



# SRI MITTAPALLI COLLEGE OF ENGINEERING

## (AUTONOMOUS)

**MR23**

**Subject Code: MR231101**

**I B.Tech. I Semester (Regular) Examinations, (FEB-2024)**  
**COMMUNICATIVE ENGLISH**  
**(CSE)**

**Time: 3 hours**

**Max. Marks: 70**

.....  
Note: Question Paper consists of Two parts (Part-A and Part-B)

**PART-A**

Answer all the questions-mandatory (10 x 2M=20M)

Q.No	Questions	KL	CO	Marks
1	a) What do the actions of Jim and Della symbolize?	Knowledge BTL-2	CO1	2M
	b) Write any two example words for each of the following prefix and suffix. i) proto- ii) -ness	Knowledge BTL-1	CO1	2M
	c) Why has the poet used the word “brimming” in the line “to join the brimming river”?	Knowledge BTL-2	CO2	2M
	d) Fill in the blanks in the following sentences with suitable prepositions. i. Reshma travelled ____ her father all ____ the world ii. They were talking .....us.....their son. iii. She was relieved ____ the pain after the effect of medicines.	Application BTL-3	CO2	2M
	e) What motivated Musk towards business and technology?	Knowledge BTL-1	CO1	2M
	f) Write one compound word for each of the following classes. i. Noun..... ii. Pronoun..... iii. Adjective..... iv. Preposition.....	Application BTL-3	CO2	2M
	g) What are the ideas of Harvey towards elementary education ?	Knowledge BTL-1	CO1	2M
	h) Change the following sentences into indirect speech: i. Sarah exclaimed, "I can't believe we won the competition!" ii. John asked, "Have you seen my keys anywhere?"	Application BTL-3	CO2	2M
	i) Name some challenges that we can overcome using intrapersonal communication.	Knowledge BTL-1	CO1	2M
	j) i) scared (write the Synonym of the word) ii) benevolent (write the antonym of the word)	Knowledge BTL-1	CO1	2M

## PART-B

Answer all the questions.

Either 'a' or 'b' from each question (5 x 10M=50M)

Q.No	Questions	KL	CO	Marks
<b>Unit-I</b>				
2	i) Enumerate the human values from the short story 'Gift to Magi'.  ii) <b>Rewrite the following short texts, making corrections in spelling and the use of capitals and punctuation marks.</b>  the sky was clear there was a gentle breeze birds were chirping and flowers were in full bloom. I decided to take a walk in the park. Suddenly i saw a beautifull butterfly it had vibrant colors on its wings it was a mesmerizing sight	Comprehension BTL-2	CO1	5M
	Application BTL-3	CO2		5M
<b>OR</b>				
3	i) Write a brief note on the financial situation of the couple, in the words of O. Henry.  ii) Write the correct question to ask about the word/phrase in bold using <b>who, what, why, when, how, or which</b> . i. <b>My friend</b> cracked JEE recently. ii. The baby <b>looks</b> joyful. iii. I am reading decoding <b>the leader</b> right now. iv. <b>Chat GPT</b> will take over the future jobs. v. <b>The students</b> reported on time.	Comprehension BTL-2	CO1	5M
	Application BTL-3	CO2		5M
<b>Unit-II</b>				
4	i) "Nature is forever". How does Alfred Tennyson support this idea in his poem <b>The Brook</b> ?  ii) Compose paragraph of about 200 words on <b>Open AI and the future of work</b> .	Comprehension BTL-2	CO2	5M
	Application BTL-3	CO4		5M
<b>OR</b>				
3	i) How has the poet describe the <b>landscape, flowers, plants and colours</b> in the poem <b>The Brook</b> ?  ii) <b>Fill in the blanks following with suitable articles (If the blank space does not need an article, indicate with an X)</b> i. Can I borrow _____ pencil from your pile of pencils and pens? ii. One of the students said, "_____ professor is late today." iii. I bought _____ umbrella to go out in the rain. iv. Please give me _____ cake that is on the counter. v. I lived on _____ Main Street when I first came to town.	Comprehension BTL-2	CO1	5M
	Application BTL-3	CO2		5M
<b>Unit-III</b>				
4	i) Draft a write up on how <b>Tesla</b> revolutionized the transportation mechanism.  ii) <b>Fill in the blanks using appropriate tense forms of the verbs in brackets.</b> i. She ..... ( <b>work</b> ) here for five years before she got a promotion. ii. By the time we reached the airport, the plane .....( <b>already/leave</b> ). iii. I .....( <b>leave</b> ) by the time you arrive. iv. He usually ..... ( <b>run</b> ) five miles every morning. v. I .....( <b>never/see</b> ) such a beautiful sunset before.	Comprehension BTL-2	CO1	5M
	Application BTL-3	CO2		5M

