

## I B.Tech I Semester Supple. Examinations, May-2023

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) State and explain the superposition principle. [2M] ii) Describe Fraunhofer diffraction pattern obtained with single slit. [10M]
	OR	
	b	i) Describe the construction and action of Nicol prism. Explain how Nicol prism acts as an analyzer. [8M] ii) Find the minimum thickness of half wave and quarter wave plates for a light beam of wavelength 589.3 nm. If $\mu_o = 1.65833$ and $\mu_e = 1.48640$ . [4M]
	Unit-II	
2	a	i) With the help of suitable diagrams, explain the principle, construction and working of Ruby laser. [8M] ii) What are the various application of lasers? [4M]
	OR	
	b	i) What is meant by acceptance angle for an optical fiber? Obtain mathematical expression for acceptance angle and numerical aperture. [8M] ii) The numerical aperture of an optical fiber is 0.2 when surrounded by air. Given the refractive index of the cladding is 1.59. Find the acceptance angle when the fiber is in water. [4M]
	Unit-III	
	a	i) Define the terms Basis, Space lattice and Unit cell. [3M] ii) Describe seven crystal systems with neat diagrams. [9M]
OR		
b	i) What are the Miller indices? How are they obtained? [6M] ii) Derive expression for inter planner spacing in case of cubic structure. [6M]	
Unit-IV		
4	a	i) State Gauss theorem and explain why it is called as divergence theorem. [3M] ii) What are the fundamental laws of electromagnetism? Explain. [9M]
	OR	
	b	i) Explain in detail the classification of magnetic materials on the basis of electron spin. [9M] ii) What are hard magnetic materials? Write their properties. [3M]
	Unit-V	
	a	i) Explain the physical significance of wave function. [4M] ii) Derive time independent Schrodinger wave equation. [8M]
OR		
b	i) Write note on intrinsic and extrinsic semiconductors with suitable example. [4M] ii) Explain the classification of materials into conductors, semiconductors and insulators. [8M]	

\*\*\*

## I B.Tech I Semester Supple. Examinations, May-2023

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 $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ into normal form and hence find its rank.	[6M]
		ii) Use the Gauss elimination method to solve the system $4x + 3y - z = 6, 3x + 5y + 3z = 4, x + y + z = 1.$	[6M]
	OR		
	b	i) Solve the system of equations $10x + y + z = 12, 2x + 10y + z = 13,$ $x + y + 3z = 5$ by the LU decomposition method.	[6M]
		ii) Solve the system of equations $2x + 20y - 2z = -44,$ $-2x + 3y + 10z = 22, 10x + 2y + z = 9$ by Gauss-Seidel method.	[6M]
2	Unit-II		
	a	Find the rank, index, and signature of the following quadratic form by reducing it into the canonical form using orthogonal transformation $3x^2 + 3y^2 + 3z^2 + 2xy - 2yz + 2zx.$	[12M]
	OR		
	b	i) Find the characteristic roots and corresponding characteristic vectors of the matrix $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & -1 \\ 1 & -1 & 0 \end{bmatrix}.$	[6M]
	ii) Verify the Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence find $A^{-1}.$	[6M]	
3	Unit-III		
	a	i) Apply Lagrange's mean value theorem to show 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) Show that the triangle of the maximum area that can be inscribed in a given circle is an equilateral triangle.	[6M]
	OR		
	b	i) Compute the value of $\sin 91^\circ$ correct to four decimal places using Taylor's series	[6M]
	ii) State Rolle's mean value theorem and give its geometrical meaning. Verify Rolle's mean value theorem for $\frac{\sin x}{e^x}$ in $(0, \pi).$	[6M]	

