R19

I B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2025

NARASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, March-2025

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
		Unit-I	
1	a	i) Write about the Interference in thin films by reflection	[6M]
		ii) Define diffraction, What are the differences between Fresnel's and Fraunhofer diffraction	[6M]
		OR	
	b	i) Define Polarization. What are the types of Polarization?	[6M]
		ii) Write about Quarter wave plate and Half Wave plate	[6M]
		Unit-II	
2	a	Define Laser and Population Inversion. Write about Spontaneous and Stimulated emission of radiation.	[12M]
		OR	
	b	i) what is the Principle of optical fiber	[4M]
		ii) Define Acceptance angle and Cone.	[4M]
		iii) What are the applications of Optical Fiber?	[4M]
		Unit-III	
3	a	i) Define Unit Cell. What are Lattice parameters?	[6M]
		Write the structures and packing fractions for SC, BCC, and FCC.	[6M]
		OR	
	b	i) Write about Directions and planes in crystals	[6M]
		ii) Write about Miller indices.	[6M]
		Unit-IV	
4	a	i) Derive the Maxwell's Electromagnetic Equations	[6M]
		ii)What are the Fundamental laws of electromagnetism	[6M]
		OR	
	b	i) Write the Classification of Magnetic materials	[6M]
		ii) Distinguish Between Soft and Hard magnetic materials	[6M]
		Unit-V	
5	a	i) Write about the Physical significance of wave function.	[6M]
		ii) Derive the Schrodinger Time Independent wave equations	[6M]
		OR	
	b	i) Write the Differences between Intrinsic and Extrinsic semiconductor	[6M]
		ii) what is hall effect. Define insulators with examples.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech I Semester Supple. Examinations, March-2025

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) Reduce the matrix $\begin{bmatrix} 0 & 1 & 2 & 1 \\ 1 & 2 & 3 & 1 \\ 3 & 1 & 1 & 3 \end{bmatrix}$ to normal form and find the rank.	[6M]
		ii) Solve the following system of equations by the Gauss-Jordan method: $x + y + z = 9,\ x - 2y + 3z = 8,\ 2x + y - z = 3$	[6M]
		OR	
	b	i) Find LU decomposition for the matrix $\begin{bmatrix} -3 & 2 & -1 \\ 6 & -6 & 7 \\ 3 & -4 & 4 \end{bmatrix}$.	[6M]
		ii) Check the consistency of following system of equations and solve them completely $3x + y + 2z = 3;\ 2x - 3y - z = -3;\ x + 2y + z = 4$.	[6M]
2		**Unit-II**	
	a	i) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$, find the inverse of A and also express $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$ as a linear polynomial.	[6M]
		ii) Obtain the canonical form of the quadratic form $2x^2 + 2y^2 + 2z^2 - 2xy - 2yz - 2zx$ got by an orthogonal transformation. Hence indicate its nature, rank, index and signature.	[6M]
		OR	
	b	i) Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form and specify the matrix of transformation.	[6M]
		ii) For the nonsingular matrix $A = \begin{bmatrix} 1 & 3 & 4 \\ 0 & 2 & 5 \\ 0 & 0 & 3 \end{bmatrix}$, find the eigen values of A^2, A^{-1}.	[6M]
3		**Unit-III**	
	a	i) Using Taylor's theorem, prove that $x - \frac{x^3}{6} < \sin x < x - \frac{x^3}{6} + \frac{x^5}{120}$, for $x > 0$.	[6M]
		ii) A rectangular metal sheet of length 6 metres width 2 metre is given. Four equal squares are removed from the corners. The sides of this sheet are now turned up to form an open rectangular box. Find approximately, the height of the box in centimetres, such that the volume of the box is maximum.	[6M]