	OR				
	i) Elon Musk is a proven leader of cutting-edge technology. Substantiate your answer citing examples.	Application BTL-3	CO4	5M	
b	<b>ii) Choose the correct collocation in each of the given pairs.</b> <ul style="list-style-type: none"> <li>i. Parting with money..... money partition</li> <li>ii. sow benefits reap benefits</li> <li>iii. press an icon click on an icon</li> <li>iv. take a conversation make a conversation</li> <li>v. Un sung heroes untold heroes</li> </ul>	Application BTL-3	CO1	5M	
<b>Unit-IV</b>					
	i) Elicit your ideas on the concept of motivation by Saki.	Application BTL-2	CO1	5M	
a	ii) The laptop you just purchased has a problem with several keys on its keypad. It is in the guarantee period. Write an official letter to the supplier and ask for a free replacement.	Application BTL-3	CO5	5M	
OR					
5	i) Do you think Harvey and Elizabeth's experiment failed? Justify your answer.	Application BTL-3	CO4	5M	
b	<b>ii) Prepare a resume and job application /cover letter for the following job advertisement.</b> Wanted a design engineer for Brane Solutions Private Limited based out of Hyderabad. The candidate must be a graduate in engineering with an experience of at least two years. Computer knowledge and communicative English are necessary. Apply within a week to HR Manager, Brane Solutions Private Limited, 4 Floor Mind Space, Hyderabad .	Application BTL-3	CO5	5M	
<b>Unit-V</b>					
	i) Analyze on how intrapersonal communication helps over interpersonal communication in improving human connections?	Application BTL-2	CO3	5M	
a	ii) Write an argumentative essay on <b>The positive side of Covid positive.</b>	Application BTL-3	CO5	5M	
OR					
6	i) Enlist a few ways in which intra personal communication can be incorporated in your life.	Application BTL-3	CO2	5M	
b	<b>ii) Rewrite the following sentences correctly.</b> <ul style="list-style-type: none"> <li>i. He apologized to his mistake.</li> <li>ii. She thanked me on my assistance.</li> <li>iii. They are exclusively focusing about improving their skills.</li> <li>iv. We are studying only.</li> <li>v. I should appreciate his dedication on the project.</li> </ul>	Application BTL-3	CO2	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks

\*\*\*



**Sub Code: MR231103**

**I B.Tech I Semester Regular/Supple. Examinations (FEB2024)**

**CHEMISTRY**

**(CSE)**

**Time: 3 hours**

**Max. Marks: 70**

Note: Question Paper consists of Two parts (Part-A and Part-B)

**PART-A**

Answer all the questions is mandatory (10 x 2M=20M)

Q.No	Questions	KL	CO	Marks
1	a) Define wave and write the characteristics of particle	KL1	CO1	2M
	b) Calculate the bond orders of O <sub>2</sub>	KL3	CO1	2M
	c) Define Semiconductors	KL1	CO2	2M
	d) Analyse applications of carbon nano tubes	KL4	CO2	2M
	e) Define electro chemicals	KL3	CO3	2M
	f) Compare primary battery with secondary battery	KL2	CO3	2M
	g) Define degree of polymerization with example	KL1	CO4	2M
	h) Define addition polymerization	KL1	CO4	2M
	i) Explain the selection rules of UV-Visible spectroscopy	KL2	CO5	2M
	j) Express various regions of electromagnetic spectrum	KL2	CO5	2M

**PART-B**

Answer all the questions.

Either 'a' or 'b' from each question (5 x 10M=50M)

Q.No	Questions	KL	CO	Marks
Unit-I				
2	i) Explain the derivation of time independent Schrodinger wave equation	KL2	CO1	5M
	a ii) Illustrate molecular orbital energy level diagram for CO and calculate the bond order.	KL3	CO1	5M
OR				
b	i) Derive an expression for energy of a particle in one dimensional box.	KL2	CO1	5M
	ii) Illustrate pi molecular orbital diagram for Benzene.	KL3	CO1	5M

		Unit-II			
3	a	i)Classify Semiconductors and differentiate p-type semiconductor from n-type.	KL3	CO2	5M
		ii)Discuss types of Superconductors and their applications	KL2	CO2	5M
OR					
b		i) Discuss briefly about supercapacitors	KL2	CO2	5M
		ii) Explain properties and applications of fullerenes.	KL2	CO2	5M
		Unit-III			
4	a	i)Derive Nernst equation for electrode and cell potential	KL2	CO3	5M
		(ii)Explain working of the Hydrogen – Oxygen fuel cell including cell reactions	KL2	CO3	5M
OR					
b		i) Explain about construction and working of Electrochemical cell	KL2	CO3	5M
		ii) Explain working of the lithium ion battery including neat diagram and cell reactions	KL2	CO3	5M
		Unit-IV			
5	a	i) Distinguish thermoplastics from thermosetting plastics.	KL4	CO4	5M
		ii) Discuss preparation, properties and uses of Bakelite.	KL2	CO4	5M
OR					
b		i) Discuss about mechanism of conduction in polyacetylene	KL2	CO4	5M
		ii) Explain the preparation, properties and applications of Buna-S and Buna-N	KL2	CO4	5M
		Unit-V			
6	a	i) Illustrate components of IR Spectrophotometer with neat sketch..	KL3	CO5	5M
		ii) Explain types of electronic transitions in UV-Visible spectroscopy.	KL2	CO5	5M
OR					
b		Illustrate the classification and instrumentation of HPLC	KL3	CO5	10M

