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I B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

APRIL 2024

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCC1TH02 **ENGINEERING PHYSICS**

Time: 3 hours (Common to CE, ME, ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.		Questions	Marks
1		Unit-I	
	a	i) Derive the condition for bright and dark fringes of a diffraction pattern due to Fraunhofer diffraction due to single slit.	[6M]
		ii) Explain the construction and working of Newton's ring experiment. Derive the expression for wavelength of light source using this experiment.	[6M]
		OR	
	b	i) Discuss the principle of double refraction. Explain the construction and working of Nicol's prism using double refraction.	[6M]
		ii) Differentiate (a) interference and diffraction, (b) Quarter and half-wave plate.	[6M]
2		Unit-II	
	a	Discuss the construction and working of He-Ne laser system. Mention its merits and demerits.	[12M]
		OR	
	b	i) Derive the expression for numerical aperture of an optical fiber.	[4M]
		ii) Discuss the applications of optical fiber in the medical field.	[4M]
		iii) Differentiate spontaneous and stimulated emission of radiation.	[4M]
3		Unit-III	
	a	i) Differentiate SC, BCC and FCC crystal systems. Prove that packing fractions of FCC>BCC>SC.	[8M]
		ii) Define unit cell. Mention the different lattice parameters of unit cell.	[4M]
		OR	
	b	i) Derive the relation between miller indices of a plane and interplanar distance.	[6M]
		ii) State and explain Bragg's law. How the Bragg's condition is helpful in understanding the crystal structure.	[6M]
4		Unit-IV	
	a	i) Classify magnetic materials based on temperature and susceptibility.	[6M]
		ii) Discuss the fundamental laws of electromagnetism.	[6M]
		OR	
	b	i) Differentiate soft and hard magnetic materials.	[6M]
		ii) Derive the Maxwell's electromagnetic equations in differential form.	[6M]
5		Unit-V	
	a	i) Derive Schrodinger time independent wave equation for a free particle.	[6M]
		ii) Differentiate intrinsic and extrinsic semiconductor.	[6M]
		OR	
	b	i) State and explain Hall effect. Derive the relation between Hall coefficient and Hall voltage.	[6M]
		ii) Discuss the dual nature of matter. Derive the expression for de-Broglie wavelength for a matter wave.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCC1TH07 **ENGINEERING CHEMISTRY**

Time: 3 hours Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No.		Questions	Marks
1		Unit-I	
	a	i) Discuss electrodialysis process for purification of brackish water.	[6M]
		ii) Explain biological oxygen demand.	[6M]
		OR	
	b	i) Explain break point chlorination.	[6M]
		ii) Discuss zeolite process for softening of hard water.	[6M]
2		Unit-II	
	a	Explain (i) anionic addition polymerization (ii) refining of petroleum	[12M]
		OR	
	b	i) Explain thermoplastics and thermosetting plastics.	[4M]
		ii) Discuss knocking.	[4M]
		iii) Explain processing of natural rubber.	[4M]
3		Unit-III	
	a	i) Discuss sol-gel method for preparation of nanomaterials.	[6M]
		ii) What are composite materials? List applications of composite materials.	[6M]
		OR	
	b	i) Explain thermotropic and lyotropic liquid crystals.	[6M]
		ii) Discuss properties and applications of fullerenes.	[6M]
4		Unit-IV	
	a	i) Discuss dry cell and calomel electrode.	[6M]
		ii) Explain galvanization and tinning.	[6M]
		OR	
	b	i) Explain working of lead acid battery.	[6M]
		ii) Discuss cathodic protection.	[6M]
5		Unit-V	
	a	i) Explain thin film lubrication.	[6M]
		ii) Explain setting and hardening of cement.	[6M]
		OR	
	b	i) Discuss any two properties of refractories.	[6M]
		ii) Explain manufacture process of cement.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCC1TH03 **LINEAR ALGEBRA AND CALCULUS**