		OR	
	b	i) Use Cauchy's mean value theorem to evaluate $\lim_{x\to 1}\left[\frac{\cos(\pi x/2)}{\log(1/x)}\right]$	[6M]
		ii) Find the maximum and minimum values of $3x^4 - 2x^3 - 6x^2 + 6x + 1$ in the interval (0, 2).	[6M]
4		Unit-IV	
	a	i) If $u = x^2 + y^2 + z^2$ and $x = e^{2t}$, $y = e^{2t}\cos 3t$, $z = e^{2t}\sin 3t$. Find $\frac{du}{dt}$, as a total derivative and verify the result by direct substitution.	[6M]
		ii) If $y_1 = \frac{x_2x_3}{x_1}$, $y_2 = \frac{x_3x_1}{x_2}$, $y_3 = \frac{x_1x_2}{x_3}$, show that the Jacobian of y_1, y_2, y_3 with respect to x_1, x_2, x_3 is 4.	[6M]
		OR	
	b	i) Given $xyz = 8$, find the value of x, y and z for which $u = \frac{5xyz}{x+2y+4z}$ is maximum.	[6M]
		ii) Expand $f(x, y) = \sin xy$ in powers of $(x - 1)$ and $(y - 1/2)$ upto the second degree terms.	[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) Find by double integration, the area lying between the parabola $y = 2 - x^2$ and the line $y = x$.	[6M]
		OR	
	b	i) Evaluate $\iint \frac{r\,dr\,d\theta}{\sqrt{a^2 + r^2}}$ over one loop of the lemniscate $r^2 = a^2\cos 2$.	[6M]
		ii) Find by triple integration, the volume of the sphere $x^2 + y^2 + z^2 = a^2$.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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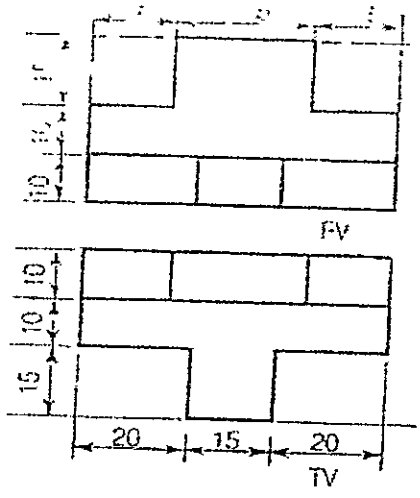
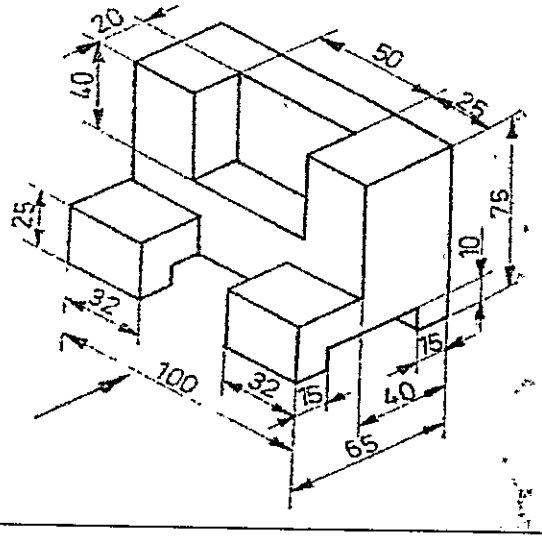
I B.Tech I Semester Supple. Examinations, March-2025