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks

\*\*\*



**SRI MITTAPALLI COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

MR23

**Subject Code: MR231105**

**I B.Tech. I Semester (Regular) Examinations, (FEB-2024)**  
**LINEAR ALGEBRA & CALCULUS**  
**(Common to ECE, CSE, IT, AI & DS)**

**Time: 3 hours**

**Max. Marks: 70**

.....  
Note: Question Paper consists of Two parts (Part-A and Part-B)

**PART-A**

Answer all the questions is mandatory (10 x 2M=20M)

Q.No	Questions	KL	CO	M
1	a. Define rank of the matrix, and write any two properties of rank of the matrix.	K2	1	2M
	b. Find the value of k such that the rank of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & k & 7 \\ 3 & 6 & 10 \end{bmatrix}$ is 2	K3	1	2M
	c. If the Eigen values of A are -1,1,3 then find the Eigen values of Adj A	K3	2	2M
	d. State Cayley-Hamilton theorem, find $A^4$ if $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ .	K2	2	2M
	e. Using Rolle's theorem ,find C $f(x) = x^3 + x^2 - x + 1; [-1,1]$	K2	3	2M
	f. Obtained the Maclaurin's series expansion of $f(x) = \cos x$	K2	3	2M
	g. Find $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}$ if $u = f(x+y, x-y)$	K3	4	2M
	h. Find $\frac{\partial^3 f}{\partial x \partial y \partial z}$ for $f(x, y, z) = e^{xyz}$	K3	4	2M
	i. Evaluate $\int_1^3 \int_3^4 (xy + e^y) dx dy$ .	K3	5	2M
	j. Evaluate $\int_0^1 \int_0^1 \int_0^y xyz dz dy dx$ .	K3	5	2M

**PART-B**

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 x 10 =50M)

Q.No	Questions	KL	CO	M
<b>Unit-I</b>				
2	<p>i. Make use of elementary transformations reduce the Matrix into Normal forms and finds its rank.</p> $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$	K3	1	5M
	<p>ii. Identify for what values of a, b the simultaneous equations <math>x + y + z = 3, x + 2y + 2z = 6, x + ay + 3z = b</math> (i) no solution  (ii) an unique solution (iii) an infinite number of solutions.</p>	K3	1	5M
OR				
3	<p>i. Solve the system of equations <math>10x - 7y + 3z + 5w = 6, -6x + 8y - z - 4w = 5, 3x + y + 4z + 11w = 2, 5x - 9y - 2z + 4w = 7</math> by using Gauss elimination method</p> <p>ii. Solve the system of equations using Gauss-Seidel method <math>20x + y - 2z = 17, 3x + 20y - z = -18, 2x + 3y + 20z = 25</math></p>	K3	1	5M
	K3	1	5M	
<b>Unit-II</b>				
4	<p>a Verify Cayley-Hamilton theorem for the matrix <math>A = \begin{bmatrix} 3 &amp; 1 &amp; 2 \\ 2 &amp; -3 &amp; 1 \\ 1 &amp; 2 &amp; 1 \end{bmatrix}</math> and hence find <math>A^{-1}</math></p>	K3	2	10M
	OR			
b	Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2xy + 2zx - 2yz$ to the canonical form by orthogonal transformations and find the rank, index, signature and nature of the quadratic form.	K3	2	10M
<b>Unit-III</b>				
a	i. Identify the validity of Rolle's theorem for ( $f(x) = e^x(\sin x - \cos x)$ ); $\left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$	K3	3	5M
	ii. If $a < b$ prove using first mean value theorem $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ . Hence deduce $\frac{5\pi+4}{20} < \tan^{-1} 2 < \frac{\pi+2}{4}$	K3	3	5M
OR				
b	i. Verify Cauchy's mean value theorem for the function $f(x) = \sin x, g(x) = \cos x ; [a, b], 0 \leq a < b \leq \frac{\pi}{2}$	K3	3	5M
	ii. Find Taylor's series expansion of the $f(x) = \cos x$ about $x = \frac{\pi}{3}$	K3	3	5M

<b>Unit-IV</b>						
5	a	i. If $x + y + z = u$ , $y + z = uv$ , $z = uwv$ then evaluate $\frac{\partial(x, y, z)}{\partial(u, v, w)}$	K3	4	5M	
		ii. Test whether $u=y/x$ , $v=xy$ are linearly independent	K3	4	5M	
OR						
6	b	i. Expand $e^x \sin y$ in powers of $x$ and $y$ on using the Maclurin's series.	K3	4	5M	
		ii. Making use of the Lagrange's method of multipliers, Find the maximum value of $x^m y^n z^p$ given that $x + y + z = a$ .	K3	4	5M	
<b>Unit-V</b>						
6	a	i. Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \sqrt{x^2 + y^2} dy dx$ by changing into polar coordinates.	K3	5	5M	
		ii. Apply the technique change of order of integration evaluate $\int_0^a \int_{x^2/a}^{2a-x} xy^2 dy dx$	K3	5	5M	
OR						
6	b	i. Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dx dy dz$	K3	5	5M	
		ii. Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} e^x dx dy dz$	K3	5	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M:Marks



