Q.P. Code: 916012 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Introduction to Data Structures (CSE)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	How to declare and initialize the pointer variable? Explain about the Scale factor length?	7M
	(b)	Write a c program to illustrate arithmetic operations of a pointer variable?	7M
		(OR)	
2.	(a)	What are the parameter passing techniques available? Write a c program on call by reference.	7M
	(b)	Explain about chain of pointers?	7M
		UNIT – II	
3.	(a)	Explain about the various Input/ output operations on files with examples?	7M
	(b)	Write the differences between static memory allocation and dynamic memory allocation techniques.	7M
		(OR)	
4.	(a)	Explain about the malloc() and calloc() functions in c language with examples?	7M
	(b)	Write about the random access file operations?	7M
		UNIT – III	
5.	(a)	What is Linear data structure? Explain the operations of Stack data structure?	7M
	(b)	Write the differences between linear and non-linear data structures.	7M
		(OR)	
6.	(a)	Write the steps to convert the prefix expression into postfix expression.	5M
	(b)	Convert the given prefix expression *-A/BC-/AKL into its equivalent postfix expression.	9M
		UNIT – IV	
7.	(a)	Write the algorithm to insert an element into Circular linked list?	8M
	(b)	Explain the Linked representation of Sparse Matrices with an example?	6M
		(OR)	
8.	(a)	Explain the importance of Garbage collection?	7M
	(b)	Write the differences between single linked list and double linked list.	7M
		UNIT-V	
9.	(a)	Write and explain the merge sort algorithm?	7M
	(b)	Apply the merge sort algorithm for the list of elements 14, 7, 3, 12, 9, 11, 6 and 2.	7M
		(OR)	
10.	(a)	Write the algorithm for insertion sort.	7M
	(b)	Apply the insertion sort algorithm for the given elements 4, 3, 2, 10, 12, 1, 5 and 6.	7M

Q.P. Code: 916212 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Electrical Circuits (EEE & ECE)

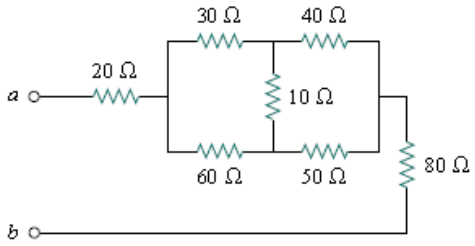
Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Explain the classification of Electrical circuit elements. 7M

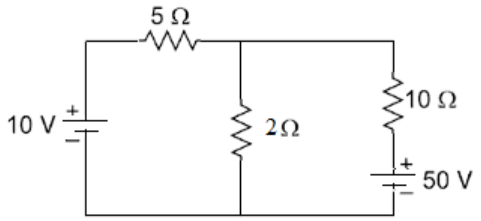
(b) Determine the equivalent resistance between the terminals a and b of fig. 7M



(OR)

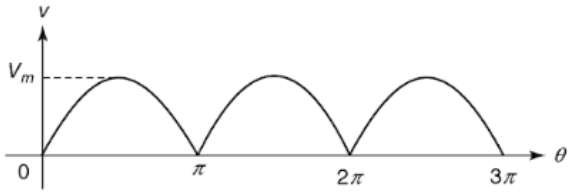
2. (a) Illustrate KVL & KCL with an example. 7M

(b) Write the mesh equations and determine the currents in the circuit shown in the fig. 7M



UNIT – II

3. (a) Determine the average value and rms value of the waveform shown in the fig. 7M



(b) Define: i) Impedance ii) Reactance iii) Admittance 7M

(OR)

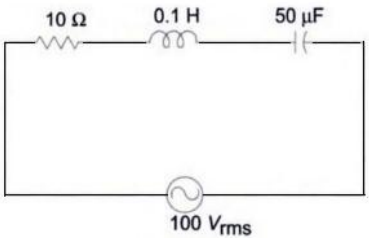
4. (a) Derive the equation of RMS value of sinusoidal waveform. 7M

(b) An inductive coil having negligible resistance and 0.1H inductance is connected across an AC supply of 220V, 50Hz. Calculate (i) Inductive reactance (ii) RMS value of Current (iii) Power factor (v) write down the equations for voltage and current. 7M

UNIT – III

5. (a) Define resonant frequency, Band width, Quality factor and derive the relation among them. 7M