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	i) Draw a diagonal scale of R.F =1:2.5, to show centimetres and millimetres and long enough to measure upto 20 centimetres.	[6M]
		ii) Construct a hyperbola when the distance of focus from directrix is 65 mm and eccentricity is 3/2.	[6M]
		OR	
	b	i) Construct a Parabola, when the distance of the focus from the directrix is 50 mm. Plot at least eight points	[6M]
		ii) Draw an ellipse by general method, given distance of focus from directrix 65mm and eccentricity ¾.	[6M]
2		Unit-II	
	a	A line AB is in the first quadrant. Its end A and B are 20 mm and 60 mm in front of the V.P respectively. The distance between the end projectors is 75 mm. The line is inclined at 30^0 to H.P and its HT is 10 mm above *xy*. Draw the projections of the line AB and determine its true length and the V.T.	[12M]
		OR	
	b	i) A straight line is parallel to V.P and inclined 45^0 to the H.P. The length of its top view is 50 mm. One end of the line is 15 mm above H.P and 25 mm in front of V.P. Draw the projections of the line and determine its true length.	[6M]
		ii) What is an orthographic projection?	[2M]
		iii) Write the quadrants in which following points are located. (A) a^1 30 mm above XY and a 10 mm above XY. (B) b^1 25 mm below XY and b 15 mm above XY.	[4M]
3		Unit-III	
	a	Draw the projections of a regular hexagonal plate of 30 mm side, having one of its sides is in the H.P and inclined at 60^0 to the V.P., and its surface is making an angle of 45^0 with the H.P.	[12M]
		OR	
	b	ABCDE is a regular pentagonal plate of 40 mm side and has its corner A on H.P. The plate is inclined to H.P such that, the top view lengths of edges AB and AE are each 35 mm. The side CD is parallel to both the reference planes. Draw the projections of the plate and find its inclination with H.P.	[12M]
4		Unit-IV	
	a	A cone, base 65 mm diameter and axis 75 mm long, has its axis parallel to the V.P and inclined at 45^0 to the H.P. A horizontal section plane cuts the cone through the mid-point of the axis. Draw the front view, sectional top view and an auxiliary top view on a plane parallel to the axis.	[12M]
		OR	
	b	i)Draw the development of the lateral surface of the cone of base diameter 50mm and altitude 70mm.	[6M]
		ii) Draw the projections of a cylinder of diameter of base 50mm and height 80mm when its axis is making an angle of 30^0 to the H.P. and parallel to the V.P.	[6M]

5		Unit-V		
	a	Draw an isometric view of given figure below. (all dimensions are in mm).  		[12M]
		OR		
	b	Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure.  		[12M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech I Semester Supple. Examinations, March-2025

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) Describe the main components of modern computer hardware architecture.	[6M]
		ii) What is data representation in computers? How are numbers and text represented in binary? Provide examples.	[6M]
		OR	
	b	i) Explain the steps involved in developing an efficient algorithm for problem-solving.	[6M]
		ii) What are the main functions of an operating system in managing hardware and software resources?	[6M]
2		Unit-II	
	a	i) Draw a flowchart for calculating simple interest and explain the steps involved.	[6M]
		ii) What are the different type of conditional statements used in python? Explain with example.	[6M]
		OR	
	b	i) Write a flowchart for a unit converter that converts kilometres to miles.	[6M]
		ii) Draw a flowchart to perform a binary search on a sorted list of numbers. How does the flowchart represent the recursive or iterative approach?	[6M]
3		Unit-III	
	a	i) Write a Python program to perform basic string operations such as concatenation, slicing, and case conversion. Explain each operation.	[6M]
		ii) Explain the difference between for and while loops in Python. Write a Python program to display the first 10 natural numbers using both loop types.	[6M]
		OR	
	b	i) Define user-defined functions in Python. Write a program that demonstrates a user-defined function with parameters and return values.	[6M]
		ii) What is Turtle Graphics in Python? Write a program using Turtle Graphics to draw a simple shape (e.g., square or triangle).	[6M]
4		Unit-IV	
	a	i) Explain how searching and sorting are performed on lists in Python. Write a Python program to demonstrate sorting a list of numbers and searching for an element.	[6M]
		ii) What are tuples in Python? How are they different from lists?	[6M]
		OR	
	b	i) Describe how dictionaries are used in Python. Write a Python program to add, remove, and access elements in a dictionary.	[6M]
		ii) Explain how to handle files in Python. Write a Python program to read from and write to a text file and explain the basic file handling operations.	[6M]
5		Unit-V	
	a	i) Explain the concept of event-driven programming in Python. How does it differ from traditional programming?	[6M]
		ii) Explain the concept of classes and objects in Python. How do attributes and methods define the behaviour of an object?	[6M]
		OR	
	b	i) Write a Python program that responds to mouse clicks to draw shapes on the screen.	[6M]
		ii) Explain polymorphism in Python. How does Python support polymorphism through method overriding and operator overloading?	[6M]

