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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Engineering Chemistry**
Course Code : **A400009**
Branch : **CE, ME, CSC, CSM, CSD & AIM**
Date & Session : **30-06-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Distinguish between Primary and Secondary Battery. 1 M
2. Give the reduction half-cell reaction of calomel electrode. 1 M
3. Write about the monomers of Dacron. 1 M
4. Justify why thermoset articles cannot be shaped by application of heat and pressure. 1 M
5. Define octane number. 1 M
6. Mention the composition and uses of CNG. 1 M
7. Why is water softened by Zeolite process unfit for use in boilers? 1 M
8. What is the main advantage of reverse osmosis process over ion-exchange process? 1 M
9. What are smart materials? Give two examples. 1 M
10. What are the raw materials used in the manufacture of glass? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). What are fuel cells? Describe in detail the working of Methanol-Oxygen fuel cells? Write its applications 10M

OR

11. B). i) What are the advantages of electroless plating? Describe the electroless plating of nickel. 4M

ii) What are the factors affecting rate of corrosion? 6M

12. A). Explain addition, condensation and copolymerization reactions with examples. 10M

OR

12. B). Discuss the properties and applications of polyvinyl acetate and poly lactic acid. 10M

13. A). i) A sample of coal has the following analysis: C=83%, s=1.5%, N=0.6%, H=7.5% and O=8.4%. Find the gross calorific value using Dulong formula. 4M

ii) Explain Proximate analysis of Coal. What is its significance. 6M

OR

13. B). Describe the fractional distillation of petroleum. Discuss the important fractions of petroleum and their use. 10M

(P.T.O..)

14. A). i) Describe the estimation of hardness of water sample by EDTA Method. 6M

ii) 60 ml of standard hardness containing 1 mg of pure $CaCO_3$ per ml consumed 22 ml of EDTA. 40 ml of water sample consumed 20 ml of EDTA solution using EBT indicator. 40 ml of water sample after boiling filtering consumed 15 ml of EDTA. Calculate the temporary and permanent hardness of water sample. 4M

OR

14. B). Illustrate water softening by ion – exchange process with the help of a neat, labelled diagram. 10M

15. A). i) Give the composition of Portland cement. Write a brief account on setting and hardening of cement. 7M

ii) Write a short note on physicochemical characteristics of glass articles. 3M

OR

15. B). i). Discuss the mechanism of thin film lubrication. 6M

ii). Explain the terms flash and fire point and give their significance. 4M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Applied Physics**
Course Code : **A400008**
Branch : **EEE, ECE & CSE**
Date & Session : **30-06-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Write the formula for Plank's Radiation Law. 1 M
2. Write the wave vector(k) values for first Brillouin zone in band theory. 1 M
3. What is the purpose of doping in semiconductors? 1 M
4. What effect does the intrinsic layer in a PIN diode have on its performance? 1 M
5. What is the principle behind the operation of a laser? 1 M
6. Name one disadvantage of multimode fiber over single-mode fiber. 1 M
7. What is the unit of dielectric constant? 1 M
8. Define susceptibility in magnetic materials. 1 M
9. What happens to the conductivity of solid electrolytes with decrease in size of the particle? 1 M
10. Mention any two applications of nanomaterials. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Derive the time-independent Schrödinger wave equation. 7M
ii) What is the physical significance of the wave function used in the above equation. 3M

OR

11. B). i) Construct the zones for an electron using kronig penny model and explain its significance. 7M
ii) Discuss the classification of solids into conductors, semiconductors and insulators based on band theory of solids. 3M

12. A). i) What is the Hall effect? Derive an expression for the Hall voltage and Hall coefficient. 6M
ii) Discuss the applications of the Hall effect. 4M

OR

12. B). i) Explain the construction, working principle and characteristics of solar cell. 8M
ii) A solar cell has an open-circuit voltage of 0.6 V and a short-circuit current of 100 mA. If the fill factor (FF) is 0.75, calculate the maximum power output of the solar cell. 2M

13. A). i) Describe the construction and working of He-Ne laser with a neat diagram. 8M
ii) A laser emits light of wavelength 632.8 nm. Calculate the energy of a single photon emitted by this laser. 2M
(Planck's constant $h=6.626\times10^{-34}$ Js, speed of light $c=3\times10^{8}$ m/s)

(P.T.O..)