Time: 3 hours (Common to CE, EEE, ME, ECE, CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Solve the system equations $10x+y+z=12, 2x+10y+z=13, x+y+3z=5$ by Gauss-Jordan method.	[6M]
		ii) Solve the system equations $10x+y+z=12, x+10y+z=12, x+y+10z=5$ by Gauss-Seidel iteration method correct four decimal places with an initial guess $x=0.4, y=0.6, z=0.8$.	[6M]
		OR	
	b	i) Solve the equations $2x+3y+z=9, x+2y+3z=6, 3x+y+2z=8$by the method of LU decomposition	[6M]
		ii) Solve the following system by Gauss elimination $2x+3y-z+2w=7, x+y+z+w=2, x+y+3z-2w=-6, x+2y+z-w=-2$.	[6M]
2		Unit-II	
	a	Find the rank, index, and signature of the following quadratic form by reducing it into canonical form using orthogonal transformation $12x^2+4y^2+5z^2-6xy-4yz+6zx$.	[12M]
		OR	
	b	i) Verify the Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix}1&3&7\\4&2&3\\1&2&1\end{bmatrix}$ and hence find A^{-1}.	[6M]
		ii) Find the eigen values and eigen vectors of the matrix $A=\begin{bmatrix}2&0&1\\0&2&0\\1&0&2\end{bmatrix}$.	[6M]
3		Unit-III	
	a	i) Using Lagrange' mean value theorem prove that $\left(\frac{\pi}{4}+\frac{3}{25}\right)<\tan^{-1}\left(\frac{4}{3}\right)<\left(\frac{\pi}{4}+\frac{1}{6}\right)$.	[6M]
		ii) Compute the value of $\cos 32^\circ$ correct to four decimal places using Taylor's series.	[6M]
		OR	
	b	i) State Rolle' mean value theorem and give its geometrical interpretation. Verify Rolle's mean value theorem for $f(x)=e^x(\sin x-\cos x)$ in $\frac{\pi}{4}\le x\le\frac{5\pi}{4}$.	[6M]

		ii) The horse-power developed by an aircraft travelling horizontally with velocity v feet per second is given by $H=\frac{a\omega^2}{v}+bv$, where a, b and ω are constants. Find for what value of v the horse-power is maximum.	[6M]
4		Unit-IV	
	a	i)If $u=\log(x^3+y^3+z^3-3xyz)$, prove that $\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^2 u=\frac{-9}{(x+y+z)^2}$.	[6M]
		ii) Expand $x^2y+3y-2$ in powers of $(x-1)$ and $(y+2)$ using Taylor's theorem.	[6M]
		OR	
	b	i) Prove that if the perimeter of a triangle is constant, its area is maximum when the triangle is equilateral.	[6M]
		ii) If $u=x+y+z, uv=y+z, uvw=z$ then evaluate $\frac{\partial(x,y,z)}{\partial(u,v,w)}$.	[6M]
5		Unit-V	
	a	i) Find the volume bounded by the cylinder $x^2+y^2=4$ and the planes $y+z=4$ and $z=0$.	[6M]
		ii) Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{dz\,dy\,dx}{\sqrt{1-x^2-y^2-z^2}}$ by changing to spherical polar coordinates.	[6M]
		OR	
	b	i) Find the volume common to the sphere $x^2+y^2+z^2=a^2$ and the cylinder $x^2+y^2=ay$.	[6M]
		ii) Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y}\,dy\,dx$.	[6M]

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NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