NARASARAOPET
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Subject Code: 19BCI1TH06

I B.Tech - I Semester Supple Examinations, March-2025
Electronic Devices and Logic Design

Time: 3 hours **Max. Marks: 60**

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

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Explain diode as rectifier with filters.	K3	1	6M
		ii)Explain VI characteristics of LED and mention colors available in LED.	K4	1	6M
		OR			
	b	i)Explain Zener diode as voltage regulator.	K3	1	6M
		ii) Explain VI characteristics of PN junction diode.	K3	1	6M
2		Unit-II			
	a	i) Explain input and output characteristics of BJT CE configuration.	K3	2	6M
		ii) Compare BJT, JFET and MOSFET.	K4	2	6M
		OR			
	b	i) Explain characteristics of depletion mode MOSFET.	K4	2	6M
		ii) Explain input and output characteristics of BJT CC configuration.	K3	2	6M
3		Unit-III			
	a	i) Minimize the given function using K-Map. $F = \Sigma m(1,2,7,9,11)+d(4,5,6)$	K3	3	6M
		ii) Convert the following a) $(345)_{10}$ to base 6. b) $(10110)_2$ to base 8 c) $(345)_7$ to base 5.	K4	3	6M
		OR			
	b	i) Design AND, OR and NOT gates using NOR gate.	K3	3	6M
		ii) Minimize the given function using K-Map. $F = \Sigma m(8,10,12,14,15)$	K3	3	6M
4		Unit-IV			
	a	i)Explain JK flip-flop operation in detail with its logic diagram.	K3	4	6M
		ii)Implement full adder using decoder and OR gates.	K4	4	6M
		OR			
	b	i)Design octal to binary encoder.	K4	4	6M
		ii) Explain RS flip-flop operation in detail with its logic diagram.	K3	4	6M
5		Unit-V			
	a	i)Explain bidirectional shift register working in detail.	K3	5	6M
		ii)Explain ripple counter in detail.	K3	5	6M
		OR			
	b	i)Explain universal shift registers working in detail.	K3	5	6M
		ii)Explain ring counter operation in detail.	K3	5	6M

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I B.Tech I Semester Supple. Examinations, March-2025

Sub Code: 19BCC1TH07 **ENGINEERING CHEMISTRY**

Time: 3 hours (Common to EEE, 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) Discuss ion-exchange process for softening hard water.	[6M]
		ii) Discuss electrodialysis method.	[6M]
		OR	
	b	i) Explain BOD and COD.	[6M]
		ii) Discuss characteristics of industrial water.	[6M]
2		Unit-II	
	a	Explain calorific value, higher and lower calorific value. Discuss ultimate analysis of coal.	[12M]
		OR	
	b	i) Explain free radical mechanism of addition polymerization.	[4M]
		ii) Differentiate thermoplastics and thermosetting plastics.	[4M]
		iii) What are the draw backs of natural rubber? What is vulcanization? How can vulcanization improve the properties of natural rubber.	[4M]
3		Unit-III	
	a	i) Discuss characterization of nanomaterials by BET method.	[6M]
		ii) Explain types of liquid crystals.	[6M]
		OR	
	b	i) Explain arc discharge method for preparation of carbon nanotubes.	[6M]
		ii) Discuss applications of composite materials.	[6M]
4		Unit-IV	
	a	i) Explain uses of electrochemical series.	[6M]
		ii) Write notes on galvanizing and tinning.	[6M]
		OR	
	b	i) What are primary batteries? Explain working of dry cell.	[6M]
		ii) Discuss electrochemical theory of corrosion.	[6M]
5		Unit-V	
	a	i) Discuss acidic, basic and neutral refractories with examples.	[6M]
		ii) Explain manufacture process of cement.	[6M]
		OR	
	b	i) Explain properties of refractories.	[6M]
		ii) Discuss classification of lubricants.	[6M]