OR

13. B). i) Draw the block diagram of fiber optic communication system and explain the function of each component in the system. 6M

ii) A step-index fiber has a core index of refraction, n_1=1.425. The acceptance angle for light entering the fiber from air is found to be 30°. (a) Calculate the numerical aperture of the fiber (b) Find the refractive index of the cladding of this fiber. 4M

14. A). i) Define ferroelectric and piezoelectric materials and determine the electric susceptibility at 0° C for a gas whose dielectric constant is 1.000041. 3M

ii) Derive the equation for the local field. 7M

OR

14. B). i) Describe the phenomenon of hysteresis in ferromagnetic materials based on domain theory. 7M

ii) Compare soft and hard magnetic materials. 3M

15. A). Define superionic conductors. Discuss the mechanism of ionic conduction in liquid and solid electrolytes. 10M

OR

15. B). i) What is the bottom-up approach of nano synthesis? 2M

ii) Describe in detail the sol-gel method for synthesis of nanomaterials. 8M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **C Programming and Data Structures**
Course Code : **A405202**
Branch : **CE & ME**
Date & Session : **02-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. What is a keyword in C? 1 M
2. What is the purpose of the assignment operator (=) in C? 1 M
3. What is the purpose of the if-else statement in C? 1 M
4. How do you declare a one-dimensional array in C? 1 M
5. What is a string in C, and how is it declared and initialized? 1 M
6. What is the purpose of the return statement in a function in C? 1 M
7. What is an abstract data type (ADT)? 1 M
8. What operation is performed when an element is added to a stack? 1 M
9. What is the basic difference between linear search and binary search? 1 M
10. Which sorting algorithm is known for repeatedly swapping adjacent elements if they are in the wrong order? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Discuss the basic structure of a C program, explaining the components involved such as keywords, identifiers, constants, variables, data types, and operators. How does each part contribute to the overall functioning of the program? 10M

OR

11. B). Explain the various types of operators in C (Arithmetic, Relational, Logical, Assignment, Increment & Decrement, Conditional, Bitwise, and Special) with examples. How do operator precedence and expression evaluation work in C? 10M

12. A). Discuss the different looping constructs in C such as while, do-while, and for loops. Explain the use of break and continue statements in controlling loop execution. Provide examples of when to use each loop and control statement. 10M

OR

12. B). What is an array and write types of an arrays? Write a C program to implement multiplication on 2D-Arrays. 10M

13. A). Explain how to declare and initialize strings in C. Discuss how to read strings from the terminal and write strings to the screen using appropriate functions. Provide examples of string-handling functions in C. 10M

(P.T.O..)

OR

13. B). i) Define pointers in C and explain their usage with arrays and structures. 5M

ii) Discuss the concept of self-referential structures and their role in linked lists. Provide examples and explain their significance in dynamic memory allocation. 5M

14. A). Explain the concept of a singly linked list. Describe the operations of insertion, deletion, and searching on a singly linked list. Provide code snippets to demonstrate each operation. 10M

OR

14. B). i) Discuss the differences between array-based and linked list-based representations of queues. 5M

ii) Explain the operations (enqueue, dequeue for queue) with neat diagrams and provide real-world applications for queues. 5M

15. A). Explain the linear search algorithm in detail and provide example code and compare their time complexities. 10M

OR

15. B). Describe the Bubble Sort, Insertion Sort, and Selection Sort algorithms in detail. Explain their working principles, provide example code for each, and analyze their time complexities. Discuss the scenarios where each sorting algorithm would be most efficient. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **English for Skill Enhancement**
Course Code : **A400101**
Branch : **EEE, ECE & CSE**
Date & Session : **02-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. What is a clause, and give an example? 1 M
2. Define an imperative sentence and provide an example. 1 M
3. Write a sentence describing a person using at least three adjectives. 1 M
4. Write a sentence using the homonym "bank." 1 M
5. Give an example of a situation where intensive reading is used. 1 M
6. English has borrowed many words from Indian languages. Find four such words and their languages. 1 M
7. What does the acronym SQ3R stand for? 1 M
8. Rewrite the sentence to eliminate redundancy: "He returned back to the office after lunch." 1 M
9. What is reading comprehension. give an example? 1 M
10. Identify the error in this sentence and rewrite it correctly: "Each of the boys are playing football." 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) What does the author mean by saying that there should be a 'Bharat brand of English'? Has English in India developed unique expressions and usages? 7M

