QUESTION BANK

S2 ME

VIDYA ACADEMY OF SCIENCE & TECHNOLOGY TECHNICAL CAMPUS

(A Unit of Vidya International Charitable Trust)

PROGRESS THROUGH EDUCATION

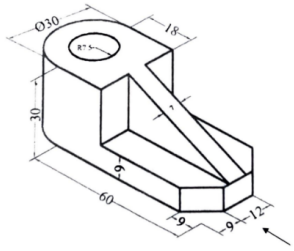
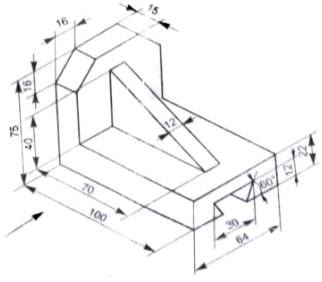
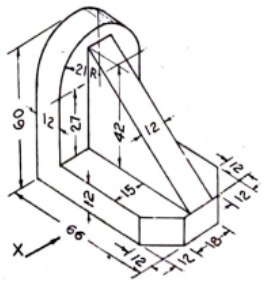
NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
"B++" GRADE

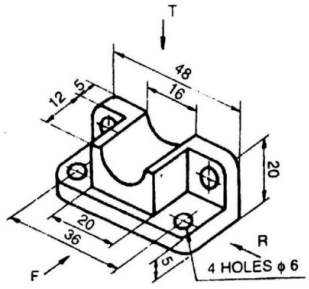
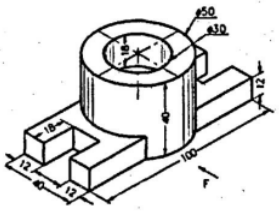
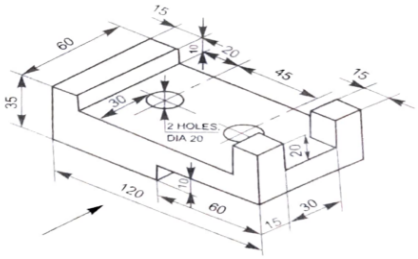
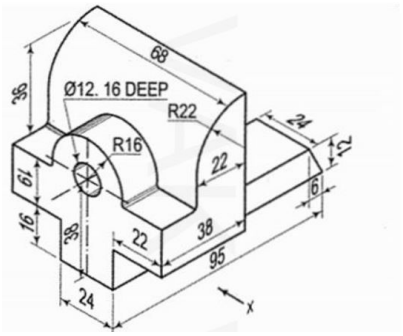
CODE: EST 110	COURSE NAME: ENGINEERING GRAPHICS	Credit: 3	
Qn. No.	**Module-1**	**Marks**	**Year**
1	The front view of line AB is 50° inclined to XY line and is 55 mm long while its top view is 60º inclined to XY line. If end A is 10 mm above HP and 20 mm in front of VP, draw its projections. Find the 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	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	KTU-Dec 2019
6	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	KTU-Dec 2019
7	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
8	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. Find its true length, true inclination with HP and locate its traces.	20	KTU-June 2017
9	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
10	A straight line PQ is 100 mm long. The end P is in HP and 20 mm in front of VP. The line PQ is inclined at 30° to the HP and 20° to VP. Draw the projections of the line if the end Q is in second quadrant.	20	KTU-June 2017
11	The line AB measuring 60 mm has its VT 15 above HP. The end B is 30 mm above HP and 35 mm in front of VP. The projections through B and VT are 80 mm apart. Draw the projections and find the inclination of the line with HP and VP.	20	KTU-Dec 2017
12	The plan pq of a straight-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 lies in the first quadrant. Draw the projections and obtain. i) True length ii) Elevation length iii) Inclination to reference planes iv) Traces	20	KTU-Dec 2017
13	The top view of a 75 mm line measures 65 mm while the length of its front view is 50 mm. Its one end is on the HP and 15 mm in front of VP. Draw the projections and find its inclination.	20	KTU-Dec 2018
14	A line PQ 108mm long has its plan and elevation lengths 60 mm and 90 mm respectively. One end of the line P is in HP while the other end is in VP. Draw its projections and locate the traces.	20	KTU-Dec 2018
15	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	KTU-Dec 2019
16	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	KTU-Dec 2019
17	The front view of a line AB measures 60 mm and makes an angle of 40° with xy line. The end A is in HP and VT of the line is 15 mm below HP. The line is inclined at 30° to VP. Draw the projections and find the true length and locate HT	20	KTU-June 2019
18	Draw the projections of a straight-line AB 100 mm long inclined at 45° to HP and 30° to VP. The end A is in HP and B is in VP.	20	KTU-June 2019