# SRI MITTAPALLI COLLEGE OF ENGINEERING

## (AUTONOMOUS)

**MR23**

**Subject Code: MR231106**

### I B.Tech. I Semester (Regular) Examinations, (FEB - 2024)

#### BASIC CIVIL & MECHANICAL ENGINEERING

#### (CSE)

**Time: 3 hours**

**Max. Marks: 70**

*Note: Question Paper consists of two parts (Part-A and Part-B)*

### BASIC CIVIL ENGINEERING

#### PART-A

Note: Answer All Questions.

All Questions Carry Equal Marks (5 x 1 =5M)

Q.No		Questions	KL	CO	M
1	a	List the different grades of cement	(BTL-1)	CO5	1M
	b	Define levelling	(BTL-1)	CO2	1M
	c	Convert the following reduced bearings to whole circle bearing - N30°10'E, S48°30'E	(BTL-1)	CO2	1M
	d	Define principal of surveying	(BTL-1)	CO4	1M
	e	List out the different types of train gauges	(BTL-1)	CO3	1M

**Note: Answer All Questions.  
Either 'a' or 'b' from each question  
All Questions Carry Equal Marks (3 x 10 =30M)**

Q.No		Questions	KL	CO	M
<b>Unit-I</b>					
2	a	i) Discuss the advantages and disadvantages of prefabricated structures. ii) Explain the applications of following branches of civil engineering: a) Structural engineering. (b) Geotechnical engineering.	(BTL-2)	CO5	5M
	b	i) Explain the role of Civil Engineer in society ii) List out various types of cement and write about any one in detail.	(BTL-2)	CO5	5M
<b>OR</b>					
3	a	Write the differences between Whole Circle Bearing & Quadrantal Bearing with example	(BTL-3)	CO2	10M
	b	i) State the applications of contour map. ii) The following fore bearings were observed for lines, AB, BC, CD, DE, EF and FG respectively. Determine their back bearings: (i) 148° (ii) 65° (iii) 285° (iv) 215° (v) N 36° W (vi) S 40° E	(BTL-3)	CO2	5M

<b>Unit-III</b>						
4	a	i) Explain about design of airports ii) List the components of Hydrological Cycle and explain.	(BTL-2)	CO3	5M	
	b	i) Discuss the concept of Rainwater harvesting and its significance. ii) List the standards of drinking water as per BIS	(BTL-2)	CO4	5M	
OR						
5	a	i) Discuss the concept of Rainwater harvesting and its significance. ii) List the standards of drinking water as per BIS	(BTL-2)	CO4	5M	

\*\*\*

### **BASIC MECHANICAL ENGINEERING** **PART-B**

Note: Answer All **FIVE** Questions.  
All Questions Carry Equal Marks (5 x 1 =5M)

Q.No		Questions	KL	CO	M
5	a	Classify engineering materials.	(BTL-1)	CO1	1M
	b	Name the tools required in casting process.	(BTL-1)	CO2	1M
	c	Draw line diagram of Simple VCR system.	(BTL-1)	CO3	1M
	d	List out any two applications of robots in industrial sector.	(BTL-1)	CO1	1M
	e	What is belt drive? List out any two applications.	(BTL-1)	CO2	1M

**Note: Answer All Questions.**  
**Either 'a' or 'b' from each question**  
**All Questions Carry Equal Marks (3 x 10 =30M)**

Q.No		Questions	KL	CO	M
<b>Unit-I</b>					
6	a	i. Define composite material and discuss societal applications of composite materials. ii. Mention at least three different types of cast iron with suitable applications.	(BTL-2)	CO1	5M
	b	i. Define smart material. State the various types of smart-materials with their applications. ii. Elaborate the role of mechanical engineering in the automobile and marine sector.	(BTL-3)	CO1	5M
OR					
7	a	i. Explain the steps involved in the casting process with a flowchart. ii. Explain about different manufacturing techniques	(BTL-2)	CO2	5M
	b	i. Discuss any three types of machining process with a neat sketch. ii. Illustrate the working principle of boiler with a neat sketch	(BTL-3)	CO2	5M
OR					
<b>Unit-II</b>					
8	a	i. Explain the steps involved in the casting process with a flowchart. ii. Explain about different manufacturing techniques	(BTL-3)	CO2	5M
	b	i. Discuss any three types of machining process with a neat sketch. ii. Illustrate the working principle of boiler with a neat sketch	(BTL-4)	CO2	5M
OR					
9	a	i. Describe and classify the mechanical power transmission drives. ii. Demonstrate the working of hydroelectric power plant and list out the applications.	(BTL-3)	CO3	5M
	b	i. Illustrate the working principle of steam power plant with neat sketch. ii. Discuss about chain drives with applications.	(BTL-4)	CO3	5M