ii) Use the correct articles(a, an, the and NA) to fill in the blanks: 3M

a. Our library has three copies *of* ____*Mahabharata.*
b. Have you had_____ breakfast?
c. Lalith is_____ European

OR

11. B). i). Expand the following idea "Don't judge a book by its cover." into a passage of about 150-200 words. 7M

ii). Write the antonyms for the following words 3M

a. Barren
b. Reveal
c. well-mannered

(P.T.O.)

12. A). i). Why does Sudha Murty have such great respect for JRD Tata? What did Sudha Murty's encounters with JRD Tata reveal about the latter? 7M

ii). Find the errors and correct the following sentences. 3M

a. 150 kilometers are not a great distance.

b. Neither of the boys want breakfast.

c. The president and chief executive of the company have arrived.

OR

12. B). i). Draw a character sketch of Sudha Murty, as seen from the facets of her personality she reveals in this essay. 7M

ii). Write a brief descriptive passage on "A birthday celebration". 3M

13. A). i). There are a number of issues that need to be tackled to improve online learning, and this essay touches upon a few of them. Elaborate on any two issues mentioned in this essay by referring to your own experience. 7M

ii) How do the words adapt, adept, and adopt differ in meaning and usage? Provide examples for clarity. 3M

OR

13. B). i). The laptop you just purchased has a problem with several keys on its keypad. It is in the guarantee period. Write a letter to the supplier and ask for a free replacement. 7M

ii). Explain the advantages and disadvantages of online learning. 3M

14. A). i) Write an essay on "Social media: a curse or boon?" 7M

ii) Write a short note about A.P.J. Abdul Kalam. 3M

OR

14. B). i) Kalam believed that 'Students of art and literature *are* important contributors to transforming India into a developed nation'. Do you agree with this statement? Elaborate on your answer. 7M

ii). What are the full forms of the following abbreviations: FIR, GDP, and IQ? 3M

15. A). i). What is technical report writing and mention the types of reports with examples. 7M

ii). Fill in the blanks in the given sentences and rewrite the sentences. 3M

a) He prefers coffee tea.

b) I--- ---------- (buy) a new phone last week.

c) She usually --------- (take) tea every morning.

OR

15. B). i). The road near your house has been seeing an increase in traffic. Prepare a feasibility report to be submitted to the local corporation office, showing how the traffic may be diverted during peak hours to other roads. 7M

ii). A Scooter manufacturing company has asked an agency to prepare a marketing report on how to improve the sales of its latest model of scooter. 3M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Basic Electrical Engineering**
Course Code : **A402201**
Branch : **CSC, CSM, CSD & AIM**
Date & Session : **02-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

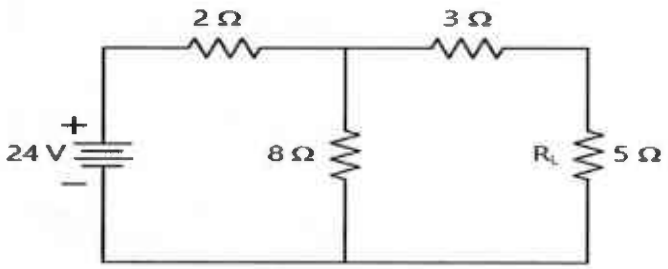
Each question carries ONE mark. **10x1=10M**