(b) For the circuit shown in the fig., determine the frequency at which the circuit resonates. Also find the voltage across the inductance at resonance and the Q factor of the circuit. 7M



(OR)

6. (a) What is the current locus diagram? Sketch the current locus diagram of series RC circuit as C varies from 0 to Infinity and show that it is a circle. 7M

(b) Draw and explain the locus diagram of series RL circit with X_L as variable. 7M

UNIT – IV

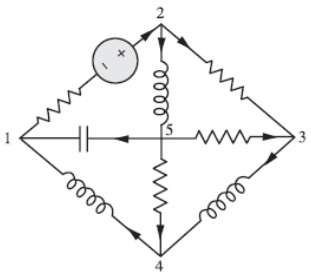
7. (a) What is the magnetic coupled coil? Define Mutual flux, Mutual inductance and Mutual induced e.m.f. 7M

(b) Coils A and B are magnetically coupled. Coil A has a self inductance of 0.30 H and 300 turns, and coil B has a self inductance of 0.20 H and 120 turns. A change of flux of 8 mWb occurs in coil B when a current of 3 A is reversed in coil A. Determine (a) the mutual inductance between the coils, and (b) the coefficient of coupling. 7M

(OR)

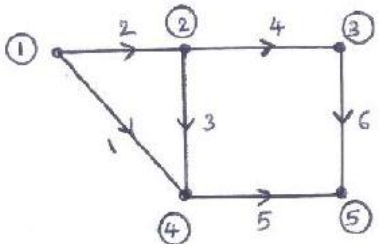
8. (a) Define and explain the Dot convention. 7M

(b) Draw dual network to the given circuit. 7M

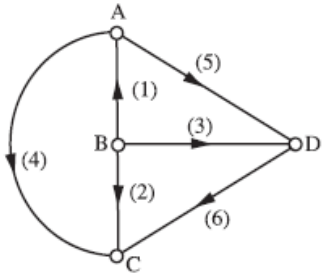


UNIT-V

9. (a) Write the complete and reduced incidence matrix for the given graph shown 7M

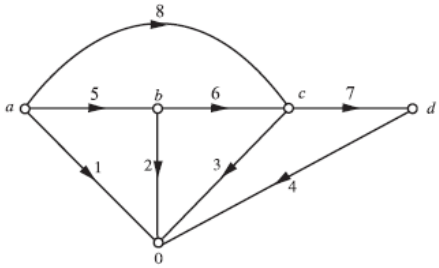


(b) From the given graph, select a tree with branches 3, 5, 6 and write the fundamental cut-set matrix and write node equations. 7M



(OR)

10. (a) For the given graph write fundamental cut set matrix and Tie-set matrix (Tree branches are:1,2,3,4). 7M



(b) Draw the graph of a network of whose the incidence matrix is as shown below. Also draw one possible tree and Co-tree. 7M

$$\begin{array}{c} \\ p \\ q \\ r \\ s \end{array} \begin{array}{c} \begin{array}{cccccccccc} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \end{array} \\ \begin{bmatrix} 0 & 0 & 1 & 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & -1 & -1 & 0 & 0 & 0 & -1 & 0 & 0 & -1 \\ -1 & 1 & 0 & 0 & 0 & 0 & 0 & -1 & -1 & 1 \\ 1 & 0 & 0 & 0 & -1 & -1 & 1 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

Q.P. Code: 916412 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Engineering Drawing - 2 (CE & ME)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

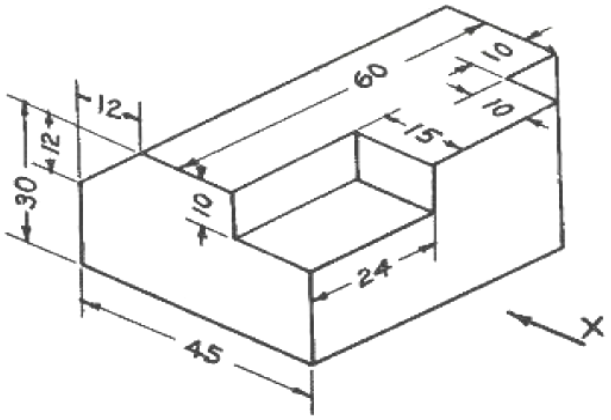
1. A hexagonal prism, edge of base 20 mm and axis 50 mm long, rests with its base on H.P such that one of its rectangular faces is parallel to V.P. It is cut by a plane perpendicular to V.P, inclined at 45^0 to H.P and passing through the right corner of the top surface of the prism. Develop the lateral surfaces of the truncated prism. 14M