Unit-IV		
4	a	i) If $u=x(1-y), v=xy$ , then prove that $\frac{\partial(u,v)}{\partial(x,y)} \cdot \frac{\partial(x,y)}{\partial(u,v)}=1$ . [6M]
		ii) If $\frac{3}{x}+\frac{4}{y}+\frac{5}{z}=6$ , find the values of $x, y, z$ which makes $x+y+z$ is minimum. [6M]
	OR	
	b	i) If $z=f(x,y)$ and $x=e^u \cos v, y=e^u \sin v$ , then prove that $x \frac{\partial z}{\partial v}+y \frac{\partial z}{\partial u}=e^{2u} \frac{\partial z}{\partial y}$ . [6M]
ii) Find the minimum and maximum distances from the origin to the curve $5x^2+6xy+5y^2=8$ . [6M]		
Unit-V		
5	a	i) Using double integration, find the volume of the solid generated by revolving the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about the y-axis. [6M]
		ii) Evaluate $\int_0^2 \int_0^{\sqrt{2x-x^2}} \frac{x dy dx}{\sqrt{x^2+y^2}}$ by changing into polar coordinates. [6M]
	OR	
	b	i) Evaluate $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dy dx$ . [6M]
ii) Evaluate $\int \int (x+y)^2 dx dy$ over the region bounded by the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ . [6M]		

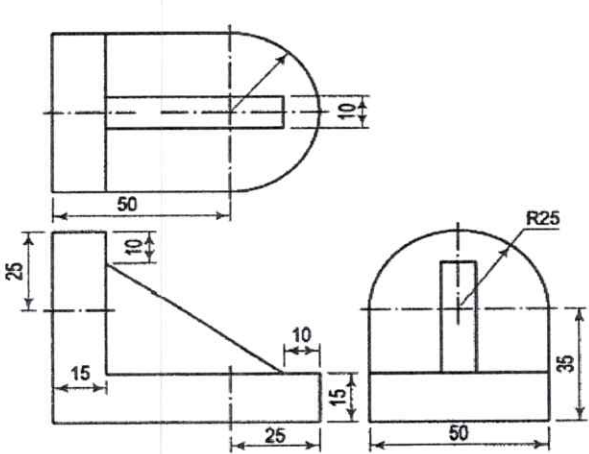
\*\*\*



## I B.Tech I Semester Supple. Examinations, May-2023

**Sub Code: 19BCC1TH04**
**ENGINEERING DRAWING**
**Time: 3 hours**
**(Common to CE & ME)**
**Max. Marks: 60**

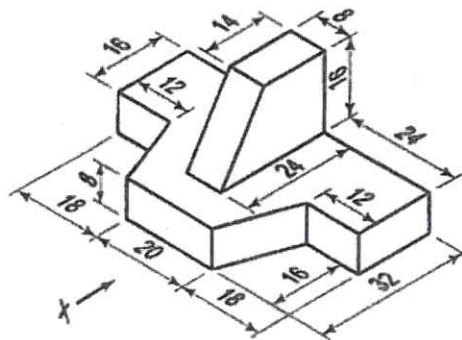
Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	Marks
1	Unit-I	
	a) i) Construction of ellipse using oblong method by taking major axis is 100mm and minor axis is 70mm	[12M]
	OR	
	b) i) Construct a scale of 1 : 4 to show centimetres and long enough to measure upto 5 decimetres. ii) Construct a regular pentagon of 30 mm side by general method.	[6M] [6M]
2	Unit-II	
	a) i) Two points A and B are in the H.P. The point A is 30mm in front of V.P while B is behind the V.P. The distance between their projectors is 75mm and the line joining the top views makes an angle of 45° with X,Y. Find the distance of the point B from the V.P	[12M]
	OR	
b) i) A line AB is 75mm long, is inclined 45° to the H.P and 30° to the V.P. Its one end A is 20mm above H.P and 40mm in front of the V.P. Draw its projections and determines its traces.	[12M]	
3	Unit-III	
	a) A square ABCO of 50 mm side has its corner A in the H.P., its diagonal AC inclined at 30° to the H.P. and the diagonal BD inclined at 45° to the V.P. and parallel to the H.P. Draw its projections.	[12M]
	OR	
b) Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60° to the V.P., and its surface making an angle of 45° with the H.P.	[12M]	
4	Unit-IV	
	a) i) A cube of 50 mm long edges is resting on the H.P. with its vertical faces equally inclined to the V.P. Draw its projections.	[12M]
	OR	
b) Draw the projection of pentagonal prism base 25mm side and axis 60mm long, resting on one of its rectangular faces on the H.P., with the axis inclined at 45° to V.P.	[12M]	
5	Unit-V	
a	<p>Draw isometric view for the given orthographic projections.</p> 	[12M]