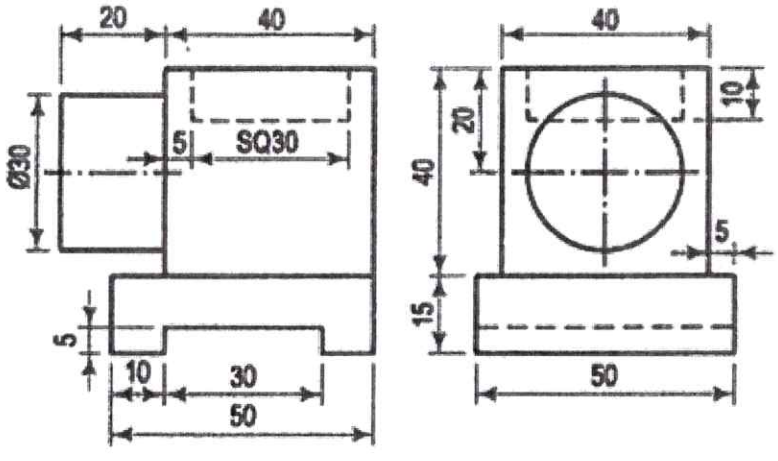
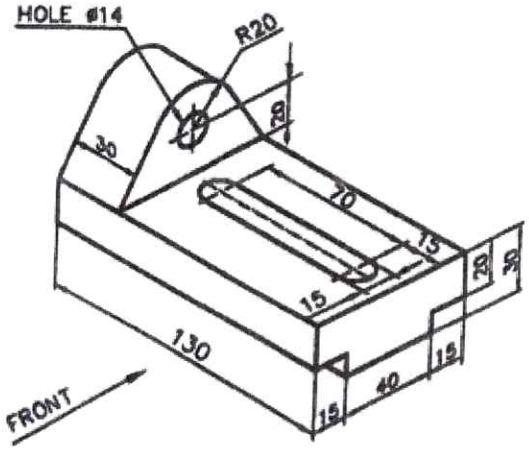
Sub Code: 19BCC1TH04 **ENGINEERING DRAWING**

Time: 3 hours **(Common to CE & ME)** Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	The foci of an ellipse are 90 mm apart and the minor axis is 65 mm long. Determine the length of the major axis and draw half the ellipse by concentric-circles method and the other half by oblong method. Draw a curve parallel to the ellipse and 25 mm away from it.	[12M]
		OR	
	b	The distance between two stations by road is 200 km and it is represented on a certain map by a 5 cm long line. Find the R. F. and construct a diagonal scale showing a single kilometer and long enough to measure up to 600 km. Show a distance of 467 km on this scale.	[12M]
2		Unit-II	
	a	i) Mark the projections of the following points on a common reference line: P, 35 mm behind the VP and 20 mm below the HP. O, 40 mm in front of VP and 30 mm above the HP. R, 50 mm behind the VP and 15 mm above the HP. S, 40 mm below the HP and in the VP.	[6M]
		ii) A point P is on HP and 20 mm in front of VP. Another point O is also on HP and behind VP. The distance between their end projectors is 60 mm. Draw its projections it the line joining P & Q makes an angle of 60^0 with the reference line. Also find the positions of point P and Q	[6M]
		OR	
	b	The point B of a line AB is on the horizontal plane, the top view of the line makes an angle of 30° with XY line, being 80mm. The point A is on the vertical plane and 50mm above the horizontal plane. Draw the top and front views of the line and obtain the true length of the line. Also find the inclinations of the line with the two planes	[12M]
3		Unit-III	
	a	A rectangular lamina of 35mm x 20mm rests on HP on one of its shorter edges. The lamina is rotated about the edge on which it rests till it appears as a square in the top view. The edge on which the lamina rests being parallel to both HP and VP. Draw its projections and find its inclinations to HP and VP.	

		OR	
	b	A regular hexagonal lamina of sides 25mm is lying such a way that one of its sides on HP while the side opposite to the side on which it rests is on VP. If the lamina makes 60° to HP, draw the projections of the lamina.	[12M]
4		Unit-IV	
	a	A square pyramid 35mm sides of base and 65mm axis length rests on HP on one of its edges of the base, which is inclined to VP at 30°. Draw the projections of the pyramid when the axis is inclined to HP at 45°.	[12M]
		OR	
	b	A hexagonal pyramid of base side 30mm and axis height 60mm is resting on its base on HP with two of the base edges parallel to VP. It is cut by a plane perpendicular to VP, inclined 30° to HP and bisects the axis of the pyramid. Draw the development of the lateral surfaces of the lower portion of the pyramid.	[12M]
5		Unit-V	
	a	Draw the isometric view from the orthographic views given below.  	[12M]
		OR	
	b	Draw the front, top and right side views of the object shown in Fig  	[12M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCC1TH05 **PROBLEM SOLVING WITH PYTHON**