(OR)

2. Draw the development of the lateral surface of the lower portion of a cylinder of diameter 50mm and axis 70mm when sectioned by a plane inclined at 40^0 to H.P and perpendicular to V.P and bisecting the axis. 14M

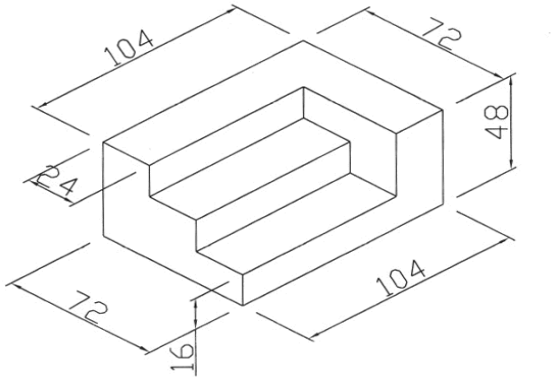
UNIT – II

3. Draw the elevation, plan and side view for the following Fig 14M



(OR)

4. Draw the elevation, plan and side view for the following Fig 14M



UNIT – III

5. Draw isometric view of a cylinder of 50 mm base diameter and 70 mm long axis when the axis is perpendicular to the 14M
(i) H.P. (ii) V.P.

(OR)

6. Draw the isometric projection of a hollow rectangular prism of base 50 mm ×40mm (outside), height 75mm and thickness 8mm when its axis is horizontal. 14M

UNIT – IV

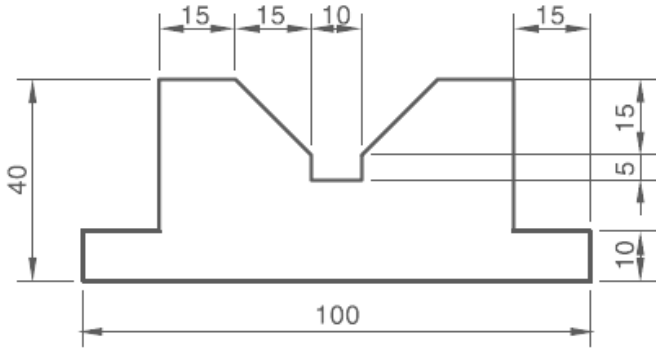
7. A horizontal cylinder of 30mm diameter and 90mm long penetrates centrally a vertical prism of 25 mm side and 80mm height. The axis of the cylinder is parallel to V.P and perpendicular to the axis of the prism. Draw the projections of the solids showing the curves of intersection in the front view. 14M

(OR)

8. A cylinder of 50mm diameter stands vertically with its base on H.P. It is completely penetrated by another cylinder of 35mm diameter. The axis of the penetrating cylinder is parallel to V.P, inclined at 30^0 to H.P and bisects the axis of the vertical cylinder. Draw the curves of intersection. 14M

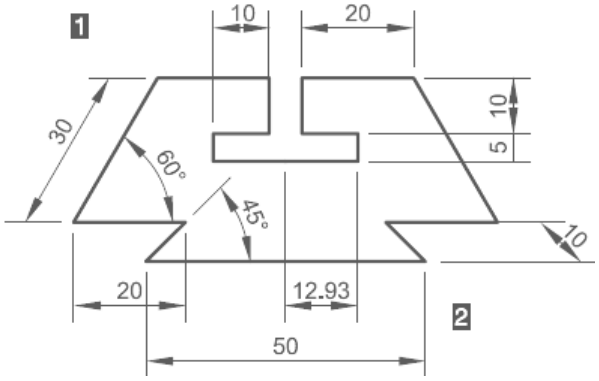
UNIT-V

9. State a series of command steps required to reproduce Fig. with the help of Line command, using relative rectangular coordinate system. 14M



(OR)

10. State a series of command steps required to reproduce Fig., with the help of Line command 14M



Q.P. Code: 916612 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: English - II (Common to All)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Write an essay on the 'impact of education in the development of a nation'. 10M

(b) Correct the following sentences. 4M

(i) She congratulated me in my success.
(ii) John saw a rabbit walking down the hill.
(iii)Raj is a engineer.
(iv)Ravi, Raj and Ram is going to a movie theatre.