\*\*\*



# SRI MITTAPALLI COLLEGE OF ENGINEERING

## (AUTONOMOUS)

MR23

**Subject Code: MR231107**

### I B.Tech. I Semester (Regular) Examinations, (FEB, 2024)

#### INTRODUCTION TO PROGRAMMING

#### (Common to ECE, CSE, IT, AI & DS)

**Time: 3 hours**

**Max. Marks: 70**

Note: Question Paper consists of Two parts (Part-A and Part-B)

#### PART-A

Answer all the questions is mandatory (10 x 2M=20M)

Q.No	Questions	KL	CO	Marks
1	a) Define i) Algorithm ii) Flowchart	1	1	2M
	b) What is Typecasting? Explain	1	2	2M
	c) Give the syntax of switch.	1	2	2M
	d) Explain the differences between break and continue	1	2	2M
	e) Define an Array. Given the representation to declare an array of 5 integers.	1	3	2M
	f) Define a string. Explain how a string is different from an array of characters.	1	4	2M
	g) Define pointer. Explain the use of an integer pointer.	1	4	2M
	h) Give the difference between structure and union	1	4	2M
	i) Define Recursion.	1	5	2M
	j) Write a function to create a new file and open it to write some data in it.	4	5	2M

#### PART-B

Answer all the questions.

Either 'a' or 'b' from each question (5 x 10M=50M)

Q.No	Questions	KL	CO	Marks
<b>Unit-I</b>				
2	i) What is Central Processing Unit (CPU) in a computer. Explain about various components and their functions of CPU.	2	2	5M
	ii) List the basic data types, their sizes, and ranges of values supported by 'C' language.	2	1	5M
<b>OR</b>				
b	i) Explain various arithmetic operators in C Language with examples	2	1	5M
	ii) What is typecasting. Explain with example.	1	1	5M

<b>Unit-II</b>						
3	a	i) Illustrate the use of while and for loops in C language with example programs.	2	2	5M	
		ii) Explain with examples the use of switch statement.	2	2	5M	
OR						
4	b	i) Explain various loop statements in C.	3	2	5M	
		ii) Write a program to check whether a given number is palindrome or not.	2	3	5M	
<b>Unit-III</b>						
5	a	i) What is an Arrays? Write a program to find the sum of all elements in an Array.	1	3	5M	
		ii) Explain the use of various string manipulation functions with examples.	3	4	5M	
OR						
6	b	i) What are two dimensional Arrays. Write a program to find the sum of two 2 X 2 Matrices.	3	3	5M	
		ii) What is string? Explains the operations that can be performed on a string?	3	3	5M	
<b>Unit-IV</b>						
5	a	i) Define a pointer. How to initialize and declare pointer variables? Explain the same with examples.	2	4	5M	
		ii) Define a structure. Describe how to declare and initialize structure and its members with an example.	2	4	5M	
OR						
6	b	i) How to initialize and access pointer variable? Explain pointer to a function with example.	2	4	5M	
		ii) Define a Union. Describe how to declare and initialize structure and its members with an example.	2	4	5M	
<b>Unit-V</b>						
6	a	i) What is Recursive Function? Write a recursive function to find the factorial of a given number.	2	5	5M	
		ii) What is Call by Value and Call By Reference. Explain	2	5	5M	
OR						
6	b	i) Explain various Dynamic Memory Allocation functions with examples.	4	5	5M	
		ii) Explain various file handling functions.	2	5	5M	

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks

\*\*\*



# SRI MITTAPALLI COLLEGE OF ENGINEERING

## (AUTONOMOUS)

MR23

**Subject Code: MR231108**

### I B.Tech. I Semester (Regular) Examinations, (FEB - 2024) ENGINEERING PHYSICS (Common to ECE, IT, AI & DS)

**Time: 3 hours**

**Max. Marks: 70**

.....  
Note: Question Paper consists of Two parts (Part-A and Part-B)

#### PART-A

Answer all the questions is mandatory (10 x 2M=20M)

Q.No	Questions	KL	CO	Marks
1	a) Write the conditions for bright and dark in thin film interference by reflection of light.	KL2	CO1	2M
	b) What is the resolving power of the grating	KL1	CO1	2M
	c) What are the atomic packing fraction and coordination number?	KL1	CO2	2M
	d) Write the significance of Miller indices	KL2	CO2	2M
	e) What is the orientation polarizability?	KL1	CO3	2M
	f) Explain the magnetic hysteresis loop	KL2	CO3	2M
	g) Outline the physical significance of wave function.	KL2	CO4	2M
	h) Evaluate the energy of an electron confined in a box of width $2 \text{ \AA}$ for the first excited state.	KL2	CO4	2M
	i) Define the drift and diffusion currents.	KL1	CO5	2M
	j) How do you classify the crystalline solids	KL1	CO5	2M

**PART-B**

Answer all the questions.