1. Write the Voltage-Current relationship for inductor. 1 M
2. State Kirchhoff's Laws. 1 M
3. Mention the condition for series resonance. 1 M
4. Write the expression for RMS value of sinusoidal signal. 1 M
5. Draw equivalent circuit of single-phase transformer. 1 M
6. List out the different types of three phase transformer connections. 1 M
7. Why is single phase induction motor not self-starting? 1 M
8. Name the applications of DC motors. 1 M
9. List out the different types of batteries. 1 M
10. Justify need of earthing? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the current flowing through 5Ω Resistor using Thevenin's theorem. 10M



OR

11. B). Derive an expression for time domain analysis of first order series RL circuit. 10M

12. A). A resistance of 30Ω and capacitance of 120μF are connected in series and are fed by 230V, 50 Hz supply. Determine Capacitive reactance, impedance, current drawn by the circuit, power factor and reactive power. 10M

OR

12. B). Derive the relation between line and phase voltages and currents in balanced star connected three phase system. 10M

(P.T.O..)

13. A). Illustrate about auto transformer with a neat sketch. 10M

OR

13. B). Describe the basic principle of single-phase transformer and discuss about different types of losses in a transformer. 10M

14. A). With neat sketch explain the constructional details of DC Machine. 10M

OR

14. B). Explain the principle of operation of Induction Motor and Draw the Torque-Slip characteristics of three phase induction motor. 10M

15. A). Differentiate between Fuse and Circuit Breaker. Write its advantages and disadvantages. 10M

OR

15. B). Discuss about MCB, ELCB and MCCB. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name	:	**Ordinary Differential Equations and Vector Calculus**
Course Code	:	**A400002**
Branch	:	**(CE, EEE, ME, ECE, CSE, IT, CSC, CSM, CSD & AIM)**
Date & Session	:	**04-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Find integrating factor of $(x+y+1)\frac{dy}{dx}=1$ 1 M
2. Define integrating factor. 1 M
3. Solve $(D+2)(D-1)^2 y=0$. 1 M
4. Find the particular integral of $\frac{d^2y}{dx^2}+4y=\sin x$. 1 M
5. Evaluate $L^{-1}\left\{\frac{(S-2)}{(S-2)^2+9}\right\}$. 1 M
6. State First shifting theorem. 1 M
7. If $\phi = xy - z^2$ then find the value of $\nabla\phi$ at $(1,2,3)$. 1 M
8. Find $div\vec{F}$ at $(1,2,3)$ if $\vec{F} = yz\hat{i} + zx\hat{j} + xy\hat{k}$. 1 M
9. State Stoke's theorem. 1 M
10. If C is the arc $y=x$ from $(0,0)$ to $(1,1)$ then find $\int_C ydx + xdy$ 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Solve $\left[y\left(1+\frac{1}{x}\right)+\cos y\right]dx+\left(x+\log x - x\sin y\right)dy=0$. 10M

OR

11. B). If a substance cools from 370K to 330K in 10 minutes when the temperature of the surrounding air is 290K, find the temperature of the substance after 40 minutes. Also find when the temperature of the substance will become 310K. 10M

12. A). Solve $(D^3+2D^2+D)y = e^{2x}+\sin 2x$. 10M

OR

12. B). Using method of variation of parameters, solve $\frac{d^2y}{dx^2}+y=\cos ecx$. 10M

13. A). Using Laplace transforms evaluate $\int_0^\infty \frac{\cos 6t-\cos 4t}{t}dt$. 10M

OR

13. B). Using Convolution theorem, Find $L^{-1}\left\{\frac{s^2}{(s^2+4)(s^2+9)}\right\}$. 10M

(P.T.O..)

14. A). Calculate the angle between the normals to the surface $xy = z^2$ at the points $(4,1,2)$ and $(3,3,-3)$ 10M

OR

14. B). Prove that $div(r^n \vec{r}) = (n+3)r^n$. Hence show that $\frac{\vec{r}}{r^3}$ is solenoidal. 10M

15. A). i) Find the work done in moving a particle in the force $\vec{F} = 3x^2\hat{i} + (2xz - y)\hat{j} + z\hat{k}$ along the straight line from $(0,0,0)$ to $(2,1,3)$ 5M

ii) $\nabla \times (\nabla \times \bar{a}) = \nabla(\nabla . \bar{a}) - \nabla^2 \bar{a}$ 5M