(OR)

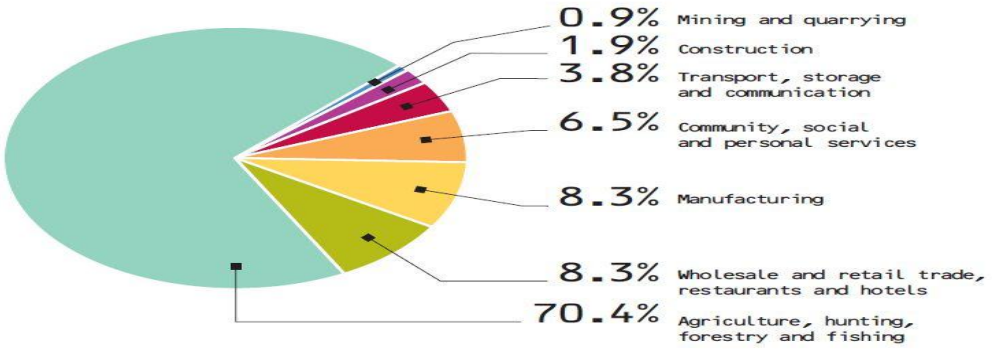
2. (a) Write an essay on 'the advantages and disadvantages of social media'. 10M

(b) Correct the following sentences. 4M

(i) We will arrive in six o'clock. (ii) Have you had an breakfast?
(iii) The book was only published in Telugu. (iv) We practiced French daily.

UNIT – II

3. (a) Convert the following diagram showing child labour in India into an essay. 10M



(b) Mark the stress to the following words. 4M

(i) Photographer (ii) Examinations (iii) Metre (iv) Paper

(OR)

4. (a) The following flow chart shows the way community hygiene programme is implemented in tribal area. Convert the following diagram into an essay. 10M

Figure 1 Diagrammatic representation of Implementation Process.

(b) Identify the syllables of the following words. 4M

(i) stranger (ii) abstract (iii) important (iv) satisfaction

UNIT – III

5. (a) You are interested in joining mountaineering course, while your parents are afraid of 7M

sending you. Create a conversation where you are convincing them to permit you to attend the course.

(b) Write a letter to your principal requesting him to issue your memorandum of marks as you have completed your graduation. 7M

(OR)

6. (a) Write a situational dialogue to the following situation. 7M
You have gone to a construction company to negotiate the price of a flat you want to buy.

(b) Imagine that you are the headmaster of a school. Write a letter to the district education officer explaining the dire need to buy computers for the government school your are working for. 7M

UNIT – IV

7. (a) What are some of the do's and don't of a group discussion? 4M

(b) Write your resume for the summer internship you wish to apply for. 10M

(OR)

8. (a) Write your resume for your dream job 10M

(b) What different types of group discussions did you learn? 4M

UNIT-V

9. (a) Write a report on the vaccination drive conducted in your town. 7M

(b) Write an email to the Director of DRDO requesting him/her to give you a chance to do a summer internship in their organization. 7M

(OR)

10. (a) Write a report on the technical event conducted in your college. 7M

(b) Write an email to the President of your cultural club describing your plan for the upcoming college annual day celebrations. 7M

Q.P. Code: 916812 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Mathematics - III (Common to All)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Reduce the following matrix into its normal form and hence find its rank 7M

$$\begin{bmatrix} 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 9 \\ 11 & 12 & 13 & 14 \\ 16 & 17 & 18 & 19 \end{bmatrix}$$

(b) Investigate for what values of λ *and* μ, the simulataneous equations: 7M

$x+y+z=6;\ x+2y+3z=10;\ x+2y+\lambda z=\mu$

have (i) no solution, (ii) a unique solution, (iii) an infinite number of solutions.

(OR)

2. (a) Find non-singular matrices P and Q such that PAQ is in the normal form for the matrix 7M

$$\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$$

(b) Find the Eigen values and Eigen vectors of the matrix: 7M

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & 4 & 3 \end{bmatrix}$$

UNIT – II

3. (a) Find a real root of the equation $x^3-3x-5=0$ by the method of false position correct to three decimal places. 7M

(b) Find a real root of the equation $x=e^{-x}$ by using Newton-Raphson method. 7M

(OR)

4. Solve the equations $28x+4y-z=32,\ x+3y+10z=24,\ 2x+17y+4z=35$ by using Gauss-Seidel iteration method 14M

UNIT – III

5. (a) The population of a town in the decennial census was given below 7M

Year : x	1891	1901	1911	1921	1931
Population: y (in thousands)	46	66	81	93	101

Estimate the population for the year 1925.