Either 'a' or 'b' from each question (5 x 10M=50M)

Q.No	Questions	KL	CO	Marks
	<b>Unit-I</b>			
2	a i) (a)What do you understand by double refraction in uniaxial crystals. ii) Describe how to produce the plane polarized light by using Nicol's Prism	KL2	CO1	5M
		KL2	CO1	5M
	<b>OR</b>			
b	i) State and explain the superposition principle.	KL1	CO1	5M
	ii) Explain how to determine the radius of curvature of convex lens by using Newton's rings method.	KL3	CO1	5M
	<b>Unit-II</b>			
3	a i) Deduce Bragg's law of crystal diffraction ii) Describe the Laue method for determination of crystal structure	KL4	CO2	5M
		KL2	CO2	5M
	<b>OR</b>			
b	i) Discuss the Bravais seven crystal systems.	KL2	CO2	5M
	ii) Derive the expression for the interplanar separation in terms of miller indices for a cubic structure.	KL4	CO2	5M
	<b>Unit-III</b>			
4	a Discuss the electronic polarizability in dielectrics.	KL2	CO3	10M
	<b>OR</b>			
b	i) Deduce the relation between magnetic susceptibility and relative permeability. ii) Distinguish between soft and hard magnetic materials with suitable examples.	KL4	CO3	5M
		KL4	CO3	5M
	<b>Unit-IV</b>			
5	a i) Obtain time-dependent Schrodinger's wave equation for a free particle of mass m and energy E. ii) Derive an equation for de- Broglie's wavelength for electron.	KL3	CO4	5M
		KL2	CO4	5M
	<b>OR</b>			
b	i) Explain why classical free electron theory failed in atomic system. ii) Derive an equation for electrical conductivity in metals based on quantum free electron theory.	KL3	CO4	5M
		KL3	CO4	5M
	<b>Unit-V</b>			
6	a i) Define extrinsic semiconductor. Derive the equation for carrier concentration in intrinsic semiconductor. ii) Explain the fermi energy function and how does it vary with temperature.	KL3	CO5	5M
		KL2	CO5	5M
	<b>OR</b>			
b	What is Hall coefficient? Obtain the expression for Hall coefficient and write its significance in semiconductors.	KL3	CO5	10M



**SRI MITTAPALLI COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

**MR23**

Subject Code: MR231109

**I B.Tech. I Semester (Regular) Examinations, (FEB-2024)**  
**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**  
**(ECE, IT, AI & DS)**

**Time: 3 hours**

**Max. Marks: 70**

*Note: Question Paper consists of two parts (Part-A and Part-B)*

**BASIC ELECTRICAL ENGINEERING**  
**PART-A**

**Note: Answer All Questions.**

**All Questions Carry Equal Marks (5 x 1 =5M)**

Q.No	Questions			KL	CO	M
1	a	Find the equivalent resistance if two resistors $100\ \Omega$ and $1k\Omega$ are connected in parallel.		BTL-1	CO1	1M
	b	Define form factor		BTL-1	CO1	1M
	c	State working principle of Permanent Magnet Moving Coil		BTL-1	CO2	1M
	d	What is working principle of Alternator?		BTL-1	CO2	1M
	e	Compare Conventional and non-conventional energy resources		BTL-4	CO3	1M

**Note: Answer All Questions.**

**Either 'a' or 'b' from each question**

**All Questions Carry Equal Marks (3 x 10 =30M)**

Q.No	Questions			KL	CO	M
<b>Unit-I</b>						
2	i. Using super position theorem, determine current flowing through $3\Omega$ resistor for the following circuit			BTL-5	CO1	5M
	ii. Define KVL & KCL and explain each with one example			BTL-1	CO1	5M
<b>OR</b>						
b	i. Determine current through $10\ \Omega$ resistor.			BTL-5	CO1	5M
	ii. Explain Voltage and current relationship with phasor diagrams in R, L, and C circuits			BTL-2	CO1	5M

<b>Unit-II</b>						
3	a	i. Explain construction, principle, and operation of DC Motor	BTL-2		CO2	5M
		ii. List the parts DC generator & explain part briefly	BTL-1		CO2	5M
OR						
4	b	i. Explain construction and working principle of Moving Iron (MI)	BTL-2		CO2	5M
		ii. Demonstrate Wheat Stone bridge and list its applications	BTL-2		CO2	5M

\*\*\*

### BASIC ELECTRONICS ENGINEERING

#### PART-B

Note: Answer All Questions.