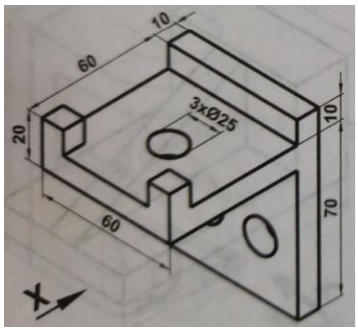
19	The distance between the end projectors through the end points of line AB is 60 mm. The end A is 20 mm above HP and 15 mm in front of VP. The end B is 45 mm in front of VP and above HP. Front view of the line measures 75 mm. Draw the projections of line AB and find its true length and true inclinations with HP and VP.	20	KTU-Dec 2021
20	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
21	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
22	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
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 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	KTU-Dec 2019
6	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	KTU-Dec 2019
7	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
8	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
9	A cone having base 50mm diameter and 65mm long axis has one of its generators in the HP and is inclined at 50° to the VP. Draw its projections when its apex being nearer to the VP.	20	KTU-Dec 2018
10	A hexagonal pyramid of base side 30mm, axis length 60mm is resting on HP on one of its triangular faces with its axis parallel to VP. Draw its projections.	20	KTU-Dec 2018
11	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
12	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
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	KTU-Dec 2022
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	KTU-Dec 2022
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 the front view, sectional top view and true shape of the section.	20	KTU-Dec 2020
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 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	KTU-Dec 2019
6	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 atter travelling through the shortest path along the curved surface. Mark the shortest path in the front and top Views of the cone.	20	KTU-Dec 2019
7	A hexagonal prism of 20mm base and 60mm height resting on its base on HP such that two base edges are perpendicular to VP. It is cut by a surface which is inclined at 30° to HP and perpendicular to VP. This plane passing through the midpoint of the axis of the prism. Draw the development of bottom portion.	20	KTU-June 2017
8	A cone of base diameter 40mm and axis length 50mm is kept on HP on its base. It is cut by a vertical section plane which is parallel to VP and 10mm in front of the axis of the cone. Draw the sectional front view, top view and true shape of the section.	20	KTU-Dec 2018
9	A cylinder having base diameter 50mm and axis length 70mm has its base in HP. A square hole of side 25mm is drilled centrally having its sides equally inclined with HP, its axis being perpendicular to VP and bisecting the axis of the cylinder. Draw the development of the cylinder with the hole.	20	KTU-Dec 2018
10	A right circular cone, 60mm of base diameter and 80mm altitude is resting with its base on the HP and is cut by a plane parallel to one of its generators and bisecting the axis. Draw the true shape of the section. Name the curve obtained.	20	KTU-June 2018
11	Draw the development of the lower portion of a cylinder of diameter 50mm and axis 70mm when sectioned by a plane inclined at 40° to HP and perpendicular to VP and bisecting the axis.	20	KTU-June 2018
12	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
13	. 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
14	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
15	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
16	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

17	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
Qn. No.	**Module- 4**	**Marks**	**Year**
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	KTU-Dec 2019
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	KTU-Dec 2019
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	KTU-Dec 2020
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	KTU-Dec 2020
5	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
6	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	KTU-July 2021
7	A sphere with 60mm diameter is surmounted centrally on the top of a square block with 70mm side and 20mm height. Draw the isometric view of the combination of solids.	20	KTU-June 2018
8	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
9	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
10	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
11	Draw the isometric projections of a hexagonal prism with edge of base 30 mm and axis 60 r	20	KTU-June 2022
12	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
13	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
Qn. No.	**Module- 5**	**Marks**	**Year**
1	A cube if 25mm side is placed vertically with its top face on an auxiliary ground plane, which is at a height of 45mm above the horizon plane. The nearest vertical edge of the cube touches the picture plane and the adjacent square faces of this edge are equally inclined to the picture plane. Draw the perspective view of the cube, if the station point is 70mm in front of the picture plane and lies in a central plane which is 30mm to the right side of the centre of the cube.	20	KTU-June 2018
2	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
3	A square prism side of base 40 mm and height 60 mm rests with its base on the ground such that one of its rectangular face is parallel to and 10 mm behind the picture plane. The station point is 50 mm in front of picture plane, 80 mm above ground plane 45 mm to the right of centre of the prism. Draw the perspective view.	20	KTU-Dec 2019

4	A rectangular pyramid base 35mm × 45mm and axis 50mm long is resting on its base on the ground plane such that one of its longer edges of base is touching on the picture plane. Draw the perspective view of the pyramid, if the station point is 60mm in front of picture plane 35mm above ground plane and in the central plane which is 50mm to the left of the axis of the pyramid.	20	KTU-June 2017
5	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
6	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
7	A square prism of base 3 cm × 3 cm and height 6 cm stands on GP with the edge of base making 45° with PP. The nearest corner is 3 cm to the right of station point and 3 cm behind the PP. The station point is 5 cm above the GP and 10 cm in front of the PP. Draw the perspective view of the square prism.	20	KTU-June 2018
8	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
9	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
10	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
11	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
12	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

13	Draw the orthographic views from T and F directions for the following figure. 	20	KTU-June 2017
14	Isometric view of a cylindrical block is shown in Figure 1. Draw the front view, top view and side view from left. Take the arrow direction F as the front side.  Figure 1	20	KTU-June 2016
15	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 2019
16	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