OR

Draw the (i) Front view (ii) Top view and (iii) Side view for the following figure.

b



[12M]

\*\*\*

**I B.Tech I Semester Supple. Examinations, May-2023**

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) Explain about Hardware components and Software in detail. [6M]
		ii) Define algorithm. Write an algorithm for adding n natural numbers [6M]
	OR	
	b	i) Explain different generations of a computer. [6M]
		ii) What is a computer? Explain various parts of a computer system? [6M]
2	Unit-II	
	a	i) Discuss Raptor Program Structure in detail. [6M]
		ii) Draw a flow chart to find GCD of two numbers using raptor. [6M]
	OR	
	b	i) Explain different types of Raptor flowchart symbols. [4M]
		ii) Outline a raptor flowchart for Fibonacci Sequence. [4M]
3	Unit-III	
	a	i) What is string? Explain how to access characters present in the string. [6M]
		ii) Write a Program to prompt for a score between 0.0 and 1.0. If the score is out of range, print error. If the score is between 0.0 and 1.0, print a grade using the following table. [6M]
		Score    Grade
		>=0.9    A
		>=0.8    B
	>=0.7    C	
	>=0.6    D	
	< 0.6    F	
OR		
b	i) Explain about different types of arguments used in python with an example for each. [6M]	
	ii) How to take input and produce the output in python. [6M]	
4	Unit-IV	
	a	i) Define list? Explain about the methods present in the list. [6M]
		ii) Write a program to add all elements to list upto 100 which are divisible by 10. [6M]
	OR	
	b	i) List any three methods used with dictionary type variables with suitable examples. [6M]
		ii) Write a program to copy the contents of one file to another file. [6M]
5	Unit-V	
	a	i) Discuss in detail about class, object, reference variable with an example. [8M]
		ii) Write a program to draw color filled polygon using turtle module [4M]
	OR	
	b	Discuss in detail about inheritance and its types with an example [12M]



**I B.Tech I Semester Supple. Examinations, May-2023**

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
<b>Unit-I</b>		
1	a i) Explain zeolite method for softening of hard water with a suitable diagram.	[6M]
	ii) Explain break point chlorination and chemical oxygen demand.	[6M]
	OR	
	b i) In hardness of water determination experiment, 50 mL hard water is measured by 25 mL 0.02M standard EDTA solution in the presence of EBT indicator at pH 10. Calculate the hardness of water.	[4M]
	ii) Explain the method of determination of dissolved oxygen of a water sample with suitable chemical reactions involved in it.	[8M]
<b>Unit-II</b>		
2	a i) Discuss the mechanism of cationic chain polymerization with a suitable example.	[6M]
	ii) Define octane number and cetane number of fuel. How they are differ from each other?	[6M]
	OR	
	b i) Define calorific value of a fuel and state the relationship between HCV and LCV. Mention the characteristics of a good fuel.	[6M]
	ii) How crude petroleum can be refined? Mention the boiling point ranges and application of any two important fractions of petroleum.	[6M]
<b>Unit-III</b>		
3	a i) How carbon nanotubes can be prepared? Mention properties and application of carbon nanotubes.	[6M]
	ii) What are liquid crystals? Discuss the classification of liquid crystals with appropriate examples.	[6M]
	OR	
	b i) Explain sol-gel method for the preparation of nano-materials with a suitable example.	[6M]
	ii) Write application of fullerenes and composite materials.	[6M]
<b>Unit-IV</b>		
4	a i) Write down the chemical reactions involved in the charging and discharging processes in a lead-acid storage cell. What are the limitations of dry cell?	[6M]
	ii) Give a brief account on comparison of chemical corrosion and electrochemical corrosion.	[6M]
	OR	
	i) Explain anodic metal coating with a suitable example.	[6M]
	ii) Distinguish between galvanizing and tinning.	[6M]
<b>Unit-V</b>		
5	a i) Draw a suitable flow-diagram for the preparation of Portland cement from raw materials. Write down the chemical reactions involved in the process	[6M]
	ii) Explain the following: Boundary lubrication and extreme pressure lubrication	[6M]
	OR	
	b i) What are refractories? Describe the classification of refractories with appropriate examples.	[6M]
	ii) Explain the following properties of a lubricating oil: (a) cloud and pour point b) flash point and fire point	[6M]