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NARASARAOPETA ENGINEERING COLLEGE
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I B.Tech I Semester Supple. Examinations, March-2025

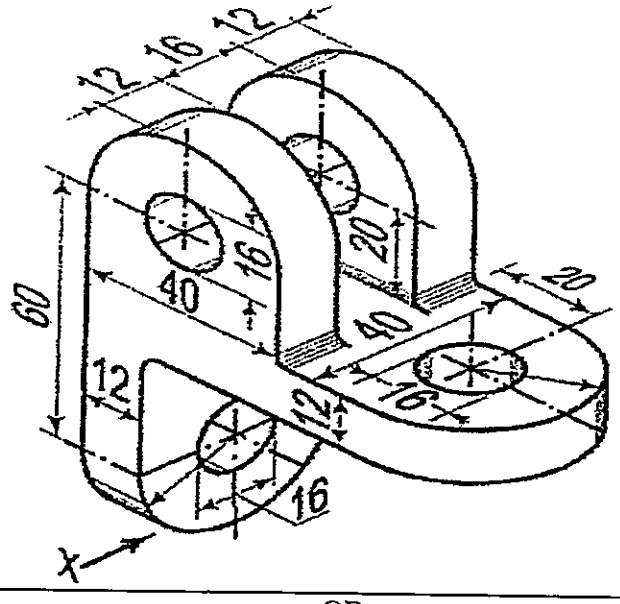
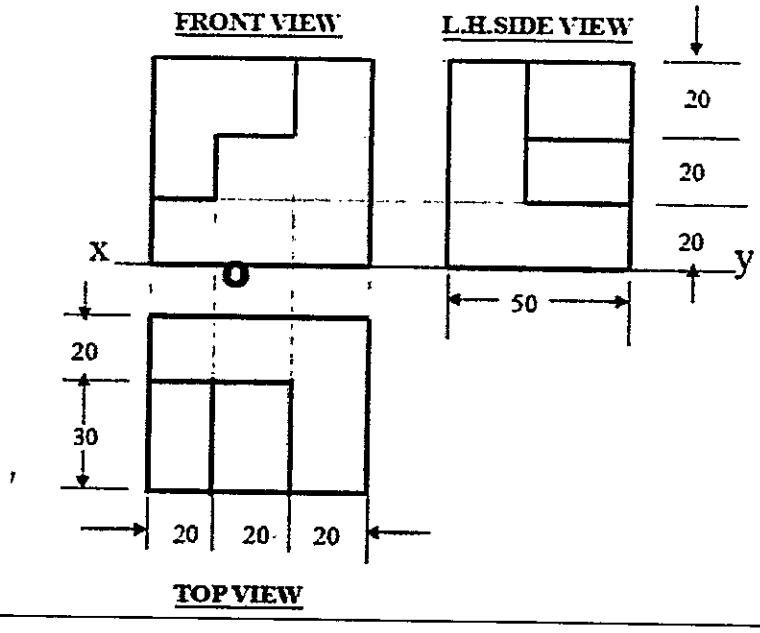
Sub Code: 19BEC1TH09 **ENGINEERING GRAPHICS**