17	 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

Question Bank

Subject: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Module 1			
Sl. No	Questions	Marks	KU/KTU
1	A particle moves along a circular helix in 3-space so that its position vector at any time 't' is $r(t) = (4cos\pi t)\vec{\imath} + (4sin\pi t)\vec{j} + t\vec{k}$. Find the displacement of the particle during the interval $1 \leq t \leq 5$.	7	KTU Feb-2017
2	If $f(x,y,z) = x^2 i - 3j + yz^2 k$ 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: $x = t, y = t^2, z = t^3, 0 \leq t \leq 1$	3	KTU Apr-2018 & Dec-2017
4	Find the divergence and curl of the vector field $f(x,y,z) = yz\vec{\imath} + xy^2\vec{j} + yz^2\vec{k}$	2	KTU Dec-2017
5	Evaluate $\int_c (3x^2 + y^2)\,dx + 2xydy$ along the circular arc C given by $x = cost,\ y = sint$ for $0 \leq t \leq \frac{\pi}{2}$	3	KTU Dec-2017
6	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.	5	KTU Dec-20117
7	If $\vec{r} = x\vec{\imath} + y\vec{j} + z\vec{k}$ 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 Model question
9	Find the work done by the Force field $F(x,y,z) = xy\vec{\imath} + yz\vec{J} + xz\vec{k}$ along C where C is the curve $r(t) = t\vec{\imath} + t^2\vec{J} + t^3\vec{k}$	7	KTU Model Question
10	Show that $f(x,y) = (cosy + ycosx)\vec{\imath} + (sinx - xsiny)\vec{j}$ is a conservative vector field. Hence find the scalar potential for it.	5	KTU Dec-2017
11	$Find\ the\ directional\ derivative\ of\ f(x,y) = x^2 = 3xy + y^2$ $at\ the\ point\ P(2,1) in\ the\ direction\ of\ \vec{a} = \frac{1}{3}\vec{\imath} + \frac{2}{3}\vec{j}$	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* $\vec{r}(t) = 2cos\pi t\vec{\imath} + 2sin\pi t\vec{\jmath} + 6t\vec{k}$ *at* $t = \frac{1}{3}$ $b)$ *Show that the vector field* $\vec{f}(x,y) = 2xy^3\vec{\imath} + 3y^2x^2\vec{\jmath}$ *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-June 2022
14	$a.$ *Find the position and velocity vectors of the particle, given* $\vec{a}(t) = (t+1)^{-2}\vec{\jmath} + e^{-2t}\vec{k}$, $\vec{v}(0) = 3\vec{\imath} - \vec{\jmath}, \vec{r}(0) = \vec{k}$ $b.$ *If* $\vec{r} = x\vec{\imath} + y\vec{\jmath} + z\vec{k}$, *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	Using Greens theorem, find the work done by the force field $\vec{f}(x,y) = (e^x - y^3)\vec{\imath} + (cosy + x^3)\vec{\jmath}$ 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 $F = x\vec{\imath} + 2y\vec{\jmath} + 3z\vec{k}$, 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 $\int_C (xy + y^2)dx + x^2dy$, 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 $F = 2xi + 3yj + z^3$k across the unit cube bounded by $x = 0, y = 0, z = 0, x = 1, y = 1, z = 1$	7	KTU MODEL question
13	$Determine\ the\ sources\ and\ sinks\ of\ the\ vector\ field$ $\vec{f}(x,y) = x^2\vec{i} + y^2\vec{j} + z^2\vec{k}$	3	KTU-June 2022
14	$Use\ divergence\ theorem\ to\ evaluate\ \iint \vec{f}.\vec{n}\,dS\ where$ $\vec{f} = 2x\vec{i} + 4y\vec{j} - 3z\vec{k}\ and\ S\ is\ the\ surface\ of\ the\ sphere$ $x^2 + y^2 + z^2 = 1$	3	KTU-June 2022

15	$a)$ *Use Green's theorem to find the work done by the force field* $\vec{f}(x,y) = xy\vec{\imath} + \left(\frac{x^2}{2} + xy\right)\vec{\jmath}$ *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.* $b)$ *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* $z = 3$, *if the density is* $\phi(x,y,z) = x^2 z$.	7 7	KTU-June 2022
16	$a)$ *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* $\vec{F}(x,y,z) = x\vec{\imath} + y\vec{\jmath} + z\vec{k}$ *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* $\vec{F}(x,y,z) = z^2\vec{\imath} + 3x\vec{\jmath} - y^3\vec{k}$ *and* C *is the circle in XY plane with counter clockwise orientation looking down the positive Z axis*	7 7	KTU-June 2022
	Module 3		
1	Consider the initial value problem $y'' - x^3y' + 6x = sinx$, $y(0) = 3, y'(0)$ =-1.Can this problem have unique solution in an interval containing zero? Explain	3	KTU JULY-2018
2	Find any three independent solutions of the differential equation $y''' - y' = 0$	3	KTU JULY-2018
3	Discuss the existence and uniqueness of solution of initial value problem $\frac{dy}{dx} = \frac{y}{\sqrt{x}}$, $y(1) = 3$	3	KTU JULY-2018
4	Prove that $y_1(x) = e^x$ and $y_2(x) = e^{4x}$ form a fundamental system (basis) for the differential equation $y'' - 5y' + 4y = 0$.Can $5e^x - 2e^{4x}$ be a solution (do not use verification code)of the differential equation ?Explain.	5	KTU 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 $\lvert x\rvert \leq 1, \lvert y - 1\rvert \leq 1$.	6	KTU JULY-2018