\*\*\*

## I B.Tech I Semester Supple. Examinations, May-2023

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
<b>Unit-I</b>		
1	a i) Write about the Algorithm and flow chart importance for any programming language	[6M]
	ii) Explain Type casting and conversion with an example	[6M]
	OR	
	b i) What is a Structured Language? What is the importance of C language?	[6M]
	ii) Discuss the operators in C Language	[6M]
<b>Unit-II</b>		
2	a i) What are the different iterative statements in C. Explain with examples	[6M]
	ii) What are the different storage classes available in C language?	[6M]
	OR	
	b i) Discuss the importance of GOTO statement in C with an example	[6M]
	ii) Give an example of Iteration and Recursion. And then give the definitions for both.	[6M]
<b>Unit-III</b>		
3	a i) Define Array. Write a program to find the largest number in an array	[6M]
	ii) Explain about String handling functions	[6M]
	OR	
	b i) Write the program for Matrix Multiplication in Array	[6M]
	ii) Discuss clearly about Array of Strings	[6M]
<b>Unit-IV</b>		
4	a i) What is a pointer variable? Discuss about Pointer Arithmetic	[6M]
	ii) What are Enumerated data types? Explain	[6M]
	OR	
	b i) Write a program for swapping of two numbers by using pointers	[6M]
	ii) Explain clearly about Structures and functions	[6M]
<b>Unit-V</b>		
5	a i) What is a file? How to detect the end of file?	[6M]
	ii) How to handle errors during file operations?	[6M]
	OR	
	b i) write a program to accept the command line arguments	[6M]
	ii) What is a file? How to use files in C?	[6M]



## I B.Tech I Semester Supple. Examinations, May-2023

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)

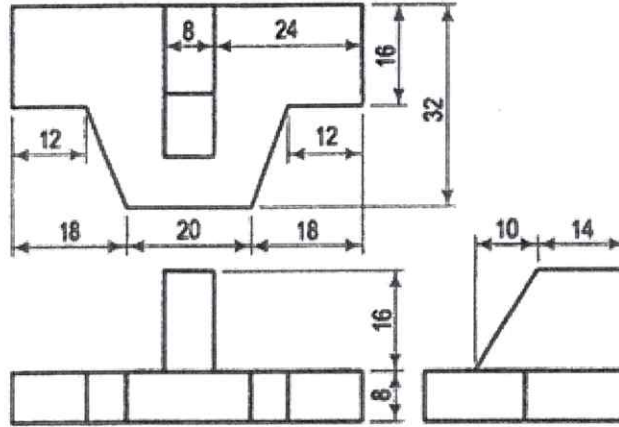
Q.No	Questions	Marks
<b>Unit-I</b>		
1	a Draw a hyperbola when the distance of the focus from the directrix is 70 mm and the eccentricity e is 1.5. Draw the tangent and normal to the curve at a point P distance 50 mm from the directrix.	[12M]
	OR	
	b Construct a parabola when the distance between the focus and directrix is 30mm. Also draw the tangent and normal to any point on the curve.	[12M]
<b>Unit-II</b>		
2	a i).Draw the projection of the following points on the same XY line, keeping convenient distance between each projector. Name the Quadrants in which they lie. A - 30 mm above HP & 35 mm in front of VP. B - 35 mm above HP & 40 mm behind VP. C - 40 mm above HP & on VP. D - 35 mm below HP & 30mm in front of VP.	6M
	ii).A point P is on HP and 30 mm in front of VP. Another point Q is on VP and below HP. The line joining their front views makes an angle of 30° to XY line while the line joining their top views makes an angle of 45° with XY line. Find the distance of the point Q from HP.	6M
OR		
	b A line PQ has its end P, 10 mm above the HP and 20 mm in front of the VP, the end Q is 35 mm in front of the VP. The front view of the line measures 75 mm. The distance between the end projectors is 50 mm. Draw the projections of the line and find its true length and its true inclinations with the VP and HP.	[12M]
<b>Unit-III</b>		
3	a A hexagonal lamina of sides 30mm is resting with one of its corners in VP and its surface inclined at an angle of 30° with VP. The diagonal passing through that corner which is in VP appears to be inclined at 45° to HP. Draw the projections of the lamina.	[12M]
	OR	
	b An isosceles triangular plate of negligible thickness has a base 25mm long and altitude 35mm. It is so placed on HP such that in the front view it is seen as an equilateral triangle of 25mm sides with the side that is parallel to VP is inclined at 45° to HP. Draw its top and front views. Also determine the inclination of the plate with the reference plane.	[12M]
<b>Unit-IV</b>		
4	a A cone of base diameter 40mm and axis length 50mm is resting on HP on a point on the circumference of its base such that its apex is at 40mm above the HP and its top view of the axis is inclined at 60° to VP. Draw the top and front views of the solid. Also, determine the inclinations of the axis when base is nearer to the observer.	[12M]