OR

15. B). Verify Green's theorem for $\oint_C (3x^2 - 8y^2)dx + (4y - 6xy)dy$, where C is the boundary of the region bounded by $x = 0, y = 0$ and $x + y = 1$ 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Engineering Graphics**
Course Code : **A403202**
Branch : **CE & ME**
Date & Session : **07-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Define eccentricity. 1 M
2. Define cycloid. 1 M
3. Construct a square plane of side 40 mm. 1 M
4. A point P is 30 mm above H.P and 40 mm in front of V.P. Construct the projection of the point. 1 M
5. What is a solid of revolution? Mentions any two examples. 1 M
6. Define prism and pyramid. 1 M
7. What is the purpose of the **SECTIONPLANE**? 1 M
8. Write the methods of development. 1 M
9. Explain isometric scale with neat sketch. 1 M
10. Write any difference between isometric view and orthographic views. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Construct a parabola when the distance between its focus and directrix is 55 mm. Also draw a tangent and a normal at a distant 70 mm from the directrix. 10M

OR

11. B). A circle of 60 mm diameter rolls on the circumference of another circle of 180 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Show a tangent and normal to the curve at a point 120 mm from the center of the directing circle. 10M

12. A). A line AB, 90 mm long is inclined at 30^0 to the H.P. Its end A is 12 mm above the H.P and 20 mm in front of the V.P. Its front view measures 65mm. Draw the top view of AB and it's inclinations with the V.P. 10M

OR

12. B). Draw the projections of regular hexagon of 40 mm side, having its surface inclined at 30^0 to the H.P. and a side parallel to the H.P. and inclined at an angle of 60^0 to the V.P. 10M

13. A). A pentagonal pyramid of base 30 mm side and axis 60 mm long, is resting on an edge of the base on H.P. Draw the projections of the pyramid, when its axis is perpendicular to V.P and the base is at 20 mm from V.P. 10M

(P.T.O..)

OR

13. B). Draw the projections of a cone, base 60 mm diameter and axis 90 mm long, lying on the H.P. on one of its generators and making an angle of 45° to V.P. 10M

14. A). A square prism of base 30mm and axis 110 mm long is resting on its base in the H.P. The prism is cut by a cutting plan. passing through the mid-point of the axis in such a way that making an angle of 60°. Draw its sectional top view and true shape of the solid. 10M

OR

14. B). Draw the development of the lateral surface of the part *P* of the solid, the front views of which is shown in figure.1. A pentagonal prism, a side of the base parallel to the V.P. 10M

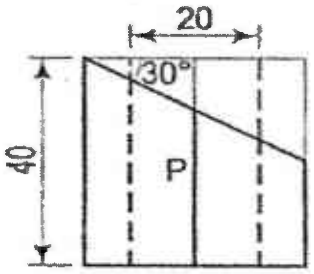

Fig.1

15. A). Draw the isometric projection of frustum of a cone of base diameter 60mm and top diameter of 30mm and axis 90mm long resting on HP. 10M