(b) Use Lagrange's interpolation formula to find the value of y when $x=3.5$ from the following table 7M

x	0	1	3	4
y	-12	0	12	24

(OR)

6. Find the values of a, b *and* c so that $y=a+bx+cx^2$ is the best fit to the data 14M

x	0	1	2	3	4
y	1	0	3	10	21

UNIT – IV

7. Find first and second derivatives of the function tabulated below at x=1.5 14M

x	1.5	2.0	2.5	3.0	3.5	4.0

y	3.375	7.0	13.625	24.0	38.875	59.0

(OR)

8. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule (ii) Simpson's $\frac{1}{3}$ rule and (iii) Simpson's $\frac{3}{8}$ rule with $h = 0.5,\ 0.25 \text{ and } 0.125$ 14M

UNIT-V

9. Find the first three Picard's successive approximations to the equation $y' = x + y^2$, with initial condition $y(0) = 1.0$ 14M

(OR)

10. Given $\frac{dy}{dx} = x + y$, with initial condition $y(0) = 1$, find the values $y(0.1),\ y(0.2) \text{ and } y(0.3)$ by Taylor's series method and compute $y(0.4)$ by Milne's method. 14M

Q.P. Code: 917012 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Environmental Studies (CE & ME)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT – I

1.	(a)	Discuss in detail about scope and importance of environmental studies	8M
	(b)	Role of individual in conservation of natural resources	6M
		(OR)	
2.	(a)	Write notes on effects of modern agriculture on environment.	7M
	(b)	Define Energy resources and explain types of energy resources with examples	7M
		UNIT – II	
3.	(a)	Write notes on Ecological succession	7M
	(b)	Give a detailed account of types, characteristics, structure and functions of desert ecosystem	7M
		(OR)	
4.	(a)	Give a detailed account of types, characteristics, structure and functions of forest ecosystem	7M
	(b)	Give a detailed account of types, characteristics, structure and functions of grassland ecosystem	7M
		UNIT – III	
5.		What is meant by in- situ and ex-situ conservation of biodiversity ? Give examples.	14M
		(OR)	
6.	(a)	Write notes on Value of biodiversity.	7M
	(b)	Describe different types of threats to biodiversity.	7M
		UNIT – IV	
7.	(a)	Write about solid waste management with flow-chart	9M
	(b)	Write notes on Darkening effect of Taj – Mahal	5M
		(OR)	
8.	(a)	Define Noise pollution and discuss its effects and control measures	7M
	(b)	Define water pollution and discuss its effects and control measures	7M
		UNIT-V	
9.	(a)	Write notes on Human rights	5M
	(b)	Write about role of Information Technology in Environment and Human health.	9M
		(OR)	
10.		Define climate change. Give a detailed account of global warming, acid rain and ozone layer depletion	14M

Q.P. Code: 917212 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Programming in C (CE & ME)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	What are input and output devices? Explain with examples?	7M
	(b)	Define Datatype? Explain types of datatypes with examples?	7M
		(OR)	
2.	(a)	Define Flowchart? Explain the symbols available in Flowchart?	7M
	(b)	Draw a Flowchart for finding whether a number is positive or negative?	7M
		UNIT – II	
3.	(a)	What is Type Conversion? Explain types of Type Conversions in C?	7M
	(b)	Write a C Program for finding Largest number among 3 numbers?	7M
		(OR)	
4.	(a)	Define Identifier? Explain identifier rules?	7M
	(b)	Write a C Program to print Fibonacci Series?	7M
		UNIT – III	
5.	(a)	Differentiate while and do..while?	7M
	(b)	Define Function? Differentiate among Call by Value and Call by Reference?	7M
		(OR)	
6.	(a)	List out Applications of Loops?	5M
	(b)	Write a C Program for swapping two numbers using Call by Value?	9M
		UNIT – IV	
7.	(a)	Define Array? Explain types of arrays in C?	7M
	(b)	Write a C Program for finding Sum of elements in an arrays?	7M
		(OR)	
8.	(a)	Explain Linear Search with example?	7M
	(b)	Define String? Explain various String Handling Functions in C with examples?	7M
		UNIT-V	
9.	(a)	Explain in detail about Typedef and Enumerated Datatypes with examples?	7M
	(b)	Explain Logical, Bitwise and Shift Operators?	7M
		(OR)	
10.	(a)	Define Structure and Union? Differentiate with examples?	7M
	(b)	Define Pointer? Explain declaration and initialization of pointers with examples?	7M