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

3	Solve the initial value problem $y'' - y' - 6y = 0, y(0) = 6,\ y'(0) = 13$ using Laplace transforms.	7	KTU-March 2017
4	Solve, by using Laplace Transform: $y"+y=3cos\ 2t$; $(0)=0$, $y'(0)=0$.	8	KTU- Apr 2018
5	Find the Inverse Laplace Transform of: $(i)\ \frac{S-4}{S^2-4}$ $(ii)\ \frac{4}{S^2-2S-3}$	8	KTU- April 2018
6	Find the Laplace Transform of : $(i)\ sin3tcos2t\ (ii)\ e^{-2t}cos^2t$	8	KTU-April 2018
7	Find the inverse Laplace transform of $\frac{1}{(s+\sqrt{2})(s-\sqrt{3})}$	7	KTU- July 2017
8	Solve the initial value problem, using Laplace transforms. y" + y' + 9y = 0, y(0) = 0.16, y'(0) = 0	8	KTU-July 2017
9	Find the Laplace transform of (i) sinh$t$cos$t$ (ii) $(t-1)^3$	8	KTU-July 2017
10	Find the Laplace transform of i) $cost - tsint$ ii) $4te^{-2t}$	8	Ktu- May 2017
11.	Find the inverse laplace transform of $F(s) = \frac{2(e^{-s}-e^{-3s})}{s^2-4}$	7	Model Question KTU
12	Find the Laplace Transform of$(sint + cost)^2$	3	KTU-June 2022
13	Find the inverse Laplace Transform of $\frac{e^{-3s}}{(s+2)^2}$	3	KTU-June 2022
14	a)Using Laplace Transform solve y''+5y'+6y=e^{-t} , $y(0) = 0$ 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
15	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	Using Fourier cosine integral, show that $\int_0^\infty \frac{cos\omega x}{1+\omega^2}\, d\omega = \frac{\pi}{2}e^{-x}, if x > 0$	7	KTU-Dec 2018
2	Find the Fourier sine transform of $f(x) = \begin{cases} sinx, 0 < x < \pi \\ 0, \quad x > \pi \end{cases}$	8	KTU-Dec 2018
3	Find the Fourier transform of $f(x) = \begin{cases} e^{kx}, x < 0 \\ 0, \quad x > 0 \end{cases}$	7	KTU-Dec 2018

4	Use Fourier integral to show that $\int_0^\infty \frac{cosx\omega+\omega sinx\omega}{1+\omega^2}\, d\omega = \begin{cases} 0\ if\ x<0 \\ \frac{\pi}{2} if\ x=0 \\ \pi e^{-x}\ if x>0 \end{cases}$	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	8	KTU-May 2017
6	Find the Fourier transform of $f(x)=\begin{cases} 1, & \lvert x\rvert<1 \\ 0, & otherwise \end{cases}$	7	KTU-May 2017
7	Express f(x) = 1, $0 < x < \pi$ 0, $x > \pi$, a Fourier sine integral and evaluate $\int_0^\infty \frac{1-cos\pi\omega}{\omega} sinx\omega\, d\omega$	7	KTU-July 2017
8	Find the Fourier Sine Transform of $(x)=e^{-\lvert x\rvert}\rvert$. Hence evaluate $\int_0^\infty \frac{\omega sin\omega x}{1+w^2}\, d\omega$.	8	KTU-April 2018
9	Find the Fourier Cosine Transform of f(x)=sin$x$; $0<x<\pi$.	7 (3)	KTU-April 2018, KTU-June 2022
10	Using Fourier integral representation show that $\int_0^\infty \frac{sin\omega-\omega cos\omega}{\omega^2} =$ $\begin{cases} \frac{\pi x}{2}, & if\ 0<x<1 \\ \frac{\pi}{4}, & if\ x=1 \\ 0, & if\ x>1 \end{cases}$	8	KTU-July 2017
11	Does the Fourier sine transform$f(x)=x^{-1}sinx$ for o<x<∞ exist? Justify your answer.	4	Ktu model question
13	Find the Fourier sine transform of e^{-x} (x > 0)	3	KTU-June 2022
14	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
15	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 2022

QUESTION BANK

ENGINEERING CHEMISTRY (CYT 100)

MODULE 1

Sl. No:	Questions	Marks	KTU Year
1.	How will you determine the pH of a solution using glass electrode?	(10)	2017, 2018
2.	Explain potentiometric titration?	(3)	
3.	Distinguish between electro chemical series and galvanic series?	(10)	2021
4.	Explain the mechanism of electro chemical corrosion?	(10)	2021