Time: 3 hours (Common to CE, ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i)What is an operating system? Discuss the features of an operating system.	[6M]
		ii) Define algorithm with an example.	[6M]
		OR	
	b	i)Discuss about different hardware architectures of computer systems.	[6M]
		ii) Explain different generations of a computer.	[6M]
2		Unit-II	
	a	Explain various decision making and looping statements in python with examples.	[12M]
		OR	
	b	i)Write a python program to check whether a given number is prime or not.	[6M]
		ii) Discuss the process of performing binary search by considering suitable data.	[6M]
3		Unit-III	
	a	i)Discuss any six string functions with their syntax.	[6M]
		ii)What is a recursive function? How is it helpful.	[6M]
		OR	
	b	i) Illustrate how to pass variable length arguments to a function in python.	[6M]
		ii) Explain about different operators in python with example.	[6M]
4		Unit-IV	
	a	I) Distinguish between lists and tuples with example.	[6M]
		ii)Discuss any six list functions in python.	[6M]
		OR	
	b	i)Explain the process of creating a dictionary and traversing its elements with syntax and example program.	[12M]
5		Unit-V	
	a	i)Discuss the process of accessing class members in python.	[6M]
		ii)Illustrate polymorphism with an example program.	[6M]
		OR	
	b	i)What is event drive programming? State its advantages.	[6M]
		ii)Write a python program to illustrate turtle bar chart.	[6M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCI1TH06 ELECTRONIC DEVICES AND LOGIC DESIGN

Time: 3 hours (Common to CSE & IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	(i) a) Explain the working of a bridge rectifier with neat waveforms. b) Compare the bridge rectifier with the half-wave rectifier.	[4+2]M
		ii) Write a short note on Zener Diode.	[6M]
		OR	
	b	i) How are the width of the space charge region and the barrier height affected when a PN junction is forward-biased and reverse-biased?	[6M]
		ii) Write a short note on LED.	[6M]
2		Unit-II	
	a	i) Draw a neat sketch to illustrate the structure of a P-channel Depletion MOSFET. Explain its operation.	[6M]
		ii) Compare BJT and FET with proper diagrams.	[6M]
		OR	
	b	i) Explain the construction and working of N-channel JFET	[6M]
		ii) a) What is the inversion layer? b) Describe how an inversion layer of charges can be formed in an MOS with the n-type substrate.	[2+4]M
3		Unit-III	
	a	i) Construct logic diagrams of X-OR and AND gates using the NOR gates.	[6M]
		ii) Minimize the given function using K-Map. F = Σm(0, 2, 8, 10, 14) + d(5, 15).	[6M]
		OR	
	b	i) Convert the following: (i) (45.78)10 to base 2, (ii) (FFEB)16 to base 8 (iii) (1011.0110)2 to base 10	[6M]
		ii) Minimize the given function using K-Map. F = Σm (0, 1, 3, 5, 7, 8, 9, 11, 13, 15).	[6M]
4		Unit-IV	
	a	i) Design an 8X1 multiplexer and explain its operation.	[6M]
		ii) Construct the logic diagram of JK Flip-Flop and explain its operation.	[6M]
		OR	
	b	i) Design a Full Adder using universal gates.	[6M]
		ii) Construct the logic diagram of T-Flip-Flop and explain its operation.	[6M]
5		Unit-V	
	a	i) With neat diagrams, explain the working of a Bidirectional Shift Register.	[6M]
		ii) Construct a mod-7 counter and explain the operation with neat diagrams.	[6M]
		OR	
	b	i) What is a shift register? Write down different types of shift registers.	[2+4]M
		ii) Construct a Johnson counter and explain its working principle with proper diagrams.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