Q.P. Code: 917612 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Mathematics – II (CE & ME)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT – I

1. (a) Prove that $div\left(grad\, r^m\right) = m(m+1)r^{m-2}$ 7M

(b) Show that the vector $\overline{F} = (y+z)\bar{i} + (z+x)\bar{j} + (x+y)\bar{k}$ is irrotational and find its scalar potential. 7M

(OR)

2. State Stoke's theorem and verify Stoke's theorem for $\overline{F} = \left(x^2 + y^2\right)\bar{i} - 2xy\,\bar{j}$ taken around the rectangle bounded by the lines $x = \pm a,\ y = 0,\ y = b$. 14M

UNIT – II

3. (a) Find $L\left[te^{-t}\sin 3t\right]$. 7M

(b) Find $L\left[\left(\sqrt{t} + \frac{1}{\sqrt{t}}\right)^3\right]$. 7M

(OR)

4. Find the Laplace Transform of the function $F(t) = \begin{cases} \sin wt, 0 < t < \frac{\pi}{w} \\ 0 \quad , \frac{\pi}{w} < t < \frac{2\pi}{w} \end{cases}$. 14M

UNIT – III

5. Apply Convolution theorem to evaluate $L^{-1}\left[\frac{s^2}{\left(s^2 + a^2\right)\left(s^2 + b^2\right)}\right]$ 14M

(OR)

6. Solve $\left(D^2 - D - 2\right)y = 20\sin 2t$, if $y(0) = 1,\ y'(0) = 2$. 14M

UNIT – IV

7. Find the Fourier series expansion of $f(x) = 1 + x + x^2$ in $(-\pi, \pi)$ and hence deduce that $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \ldots\infty = \frac{\pi^2}{6}$. 14M

(OR)

8. Obtain the half range cosine series for $f(x) = x\sin x$ in $(0, \pi)$ 14M

UNIT-V

9. (a) Form the partial differential equation from the relation $z = f(x+it) + g(x-it)$. 7M

(b) Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$. 7M

(OR)

10. A tightly stretched string with fixed end points $x = 0$ and $x = l$ is initially in a position given by $y = y_0 \sin^3\left(\frac{\pi x}{l}\right)$. If it is released from rest from this position, find the displacement $y(x,t)$. 14M

Q.P. Code: 917812 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Human Values and Professional Ethics (EEE, ECE & CSE)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	Discuss the levels of moral development suggested by Kohlberg.	7M
	(b)	Explain the classification of human values.	7M
		(OR)	
2.	(a)	Discuss professional roles played by an engineer.	7M
	(b)	What is Consensus? Differentiate between Consensus and Controversy.	7M
		UNIT – II	
3.		Explain in detail about research ethics.	14M
		(OR)	
4.		How should an experimenter plan his work? Is it necessary for him to study the information about the past experiments. Justify.	14M
		UNIT – III	
5.	(a)	Define safety and risk. Describe how these two are essential for professional engineers?	7M
	(b)	Briefly, explain about risk benefit analysis.	7M
		(OR)	
6.	(a)	Explain the effect of information on risk assessments	7M
	(b)	Discuss about the Government Regulator's Approach to Risk.	7M
		UNIT – IV	
7.	(a)	Define Collegiality. Explain techniques for achieving Collegiality.	7M
	(b)	Differentiate between Professional Rights and Employee Rights.	7M
		(OR)	
8.	(a)	'Professional rights can lead to conflicts of interest'. Explain.	7M
	(b)	What are occupational crimes? Explain.	7M
		UNIT-V	
9.	(a)	Explain the issues involved in computer ethics.	7M
	(b)	Discuss Indian scenario in accordance with 'Intellectual Property Rights'.	7M
		(OR)	
10.		Define environmental ethics. How this concept is helpful to promote the society with examples?	14M