5	Derive Nernst equation and apply it for the emf of Daniel cell.	(8)	2021
6	How is electroless nickel plating done? Write the reactions involved. Give anytwo applications of it.	(6)	2020
7	With the help of electrochemical equations, show that rusting of iron is more severe in oxygen rich acidic medium than alkaline medium.	(8)	2021
8	What is electrochemical series? Discuss any five applications.	(4)	2022
9	Explain various types of cathodic protection	(10)	2022
10	What will be the standard electrode potential of Ni2+ / Ni electrode if the cellpotential of the cell Ni / Ni 2+ (0.1M) // Cu2+(0.01M) / Cu is 0.59 V at 25oC? E0 Cu 2+ /Cu = 0.34 V.	(3)	2023
11	Calculate the emf of the cell Fe/Fe2+(0.01)//Ag+(0.1) /Ag at 298 K if standard electrode potentials of Fe and Ag are –0.44 V and 0.8 V respectively. Write the cell reaction.	(5)	2023

MODULE II

Sl. No:	Questions	Marks	KTU Year
1.	Distinguish between absorption spectrum & emission spectrum?	(3)	2017
2	What are different types of electronic transitions are possible in UV-Visible spectroscopy?	(3)	2017

3	Predict high resolution ^{1}H NMR spectra of 1-Chloroethane and 2-Chloroprrropane Define Beer Lambert law and deduce the integrated form. Discuss the plot of absorbance verses concentration, what does the slope of the graph represents?	(8)	2022
4	Draw the molecular energy diagram 1)ethene 2)1,3 butadiene 3)1,3,5 hexatriene 4) benzene and explain uv visible absorption spectrum	8	2020
5	State and explain beer lamberts law	3	2017
6	Give the applications of UV visible spetroscopy	8	2020
7	Explain the origin of spin spin splitting ana draw the splitting pattern		
8	Write the principle of Ir spectroscopy	4	2018
9	Explain chemical shift. Discuss any four factors affecting chemical shift with proper examples.	(10)	2023
10	Discuss the instrumentation of UV-visible spectroscopy with labelled sketch.Write two applications of UV-visible spectroscopy.	(6)	2023

MODULEIII

Sl. No:	Questions	Marks	KTU Year
1.	Distinguish between TGA & DTA?	(10)	2016, 2018
2.	Explain the various methods of thermal analysis.	(10)	2018
3.	Discuss principles & applications of gas chromatography?	(10)	2018
4.	.Explain the major differences between GC & HPLC?	(10)	2017
5	Write note on nano material?	(4)	2019
6	Write note on sol gel process?	(4)	2017
7	Briefly explain the principle and characterisation of SEM?	(10)	2021
8	Explain the terms retention time (t_R) and relative peak area (RPA) in GC.	(10)	2020, 2022
9	Discuss the principle and procedure in column chromatography. Explain how TLC is useful in checking the purity of each fraction.	(8)	2020, 2022
10	Sketch the Derivative TG graph of Calcium oxalate monohydrate	(6)	2020, 2022

MODULEIV

Sl. No:	Questions	Marks	KTU Year
1	What are co-polymers? Explain the properties of random,alternating, block and graft polymer?	(10)	2016,2022
2	Give the applications of conducting polymers?	(10)	2017
3	.Explain various types of isomerism?	(10)	2018,2022
4	.Draw the conformational analysis of ethane,butane,cyclo hexane,	(10)	2021
5	How many optical isomers are possible for H_3C-CH(OH)-CH(OH)-CHO? Draw the Fischer projection formula of all the isomers. Which among them are opticallyactive?	(8)	2020
6	What are OLEDs? Give the construction and working.	(6)	2020

7	What is meant by structural isomerism? What are the different types of structuralisomerism in organic molecules? Explain with examples.	(8)	2021
8	Write the structure of ABS and its monomers. Also list any twoapplications ofABS. (KTU, DEC 2020)	(6)	2020
9	What is optical isomerism and give the condition for optical activity? Explain with an example. How can we distinguish enantiomers based on physical, chemical and biological properties?	(10)	2022
10	What is tautomerism? Illustrate tautomerism in CH_3-CO-CH_3	(8)	2022
11	Explain the classification of conducting polymer.	(8)	2023

MODULE V

1	What is hard water? What are the different units in which hardness is expressed? (KTU MAY 2016,2018,DEC2018)	(4)	2016,2018
2	Describe EDTA method for the estimation of hardness? (KTU MAY 2016,DEC2017)	(4)	2017
3	How are ion exchange resins useful in removing hardness?	(10)	2019
4	Explain with flow chart , how water is purified for drinking purposes? MAY2019	(10)	2019
5	Explain BOD & COD ? (KTU MAY 2016,DEC2017)	(4)	2017
6	Write a note on aerobic & anaerobic waste water treatment (KTU, DEC 2020)	(10)	2020
7	Explain trickling filter and UASB processes in waste water treatment. (KTU, JULY 2020)	(8)	2020
8	Discuss the procedure for the determination of DO in water. (KTU, DEC 2020)	(6)	2020
9	Define reverse osmosis. Explain the method for the desalination of water usingreverse osmosis. Give its advantages. (KTU, JULY2020)	(8)	2020

