
a) Constituted, convert b)appointed, oversee		
c) Convergent, evaluate d)inaugurated, determent		
11. 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		
individuals across the world into the		
a) Papersont sphere b) Target area		
a) Kepresent, sphere b) Target, area		
iv Although he puts in a of overtime and takes few helideve he		
iv. Annough he puts in of overtime and takes few holidays, he -		
	Questions MODULE 1 Find the misspelt words from each set of words given here. a) Defendant, defendant, defandent b) Assumption, assumption, accumption c) Appreciation, appreciation, appreciation, appreciation Of Appreciation, appreciation, appreciation, appreciation, appreciation, appreciation, appreciation, appreciation Appreciation, appreciation, appreciation, appreciation Appreciation, appreciation, appreciation, appreciation Appreciation, appreciation, appreciation, appreciation Appreciation, appreciation, appreciation, appreciation Accommadate c) acommodate d) accommodate Appreciation appreciation, appreciation, appreciation Adductable c) deductable d) deductabe Appreciation of the compound words of the following. a. Swimming pool Write the definition for	Questions Marks Find the misspelt words from each set of words given here. 4 a) Defendant, defendant, difendent, defandent 5 b) Assumption, assumption, appreciation, appreciation 3 d) Superintendent, superantendant, superintendent, superintendent 3 Find the misspelt words from each set of words given. 3 1) a) acomodate b) accommadate c) acommodate d) accommodate 3 2) a) deductible b) deductable c) deductuble d) deductabe 3 3) a) license b) licence c) licens d) lisence 3 Write the definition of the compound words of the following. 3 a. Swimming pool 3 b. Paddle boat 3 c. Neck tie 4 d. Black bird 1 e. Foot print 5 f. Sunset 1 In each of the following sentences there are two blank spaces. Find out which pair of words from the options can be filled up in the blanks in the scntence in the same sequence to make the sentence meaningfully complete. 5 i. A committee has been to the transformation of the city into an International Finance Center. a) Constituted, convert b) papointed, oversee c) Convergent , evaluate d) jonaugur

	a) Sufficient, however b) Lot, besides			
	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, necessitat			
6.	Write the correct sequence words and fill in the blanks.	6	KTU- June 2022	
	(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.			
	spilled a drink on my favourite shirt. The night got even worse.			
7.	Complete the sentence as directed.	3	KTU- July 2021	
	a) He said, "I shall go as soon as it is possible." (Change into			
	Indirect speech) b) He proposed that they should wait for the			
	award. (Change into Direct speech)			
	c) The guard refused him admittance. (Rewrite the sentence			
	using "Admittance")			
8.	Find the error in the sentences given below.	1	K I U- June 2022	
	He drank once again (a)/ as he was (b)/ feeling thirsty (c)/ No error (d)			
9.	Write down two numerical adjectives and use it in a sentence	2	KTU- July 2021	
10.	Rewrite as directed.	2	KTU- June 2022	
	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)			
11	Write down the significance of technical communication	2	MODEL	
12	What is tachnical communication 2	1	KTU- July 2021	
12		1	1110 varj 2021	
MODULE 2				
1	Help your friend by suggesting and explaining SQ3R methodsand	6	KTU- July 2021	
	PQRST methods to improve his reading skills?			
2	What is reading and what are the four kinds of reading styles. When	6	KTU- June 2022	
	these styles are used?			
Module 3				
1	You are asked to make a presentation on a tough subject to 10th	4	KTU- July 2021	
	standard school students. Share your strategies to make			
	your presentation interesting and effective?			
2	Point out the differences between debate and group discussion?	2	KTU- July 2021	

3	How body language could help you in a group discussion. Write down 6 points	3	KTU- July 2021	
4	Explain the etiquettes one must follow in GD?	4	KTU- June 2022	
5	You need to make a Project presentation as a part of your internal evaluation. What preparation do you need to make for presenting visuals effectively?	4	KTU- June 2022	
Module 4				
1	a) How can we develop effective listening skills?	3	KTU- July 2021	
	b) How active listening plays an important role incommunication?	3		
2	What are the advantages and disadvantages of telephonic orvideo interviews?	5	KTU- July 2021	
3	Differentiate between active and passive listening.	3	KTU- June 2022	
4	List the barriers in listening?	3	KTU- June 2022	
5	Write short notes on types of interviews?	3	MODEL	
Module 5				
1	Write a letter to the HR manager of a leading company, requesting permission to do a two - weeks internship at his company as a part of your academic curriculum.	6	KTU- July 2021	
2	What are the different types of reports?	2	KTU- July 2021	
3	What is a report? Explain its structure and types	6	KTU- June 2022	
4	You are required to apply for a job and submit your details to a firm. 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 differences between them.	6	KTU- June 2022	