Q.P. Code: 918412 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Engineering Chemistry (EEE, ECE & CSE)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1.	(a)	Write the structure of EDTA and describe the estimation of hardness by EDTA method.	10M
	(b)	Write notes on Sources of water	4M
		(OR)	
2.	(a)	Write notes on (a) Priming & Foaming (b) Scale and Sludge.	10M
	(b)	Calgon Conditioning of water	4M
		UNIT – II	
3.	(a)	Write a short note on Vulcanization of rubber	7M
	(b)	Write a short note on Compounding of rubber	7M
		(OR)	
4.	(a)	Differences between Thermo plastics and Thermosetting plastics	6M
	(b)	Preparation, properties and applications of Nylon-6,6.	8M
		UNIT – III	
5.	(a)	Define corrosion and explain the mechanism of electro chemical corrosion.	9M
	(b)	Write a short note on sacrificial anode cathodic protection	5M
		(OR)	
6.		Define secondary batteries and explain lead acid batteries with neat diagram and reactions	14M
		UNIT – IV	
7.		What do you mean by refining of petroleum? List out the various fractions obtained during refining of crude oil with neat diagram.	14M
		(OR)	
8.	(a)	Write a short note on synthetic Petrol-Fischer Tropsech's Process	6M
	(b)	a) Flash &fire point b) Cloud and pour point	8M
		UNIT-V	
9.	(a)	Define Green chemistry and explain the significance of Green chemistry	5M
	(b)	Write a short note on a) Fluorescence b) Solar cells	9M
		(OR)	
10.	(a)	Write a short note on Laws of photo chemistry	7M
	(b)	Explain action of catalyst & applications of catalyst	7M

Q.P. Code: 918612 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. II Sem. (R15) Supplementary Examinations of February – 2022

SUB: Engineering Physics (EEE, ECE & CSE)

Time: 3 Hours **Max. Marks: 70**

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Describe the different processes when light interacts with matter using a neat energy level diagrams. 10M
(i) Explain about Absorption, spontaneous and stimulated emission Which process is more prominent to produce light source.
(ii) The dominant process is stimulated emission
Mention the reasons. Derive the relation between the processes using Einstein coefficients.
(b) What is interference? Discuss the conditions to be satisfied to produce stable and clear interference pattern. 4M

(OR)

2. (a) (i) What is the principle behind the formation of rings in Newton's ring experiment? Discuss the construction and working of Newton's ring experiment. 10M
(ii) Derive the expressions to find the radius of curvature of plano-convex lens using this experiment.
(b) What is the principle of light propagation in optical fibers? Explain using the ray diagrams. 4M

UNIT – II

3. (a) (i) Define Unit cell. Mention the different parameters of the unit cell to classify the crystal systems. 8M
(ii) State and Explain Brag's law of X-ray diffraction.
(b) Discuss any three different detection methods of ultrasonics in detail. 6M

(OR)

4. (a) (i) Discuss the properties of ultrasonics. 10M
(ii) Explain the construction and working of piezoelectric electric method and derive the frequency of ultrasonic waves produced using this method.
(b) Derive the expression for interplanar distance in cubic crystalline systems. 4M

UNIT – III

5. (a) Discuss dual nature of matter. Using the de Broglie hypothesis, determine the wavelength of matter waves. 6M
(b) What are the sources of resistivity? Derive the Equation for electrical conductivity of metals. 8M

(OR)

6. (a) (i) Discuss the boundary conditions of the particle in an infinite potential well. 10M
(ii) Derive the probability of finding the particle and energy of a particle in the potential well using the quantum mechanics principles.
(b) Mention the success the failures of classical free electron theory. 4M

UNIT – IV

7. (a) Discuss the classification of magnetic materials based on the interaction with the external magnetic field and discuss their properties. 10M
(b) What are the various applications of superconductors in science and technology? 4M

(OR)

8. (a) (i) What are the postulates of BCS theory of superconductivity 8M
(ii) Discuss how the postulates explained the properties of superconductors in detail.
(b) Explain the hysteresis curve observed in ferromagnetic materials on the application of magnetic field. 6M

UNIT-V

9. (a) (i) What are drift and diffusion processes observed in semiconductors? 8M
(ii) Derive the currents associated with these processes.
(b) Explain the synthesis of nanomaterials using Ball milling method in detail. 6M

(OR)

10.	(a)	State and explain Hall effect with the experimental setup and derive the hall coefficient.	10M
	(b)	Discuss the significance of surface to volume ratio in the case of nanomaterials.	4M