OR

b A cylinder of base diameter 50mm and axis height 65mm is resting on HP on a point on the circumference of the base with its axis inclined at  $50^\circ$  to HP and parallel to VP. Draw its projections. [12M]

Unit-V

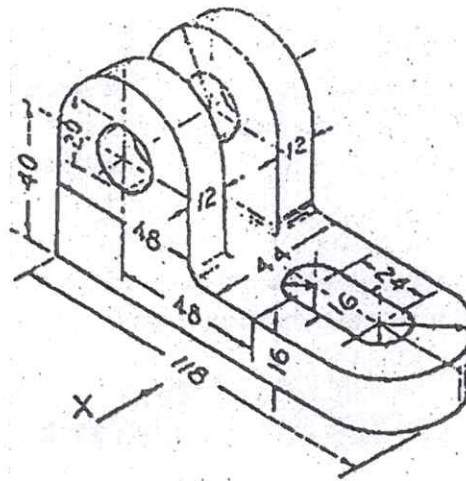
a Draw the isometric view from the orthographic views given below. [12M]



OR

5 Draw the three orthographic views for the following fig. [12M]

b



\*\*\*



## I B.Tech I Semester Supple. Examinations, May-2023

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) Derive the expression for diffusion capacitance in PN junction ii) Draw and explain the circuit diagram of full wave rectifier with inductor filter	[6M] [6M]
	OR		
	b	i) Derive expression for ripple factor and rms value of voltage of full wave rectifier with resistive load ii) Write the Application of PN junction diode	[6M] [6M]
	Unit-II		
2	a	Explain input and output characteristics of a transistor in CB configuration	[12M]
	OR		
	b	i) Explain the four distinct regions of the output characteristics of JFET	[4M]
		ii) Explain construction of n channel JFET with neat diagram	[4M]
iii) Compare JFET with BJT		[4M]	
Unit-III			
3	a	i) Reduce the following function using k-map technique $F(A,B,C,D)=\pi(0,2,3,8,9,12,13,15)$ ii) State De Morgans's theorems	[6M] [6M]
	OR		
	b	i) Simplify the following using K- map and implement the same using NAND gates. $Y(A, B, C) = \sum(0,2,4,5,6,7)$	[6M]
		ii) How are negative numbers represented? Represent signed numbers from +7 to -8	[6M]
Unit-IV			
4	a	i) Define decoder. Construct 3x8 decoder using logic gates and truth table.	[6M]
		ii) Draw the logic diagram of a SR latch using NOR gates. Explain its Operation using excitation table.	[6M]
	OR		
	b	i) Design a excess-3 adder using 4-bit parallel binary adder and logic gates.	[6M]
ii) Draw the schematic circuit of RS master slave flip flop. Give its truth table and justify the entries in the truth table		[6M]	
Unit-V			
5	a	i) Draw the block diagram of Bidirectional Shift Register and explain its operation	[6M]
		ii) Design of MOD-10 Ripple Counter and explain its operation	[6M]
	OR		
	b	i) Draw the block diagram of Universal Shift Register and explain its operation	[6M]
ii) Draw the block diagram of Ring counter and explain its operation		[6M]	

\*\*\*