11	Explain the ion exchange process in water treatment. How is the exhausted resinregenerated? (KTU, JULY 2021)	(6)	2021
12	Explain primary, secondary and tertiary process involved in sewage watertreatment with the help of flow diagram .	(8)	2021

Course Code: EST 102

Course Name: Programming in C

Module I			
Sl. 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 pseudo code to perform bubble sort on an array of numbers.	**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 insert the number in the list at the end.	**7**	July 2021(FN) June 2022
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 !:l +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 the details	**7**	July 2021(AN)
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**

HUN 102 Professional Communication

1 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 Marks)

2 Write the definition for the following compound words.a) Wild life b) Son-in- law (1Marks)

3 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.(6marks)

4 Find the error in the sentences given below.

He drank once again (a)/ as he was (b)/ feeling thirsty (c)/ No error (d) (1marks)

5 Write down two numerical adjectives and use it in a sentence (2 marks)

6 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)(2marks)

E Pages: 2

7 What is reading and what are the four kinds of reading styles. When these

styles are used (6)

8 a) Differentiate Group Discussion (GD) and debate (3)

b) Explain the etiquettes one must follow in GD? (4)

9 a) Differentiate between active and passive listening. (3)

b) List the barriers in listening (3)

10 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)

11 What is a report? Explain its structure and types. (6)

12 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.

11 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

12.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

13 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 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 c) Convergent , evaluate

b)appointed, oversee d)inaugurated, determent

ii. Keeping in mind the --------- to develop the sector the Govt has ------- solicited foreign investment.

a) Importance, never c) objective, wanted

b) proposal, forcibly 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 c) bring, realm

b) Target, area d) convince, era

iv. Although he puts in --------- of overtime and takes few holidays, he ----- cannot support his family.

a) Sufficient, however c) Plenty, still

b) Lot, besides d) Frequency, yet

v. They have been ------ on incentives to ---------- these practices are implemented at grass root level.

a) Relying, ensure c) advocating, confirm

b) Improving, secure d) debating, necessitate

14 Complete the sentence as directed.

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.....")

15 You are asked to make a presentation on a tough subject to 10th standard school students. Share your strategies to make your presentation interesting and effective?

16a) Point out the differences between debate and group discussion? (2)

b) How body language could help you in a group discussion. Write down 6 points. (3)

17 Help your friend by suggesting and explain SQ3R methods and PQRST method to improve his reading skills?(6)

18 a) How we can develop effective listening skills? (3)

b) How active listening plays an important role in communication? (3)

19 Write a letter to the HR manager of a leading company, requesting permission to do two-weeks internship at his company as a part of your academic curriculum.(6)

20 What are the advantages and disadvantages of telephonic or video interviews? (5)

21 a) What is technical communication. (1)

b) What are the different types of reports? (2)

EST 120:BASICS OF CIVIL ENGINEERING

MODULE 1

QUESTIONS	MONTH AND YEAR	MARK
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 according to National Building Code ? Explain briefly explain.	April2022	3
6. Describe the components of a residential building with neat figure	April2021	4
7. Details to be included in SITE PLAN	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: *COVERED AREA*, Plinth area,*FLOOR AREA*,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

MODULE 2

1. What is surveying & what are the principles of surveying?	April2021	7
2. What are the classifications of surveying? Explain primary classification	April2021	5
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
14. What are the different types of cement available & their use?	Dec 2021	5
15. What are the Market Forms of STEEL available?	Dec 2021	6
16. List out any two examples for prefabricated building components stating any two advantages of using them in construction.	Dec 2022	4
17. Classify bricks, and explain the characteristics of each type.	Dec 2022	6
18. Differentiate plain cement concrete and reinforced cement concrete.	Dec 2022	4
19. Explain the types of rolled steel sections and steel reinforcements	Dec 2022	6
20. State the objectives of Surveying	Dec 2022	4

MODULE 3

1. What do you mean by bearing capacity of soil? What are the functions of foundations.	April2021	7
2. Differentiate between shallow & deep foundations	April2022	5
3. Difference between header & stretcher bonds in brick masonry (draw elevations of both bonds)	April2021	5
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 How to prepare surface for plastering	Dec 2021	5
8. Explain any 5 types of paints with their functions	Dec 2021	5
9. Explain the procedure Painting on NEW WOOD WORK, OLD WOOD WORK, NEW IRON ORSTEEL WORK	Dec 2021	4
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) perpend, (c)Quoin, and (d) bond	Dec 2022	4
21. Sketch the plan of odd and even courses and elevation of one brick thick English bond wall.	Dec 2022	6