All Questions Carry Equal Marks (5 x 1 =5M)

Q.No	Questions		KL	CO	M
5	a	List the applications of diode	BTL-1	CO4	1M
	b	Label the symbol of Zener diode	BTL-1	CO4	1M
	c	Define rectifier	BTL-1	CO5	1M
	d	What are universal gates, why they called so?	BTL-1	CO6	1M
	e	Define Registers?	BTL-1	CO6	1M

**Note: Answer All Questions.**

**Either 'a' or 'b' from each question**

**All Questions Carry Equal Marks (3 x 10 =30M)**

Q.No	Questions		KL	CO	M
<b>Unit-IV</b>					
6	a	i. Explain the characteristics of PN junction diode with neat sketch	BTL-2		CO4
		ii. Compare CB & CE Configurations	BTL-4		CO4
OR					
7	b	i. Explain BJT operation with neat circuit diagram	BTL-2		CO4
		ii. Explain the Small Signal CE Amplifier.	BTL-2		CO4

Q.No	Questions		KL	CO	M
<b>Unit-V</b>					
7	a	i. Explain working of a full wave bridge rectifier with neat diagrams	BTL-2		CO5
		ii. Explain working of Zener voltage regulator in detail	BTL-2		CO5
OR					
7	b	i. Explain working of common emitter (RC coupled) amplifier	BTL-2		CO5
		ii. Explain the block diagram of public address system	BTL-2		CO5

Q.No	Questions		KL	CO	M
<b>Unit-VI</b>					
8	a	i. Determine Gray & Excess-3 codes for following binary codes. i) 1011                    ii) 0111                    iii) 1100	BTL-5		CO6
		ii. Design a full adder with logic gates.	BTL-6		CO6
OR					
8	b	i. Explain S-R flip flop with truth table.	BTL-2		CO6
		ii. Distinguish Combinational circuits with sequential circuits	BTL-2		CO6

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M: Marks



**SRI MITTAPALLI COLLEGE OF ENGINEERING**  
**(AUTONOMOUS)**

**MR23**

**Sub Code: MR231110**

**I B.Tech I Semester Regular Examinations, (FEB-2024)**

**ENGINEERING GRAPHICS**  
**(Common to ECE, IT, AI & DS)**

**Time: 3 hours**

**Max. Marks: 70**

.....  
 Note: Answer All Questions.

**Answer either 'a' or 'b' from each question  
 All Questions Carry Equal Marks (5 X 14 = 70M)**

Q.No	Questions	KL	CO	M
<b>Unit-I</b>				
1	a i) Construct a regular heptagon of 40mm side by general method.  ii) Draw an ellipse when a distance of focus its directrix is 50mm and eccentricity is 2/3. Draw a tangent and normal at a point 90mm from the directrix.	BTL-1	CO1	7M
		BTL-2	CO1	7M
<b>OR</b>				
2	b When the distance between two stations by rail is 50 km and it is represented on a Certain map by a 1cm long line. Find the R.F. and construct a diagonal scale Showing single Km & long enough to measure up to 700km. Indicate a distance of 538 km on this scale.	BTL-2	CO1	14M
	<b>Unit-II</b>			
3	a Draw the projections of the following points on the same ground lines, keeping the projectors 30 mm apart:  a) K in the H.P. and 40 mm behind V.P. b) L 10 mm below the H.P. and 25 mm behind V.P. c) M 25 mm above the H.P. and 30 mm in front of V.P. d) N is in H.P. and 40 mm behind the V.P. e) O is in V.P and 30 mm below the H.P	BTL-1	CO2	14M
	<b>OR</b>			
3	b i) A hexagonal plane with a 30 mm side rests on one of its side on the H.P., such that surface is perpendicular to the V.P. and inclined at $45^\circ$ to the H.P. Draw its projections when the plane lies in the first quadrant.  ii) A thin rectangular plate of sides, 60 mm $\times$ 30 mm has its shorter edge in V.P and that shorter edge is inclined at $30^\circ$ to H.P. Project its top view if its front view is a square of 30 mm long.	BTL-3	CO2	7M
		BTL-3	CO2	7M
<b>Unit-III</b>				
3	a i) Show a square prism of base edge 30mm and axis 60 mm rests on an edge of its base in the H.P. Its axis is parallel to V.P and inclined at $45^\circ$ to the H.P. Draw its projections.  ii) A cone of base diameter 50 mm and axis 70 mm is resting on its base in H.P. Its axis is parallel to V.P and inclined at $45^\circ$ to the H.P. Draw its projections.	BTL-3	CO3	7M
		BTL-3	CO3	7M
<b>OR</b>				
3	b i) A triangular prism of base side 30 mm and height 60 mm rests on one of its base side on the H.P. inclined at $30^\circ$ to the V.P. Its axis is inclined at $45^\circ$ to the H.P. Draw its projections.  ii) A pentagonal pyramid of 30 mm base side and 60 mm long axis has an edge of its base on the ground and the axis inclined at $35^\circ$ to the H.P. The edge of	BTL-3	CO3	7M
		BTL-3	CO3	7M

	the base on which it rests is inclined at $40^\circ$ to the V.P. Draw its projections.		
4	Unit-IV		
	a A pentagonal prism, with side of base 30 mm and axis 60 mm long, rests with its base on H.P such that two of its faces are parallel to V.P. A section plane parallel to V.P. passes through the prism at a distance 10 mm from its axis. Draw the projections of the remaining solid.	BTL-3	CO4 14M
5	OR		
	b A hexagonal prism of base 30 mm and axis 70 mm is resting on its base on the ground with a side of base inclined at $45^\circ$ to the V.P. It is cut by an auxiliary inclined plane inclined at $45^\circ$ to the H.P and passes through a point 15 mm below the top end of axis. Draw the development of the lateral surface of the truncated prism	BTL-3	CO4 14M
5	Unit-V		
	a Draw the following views of the object given in figure below. All dimensions are in mm. a) Front view b) Top view and c) Right side view	BTL-3	CO5 14M
	OR		
	b Draw the isometric view of the object whose orthographic projections are given in figure. All dimensions are in mm.	BTL-3	CO5 14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