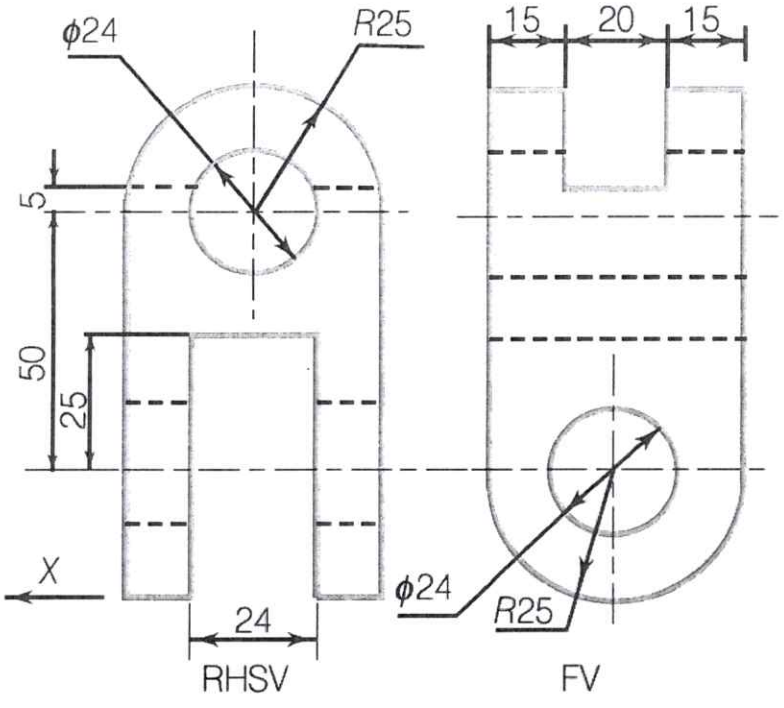
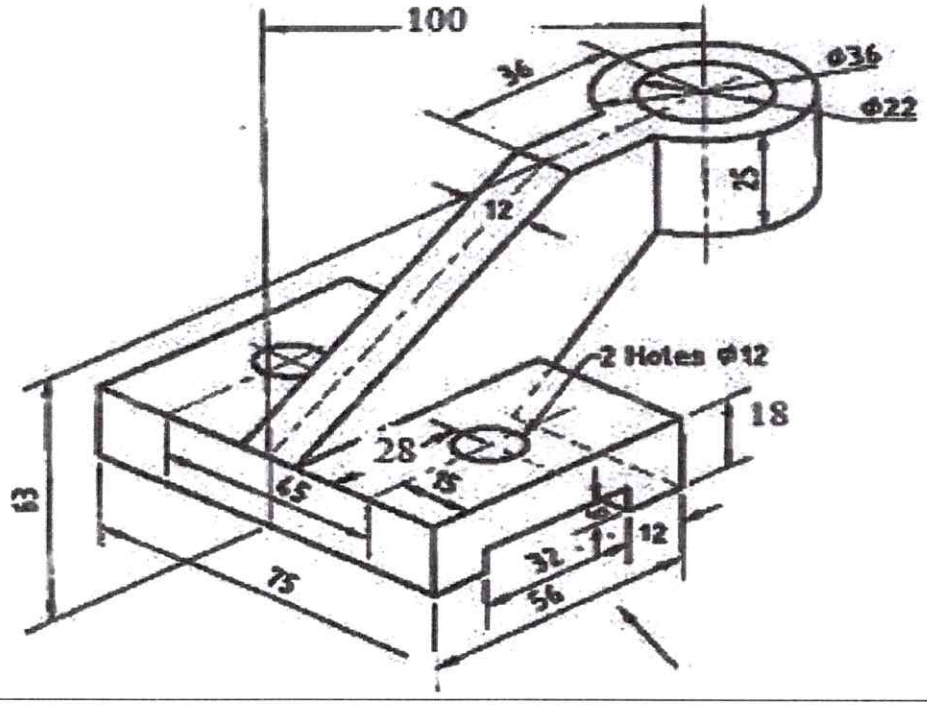
I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BEC1TH09 **ENGINEERING GRAPHICS**