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

EST 120 BASICS OF MECHANICAL ENGINEERING

MODULE 1

Qn. No	Question	Mark	Year
	1.1 Air Standard Cycles		
1	Sketch the P-v and T-s diagram of a Carnot cycle and List the processes.	4	KTU Model Question
2	In an air standard Otto cycle the compression ratio is 7 and compression begins at 35^{o}C, 0.1 MPa. The maximum temperature of the cycle is 1100^{o}C. Find i) Heat supplied per kg of air, ii) Work done per kg of air, iii) Cycle efficiency Take C_p = 1.005 kJ/kgK and C_v=0.718 kJ/kgK	7	KTU Model Question
3	A Carnot cycle works with adiabatic compression ratio of 5 and isothermal expansion ratio of 2. The volume of air at the beginning of isothermal expansion is 0.3 m^3. If the maximum temperature and pressure is limited to 550K and 21 bar, determine the minimum temperature in the cycle and efficiency of the cycle.	7	KTU Model Question
4	In an ideal diesel cycle, the temperature at the beginning and end of compression is 65^{o}C and 620^{o}C respectively. The temperature at the beginning and end of the expansion is 1850^{o}C and 850^{o}C. Determine the ideal efficiency of the cycle.	7	KTU Model Question
3	Draw the p-V diagram of a diesel cycle and define the terms (i) Compression ratio, (ii) Expansion ratio, and (iii) Cut-off ratio related to the Diesel cycle.	3	KTU Dec 2019
4	An engine working on Diesel cycle has diameter 150 mm and stroke 200 mm. The clearance volume is 10 % of the swept volume. Determine the compression ratio and air standard efficiency of the engine if the cut-off takes place at 6 % of the stroke.	10	KTU Dec 2019
5	In an air standard diesel cycle, the compression ratio is 16 and at the beginning of compression the temperature is 15°C and the pressure is 0.1 MPa. Heat is added until the temperature at the end of the constant pressure process is 1480°C. Calculate (i) cut-off ratio (ii) Heat supplied per kg. of air (iii) Work done per kg. of air (iv) Efficiency of the cycle. Take Assume Cp = 1.005 kJ/kg. K and Cv = 0.718 kJ/kg. K.	10	KTU Dec 2022
6	Explain the air standard Diesel cycle with P-V and T-S diagrams. Derive the expression for its efficiency.	10	KTU Dec 2020
7	A Carnot engine, working between 650 K and 310 K, produces 150 kJ of work. Find thermal efficiency and heat added during the process.	5	KTU Dec 2020
8	Calculate the ideal air standard thermal efficiency based on the Otto cycle for a petrol engine with a cylinder bore of 50mm and	10	KTU Dec

	stroke of 75 mm and a clearance volume of 21.3 cm^3.		2021
9	1 kg of air at temperature of 150C and pressure of 100 kPa is taken through a Diesel cycle .The compression ratio is 15 and the heat added is 1850 KJ Calculate the ideal cycle efficiency?	8	KTU Dec 2021
1.2 IC Engine			
10	Explain the classification of IC Engines	5	KTU Model Question
11	Compare the working of 2 stroke and 4 stroke IC engines	4	KTU Model Question
12	With the help of a neat sketch explain the working of a 4 stroke SI engine	7	KTU Model Question
13	Explain the concepts of CRDI and MPFI in IC Engines	7	KTU Model Question
14	Explain the fuel system of a petrol engine	3	KTU Dec 2019
15	With the help of a neat sketch show the important parts of an internal combustion engine	7	KTU Dec 2019
16	Explain the MPFI system with block diagram. Also give its advantages	7	KTU Dec 2019
17	Give the concept of hybrid engine	4	KTU Dec 2019
18	Write notes on hybrid vehicles.	4	KTU Dec 2022
19	Explain the working of four stroke petrol engine with neat sketches.	8	KTU Dec 2022
20	How does a two stroke engine differ from four stroke engine?	2	KTU Dec 2022
21	Why petrol engines are called as SI engines and diesel engines are called as CI engines?	4	KTU Dec 2020
22	What is meant by scavenging and how is it achieved in a two stroke engine?	4	KTU Dec 2020
23	Explain the CRDI system in automobiles.	4	KTU Dec 2020
24	With the help of a block diagram explain the fuel system of CI engines.	4	KTU Dec

			2021
25	Give the comparison between two stroke and four stroke engines.	2	KTU Dec 2021

MODULE II

2.1 Refrigeration systems			
Qn. No	**Question**	**Mark**	**Year**
1	Explain the working of a vapour compression system with help of a block diagram	7	KTU Model Question
2	With the help of suitable sketch explain the working of a split air conditioner	7	KTU Model Question
3	Define: COP, specific humidity, relative humidity and dew point temperature	3	KTU Model Question
4	Explain cooling and dehumidification processes.	4	KTU Model Question
5	Define Cooling and Dehumidification .Also show the process in psychrometric chart.	4	KTU Dec 2019
6	Explain the reversed Carnot cycle with PV Diagram	7	KTU Dec 2019
7	With the help of flow and p-h diagram explain the working of a vapour compression refrigeration system.	10	KTU Dec 2022
8	Describe any four desirable properties of refrigerants.	4	KTU Dec 2020
9	Explain the split air conditioner and its working.	4	KTU Dec 2020
10	With the help of a neat sketch explain the working of a simple unitary air conditioning system.	6	KTU Dec 2021
11	Define humidity ratio and relative humidity.	4	KTU Dec 2021
2.2 Hydraulic Machines			
12	Explain the working of a single stage centrifugal pump with sketches	10	KTU Model Question
13	With the help of a neat sketch, explain the working of a reciprocating pump.	7	KTU Model