\*\*\*



# SRI MITTAPALLI COLLEGE OF ENGINEERING

## (AUTONOMOUS)

**MR23**

**Sub Code: MR231110**

**I B.Tech I Semester Regular/Supple. Examinations, (FEB-2024)**

### ENGINEERING GRAPHICS (Common to ECE, IT, AI & DS)

**Time: 3 hours**

**Max. Marks: 70**

**Note: Answer All Questions.**

**Answer either 'a' or 'b' from each question**

**All Questions Carry Equal Marks (5 X 14 = 70M)**

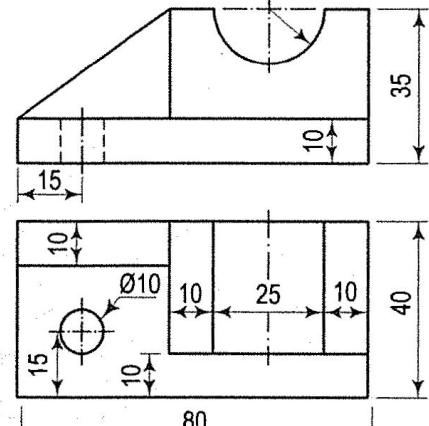
Q.No	Questions	KL	CO	M
<b>Unit-I</b>				
1	a A point moves such that its distance from a fixed straight line to its distance from a fixed point is equal. Draw the locus of the curve traced by that point. Add a normal and tangent to the curve at 40mm above the axis.	BTL-4	CO1	14M
	OR			
<b>Unit-II</b>				
2	a i) Draw the projection of the following points with a projector distance of 20mm. i. Point B, which is 10 mm above HP and 15 mm behind VP. ii. Point C, which is 25 mm below HP and 20 mm behind VP iii. Point D, which is 30mm above HP and in the VP  ii) A line AB 75mm long has its end A is in HP and other end B is in VP. The line is inclined 45° to HP and 30° to VP. Draw the projections.	BTL-1	CO2	7 M
	OR	BTL-1	CO2	7 M
<b>Unit-III</b>				
3	a A pentagonal prism of base 40mm side and 65mm height is resting on corner of its base on ground with a longer edge containing that corner inclined at 45° to H.P. and the vertical plane containing that edge and the axis inclined at 30° to V.P. Draw its projections.	BTL-4	CO3	14M
	OR			
<b>b</b> Draw the top and front views of a rectangular pyramid of sides of base 40x 50 mm and height 70 mm when it lies on one of its larger triangular faces on HP. The longer edge of the base of the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid being nearer to VP.				
BTL-4 CO3 14M				

### Unit-IV

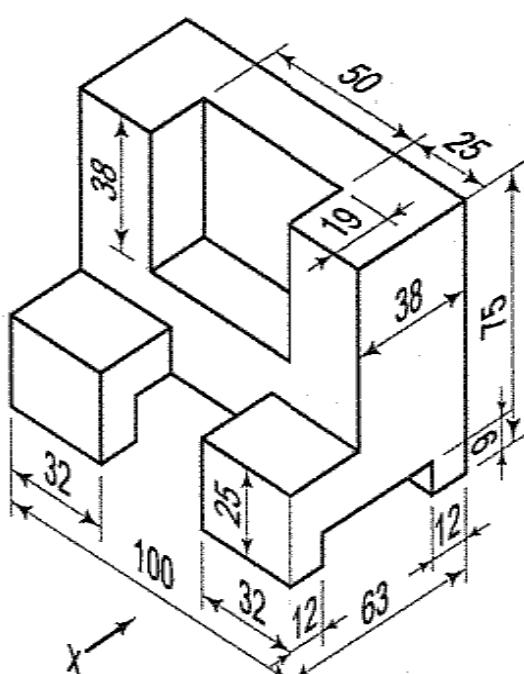
4	a	A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP and all the edges of the base equally inclined to the VP. It is cut by a section plane, perpendicular to the VP, inclined at $45^\circ$ to the HP and bisecting the axis. Draw its sectional top view and true shape of the section.	BTL-4	CO4	14M
	<b>OR</b>				

b	A square hole of side 25mm is cut in a cylindrical drum of diameter 50mm and height70mm. The faces of the hole are inclined at 45 degrees to the H.P and axis intersects with that of the drum at right angles. Draw the development of its lateral surfaces	BTL-4	CO4	14M
---	--	-------	-----	-----

### Unit-V

a	Obtain the isometric view of the casting from the views given	BTL-4	CO5	14M
				

### OR

5	Obtain the front view, top view and side view of the following component	BTL-4	CO5	14M
				

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome

M:Marks

\*\*\*