Time: 3 hours (ECE) Max. Marks: 60

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	A horizontal line PQ is 100 mm long. A point R is 50 mm from point P and 70 mm from point Q. Draw an ellipse passing through points P, Q, R.	[12M]
		OR	
	b	An area of 49 sq cm on a map represents an area of 16 m^2 on a field. Draw a scale long enough to measure 8 m. Mark a distance of 6 m 9 dm on the scale. Find RF and length of the scale.	[12M]
2		Unit-II	
	a	Draw the projections of the following points using the same reference line xy for all projections and keeping the projectors 20 mm apart. D, 30 mm below the HP and 40 mm in front of the VP E, 35 mm above the HP and in the VP F, on the HP and 40 mm in front of the VP.	[6M]
	b	A point 30 mm above xy is the elevation of two points A and B. The plan of A is 40 mm behind the VP and the plan of B is 40 mm in front of the VP. Draw the projections of the two points and state their positions with reference to the co-ordinate planes and the quadrants in which they are situated.	[6M]
		OR	
	c	Draw the projections of the lines in the following positions, assuming each one to be of 50 mm length. (i) Line JK is perpendicular to the HP and 20 mm in front of the VP. The nearest point from the HP is J, which is 15 mm above the HP. (ii) Line IN is 30 mm behind the VP and perpendicular to the HP. The nearest point from the HP is L, which is 10 mm above the HP. (iii) Line NP is 30 mm below the HP and perpendicular to the VP. The nearest point from the VP is P, which is 10 mm in front of the VP.	[6M]
	d)	A line PQ of 70 mm length is parallel to and 15 mm in front of the VP. Its ends P and Q are, respectively, 20 mm and 70 mm above HP. Draw its projections and find its inclination with the HP.	[6M]
3		Unit-III	
	a	Draw the projections of a square plane of side 35mm rests on the ground on one of its corners with a diagonal containing that corner is inclined 40° to HP and 50° to VP.	[12M]
		OR	
	b	An equilateral triangular lamina of 30 mm sides rests on one of its comers on the ground such that the median passing through the corner on which it rests is inclined at 30 degrees to the HP and 45 degrees to the VP, while the edge opposite this corner is parallel to the HP. Draw its projections.	[12M]
4		Unit-IV	
	a	A hexagonal pyramid of base side 30mm, axis height 60mm is resting on HP on one of its base corners with its axis inclined at 40° to HP and parallel to VP. Draw its projections when the base sides containing the resting corners are equally inclined to HP.	[12M]

		OR	
	b	A right pentagonal prism of base edge 40 mm and axis 70 mm long rests with its base in the VP and axis parallel to the HP. Draw its projections when one of the base edges of the prism is parallel to and 20 mm above the HP.	[12M]
5		Unit-V	
	a	Below Figure shows two views of an object. Draw the isometric drawing of the object.  	[12M]
		OR	
	b	Draw the three orthographic views for the following fig.  	[12M]

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, April-2024

Sub Code: 19BCC1TH10 **C PROGRAMMING**

Time: 3 hours (Common to EEE, ME, CSE, IT) Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No		Questions	Marks
1		Unit-I	
	a	i) Draw the flow chart to find the first 'N' terms of Fibonacci series.	[6M]
		ii) Write an algorithm for finding whether the given number is Armstrong or not.	[6M]
		OR	
	b	i) Explain a general structure of C program with an example	[6M]
		ii) Describe the various types of operators available in 'C'.	[6M]
2		Unit-II	
	a	i) Compare the use of if-else construct with that of conditional operator. Explain with example	[6M]
		ii) Write a Program to perform arithmetic operations using switch	[6M]
		OR	
	b	i) Write a recursive C function to print the factorial of a given number	[6M]
		ii) How to declare a function and differentiate calling and called function? Explain with an example program.	[6M]
3		Unit-III	
	a	i) What is an array? How a single dimension and two dimension arrays are declared and initialized?	[12M]
		OR	
	b	i) Explain declaration and initialization of array of strings.	[6M]
		ii) Write a program to check whether a string is palindrome or not.	[6M]
4		Unit-IV	
	a	i) What is pointer? How to initialize pointers? Give examples	[6M]
		ii) Write a C program to read and print an array of elements using pointers.	[6M]
		OR	
	b	i) What is structure? Explain array of structures with example.	[6M]
		ii) Describe the process of declaration and initializing a union with an example	[6M]
5		Unit-V	
	a	i) How to read from and write to a file? Explain with examples.	[6M]
		ii) Write the syntax of functions *fclose()*, *fprintf()* and explain their purposes.	[6M]
		OR	
	b	i) Discuss about command line arguments	[6M]
		ii) Write a program to count no of words and lines in a file.	[6M]

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