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	i) Construct a regular Heptagon with a 25 mm side using the regular method.	[6M]
		ii) Draw a hyperbola of eccentricity, e=4/3, if the distance of the focus from the directrix is equal to 70 mm.	[6M]
		OR	
	b	i) Draw a Parabola if the distance of the focus from the directrix is 60 mm. Draw Tangent and Normal through a point 50 mm from the directrix.	[6M]
		ii) The major axis of an ellipse is 120 mm long, and the minor axis is 80 mm long. Find the foci and draw the ellipse using the Arcs of Circles Method.	[6M]
2		Unit-II	
	a	A line AB, 90 mm long, is inclined at 45^0 to the H.P., and its top view makes an angle of 60^0 with the V.P. The end A is in the H.P., and 12 mm in front of the V.P. Draw the projections of AB.	[12M]
		OR	
	b	Draw the projections of the following points on the same ground line, keeping the distance between projectors equal to 30mm. i) A is 30 mm below H.P. and 50 mm in front of V.P. ii) B is 10 mm above H.P. and 30 mm behind V.P. iii) C is 15 mm above H.P. and 45 mm in front of V.P. iv) D is 35 mm in front of VP and 25 mm below HP v) E is 40 mm from both planes and the point is in the first quadrant	[12M]
3		Unit-III	
	a	i) An equilateral triangle ABC of 50 mm side is parallel to V.P and 15 mm in front of V.P its base AB is parallel and 75 mm above H.P. Draw the projections of the triangle when the corner is near the H.P. plane is perpendicular to H.P and parallel to V.P.	[6M]
		ii) A square lamina ABCD of side 50 mm is perpendicular to H.P and parallel to V.P. Draw the projections of the square when the side AB is 20 mm above H.P and 30 mm in front of the V.P.	[6M]
		OR	
	b	A square ABCD of 50 mm side has its corner A in the H.P., its diagonal AC inclined at 30^0 to the H.P., and the diagonal BD inclined at 45^0 to the V.P. and parallel to the H.P. Draw its projections.	[12M]
4		Unit-IV	
	a	i) Draw the projections of a cone with a base of 40 mm diameter and an axis of 50 mm long. The base is resting on H.P., and the center of the base is 50 mm in front of V.P.	[6M]
		ii) A square pyramid, base 30 mm side, and axis 60 mm long has its base in the V.P. One edge of the base is inclined at 45^0 to the H.P., and a corner contained by that edge is on the H.P. Draw its projections.	[6M]

		OR	
	b	A pentagonal pyramid, base 25 mm side and axis 50 mm long, has one of its triangular faces in the V.P., and the edge of the base contained by that face makes an angle of 30^0 with the H.P. Draw its projections.	[12M]
		Unit-V	
5	a	Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure!  	[12M]
		OR	
	b	Draw an isometric view for the given orthographic projections.  	[12M]

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

I B.Tech I Semester Supple. Examinations, March-2025

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
		Unit-I	
1	a	i) Illustrate with simple example Algorithms, Flow Charts and program.	[6M]
		ii)Discuss the generation of Programming Languages. Discuss the features of Structured Programming Language.	[6M]
		OR	
	b	i) Give the importance of ***keywords*** and ***identifiers***. Give the rules to frame an ***identifier***.	[6M]
		ii) Discuss Basic Data Types in C with examples.	[6M]
		Unit-II	
2	a	Explain while statement with example. Distinguish between ***break*** and ***continue*** Statement.	[12M]
		OR	
	b	i) What is ***recursive function***? Give an example.	[4M]
		ii) Give ***storage classes*** in C	[4M]
		iii)Write a C program to find sum and average of N given numbers.	[4M]
		Unit-III	
3	a	i) Write a C program to multiply two given matrices A (M X N) and B (N x K).	[8M]
		ii) Discus the operations on Array.	[4M]
		OR	
	b	i) Discuss String Manipulation functions. Write a *declare statement for an array of strings.*	[6M]
		ii) Write a C program to read and print a string.	[6M]
		Unit-IV	
4	a	i) Write c statement to declare a pointer to an integer and also give C statement to read and print the value the string.	[6M]
		ii) What are the possible arithmetic operations on pointers?	[6M]
		OR	
	b	i) Distinguish between **Structure** and **Union.** Illustrate with example	[6M]
		ii) What is ***Enumerated Data Types***? Give an example	[6M]
		Unit-V	
5	a	i) Write a C program to create a text file and read the file.	[6M]
		ii) How do you detect end of a file (EOF)?	[6M]
		OR	
	b	i) What are command line arguments?	[6M]
		ii) Write a C program to copy the two give files into another new file.	[6M]

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