			Question
14	A turbine is to operate under a head of 25 m at 200 rpm. The discharge is 9 m^3 /s. If the overall efficiency of the turbine is 90 %. Determine the power developed by the turbine.		KTU Model Question
15	Differentiate between Impulse and Reaction turbine. Give examples for each type.	4	KTU Dec 2019
16	A centrifugal pump using 1kW of electric motor for pumping water against 3m suction head and 7m delivery head. The discharge of the pump is 100 litters /minute. Find the efficiency of pump	5	KTU Dec 2019
17	A turbine is working at a head of 250 m and the discharge through the penstock is 2 m3 / s. If the efficiency of the turbine is 55 % , find the power developed by the turbine		KTU Dec 2019
18	What is mean by priming of a pump? Why is it necessary in a centrifugal pump?	4	KTU Dec 2022
19	Explain with a neat sketch, the working of Kaplan turbine.	10	KTU Dec 2022
20	A centrifugal pump discharges water at a rate of 200 litres/minute against a head of 16 m when running at 300 rpm. Calculate the power required to run the pump if the overall efficiency of the pump is 50 %.	3	KTU Dec 2020
21	With the help of a neat sketch explain the working of a reciprocating pump.	6	KTU Dec 2020
22	What is meant by priming of a pump? Why is it necessary in a centrifugal pump?	4	KTU Dec 2021
23	Explain with a neat sketch, the working of a Pelton turbine	10	KTU Dec 2021
2.3 Power Drives			
24	Explain the working of belt drive and gear drive with the help of neat sketches	7	KTU Model Question
25	Explain a single plate clutch.	7	KTU Model Question
26	Sketch different types of gear trains and explain.	7	KTU Model Question
27	Illustrate the working of an epicyclic gear train	4	KTU Model Question
28	Explain the open belt and cross belt drive in power transmission. Also give the applications.	5	KTU Dec 2019

29	What are the different types of gears used in power transmission?	4	KTU Dec 2022
30	Explain the working of a single plate clutch with neat sketch.	7	KTU Dec 2020
31	Why gear drives are called positive drives, Whereas belt and rope drives are not considered positive?	4	KTU Dec 2021

MODULE III

Qn. No	Question	Mark	Year
3.1 Manufacturing Processes			
1	Differentiate between up-milling and down-milling operations.	4	KTU Model Question
2	Explain the functions of runners and risers used in casting.	4	KTU Model Question
3	Briefly describe rolling process.	4	KTU Dec 2022
4	Explain the production processes:- (i) Turning (ii) Arc welding (iii) Extrusion (iv) Forging	10	KTU Dec 2022
5	Explain the general procedure used in making a sand mould for the casting	4	KTU Dec 2021
6	Explain the two high, three high, four high and cluster rolling mills with neat sketches.		KTU Model Question
7	Describe the working of a cluster rolling mill giving a sketch.	4	KTU Dec 2020
8	What is casting? With the help of a neat sketch explain the process of sand mould casting.	10	KTU Dec 2020
9	Describe the direct extrusion and indirect extrusion with sketches	4	KTU Dec 2021
3.2 Metal Joining Processes			
10	Differentiate between soldering and brazing.	4	KTU Model Question
11	How the welding processes are classified? List out the different types of welding methods.	4	KTU Dec

			2019
12	Describe the arc welding process with a neat sketch	7	KTU Model Question
13	Explain the process of Arc welding with the help of a sketch.	6	KTU Dec 2019
3.3 Basic Machining Operations and Advanced Marching Operations			
14	Describe the operations which can be performed using drilling machine	7	KTU Model Question
15	With a neat sketch, explain the working and parts of a lathe.	10	KTU Model Question
16	Explain the Additive manufacturing.	4	KTU Dec 2022
17	Explain the elements of CNC systems with block diagram. List the advantages of CNC machines.	10	KTU Dec 2022
18	Compare conventional machine tools and CNC machines.	4	KTU Dec 2020
19	Give the block diagram of a lathe, indicate the principal parts and list out the important operations performed on a lathe.	10	KTU Dec 2020
20	Compare CAD and CAM.	4	KTU Dec 2021
21	Explain the advantages and disadvantages of rapid manufacturing systems.	4	KTU Dec 2021
22	Discuss any four operations that can be performed on a lathe with simple sketches.	10	KTU Dec 2021
23	Explain the principle of Additive manufacturing	4	KTU Model Question
24	Define the terms Rapid prototyping and Additive manufacturing	4	KTU Dec 2019
25	Describe the working of a Milling machine. Draw the block diagram of a Milling machine and indicate its main parts.	10	KTU Dec 2019