OR

15. B). Draw the Front view, Top view and Left side view for the part shown in figure 2. All dimensions are in mm. 10M

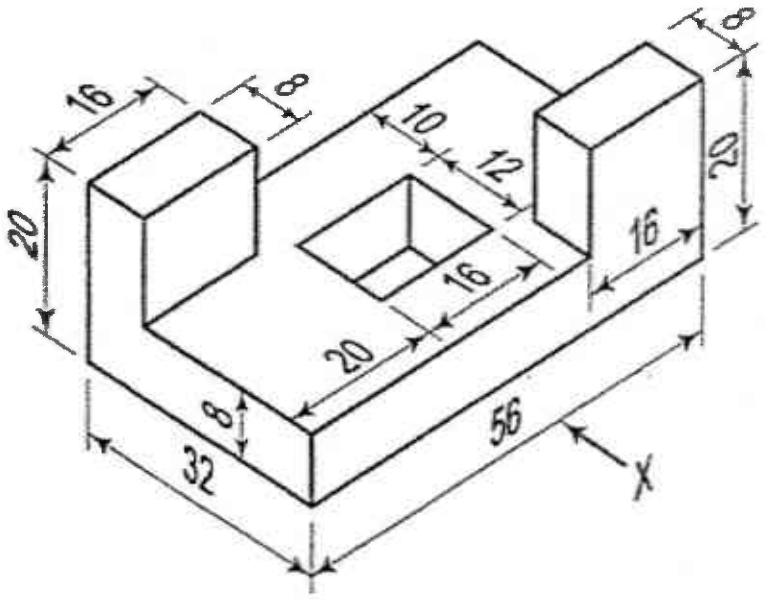

Fig.2

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Analog Electronic Circuits**
Course Code : **A404202**
Branch : **Electrical & Electronics Engineering**
Date & Session : **07-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Draw the V-I characteristic of a P-N junction diode. 1 M
2. Which BJT configuration provides the highest input impedance? 1 M
3. What is the role of a MOSFET as a switch? 1 M
4. Define the term "common-source amplifier." 1 M
5. What is the difference between Class A and Class B power amplifiers? 1 M
6. Why are RC coupled amplifiers widely used? 1 M
7. What is the effect of negative feedback on the bandwidth of an amplifier? 1 M
8. Name two types of LC oscillators. 1 M
9. What is the ideal slew rate of an operational amplifier? 1 M
10. What is the output of an integrator circuit when a square wave is applied at the input? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the working of a full-wave rectifier with a center-tapped transformer. Draw the input and output waveforms and calculate the efficiency. 10M

OR

11. B). Design a clamping circuit to shift the input waveform upward by 2V. Explain the working and provide the necessary circuit diagram. 10M

12. A). For a common-source JFET amplifier, derive the voltage gain equation and analyze how the gain changes with variations in source resistance (R_S). 10M

OR

12. B). Compare the performance of common-source and common-drain FET amplifiers in terms of input impedance, output impedance, and voltage gain. 10M

13. A). Explain the operation of a Class B push-pull amplifier. Discuss how crossover distortion occurs. 10M

OR

13. B). Design a two-stage RC coupled amplifier to achieve a voltage gain of 100. Specify the values of resistors and capacitors required for the design. 10M

(P.T.O..)

14. A). Derive the expressions for voltage gain, input impedance, and output impedance of a voltage-series feedback amplifier. 10M

OR

14. B). Design a Wien-Bridge oscillator to generate a sinusoidal signal of 1 kHz. Explain its working principle. 10M

15. A). Compare the performance of an ideal operational amplifier with a practical operational amplifier in terms of input offset voltage, input bias current, and slew rate. 10M

OR

15. B). Design an operational amplifier circuit to generate a square wave with a frequency of 5 kHz. Explain the operation. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name	:	**Data Structures**
Course Code	:	**A405301**
Branch	:	**CSE, CSM, CSC, AIM & CSD**
Date & Session	:	**07-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. List out the types of Linear Data Structure. 1 M
2. Examine the following operations performed on Stack of size 7. Push(10), push(20), push(30) pop( )push(50) push(70) pop( ) pop( ) pop( ) push(60) after completion of all operations analyze the number of elements on Stack with neat diagram. 1 M
3. Write the applications of Dictionary. 1 M
4. Define a hash function. 1 M
5. Define a B+ trees. 1 M
6. What is a Binary Search Tree? 1 M
7. What is Heap Sorting? 1 M
8. Define Graph. List out the types of Graph Representation. 1 M
9. What is Boyer Moore algorithm? 1 M
10. Define a Standard Tries. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the Double Linked Insertion, Deletion and Search Operations with a suitable example. 10M

OR

11. B). Solve the Expression from infix to postfix using flowing expression: 10M

(A – (B / C + (D % E * F) / G)* H)

12. A). i) What are Skip list in data structure? Discuss the operation in Skip list. 5M
ii) Consider a 4 level Skip list and insert the following keys at particular level with neat diagram. 22 at level 2, 35 at level 3, 28 at level 4, 16 at level 3, 73 at level 2 and 84 at level 4. 5M

OR

12. B). Explain Hash collision resolve techniques with a suitable example. 10M

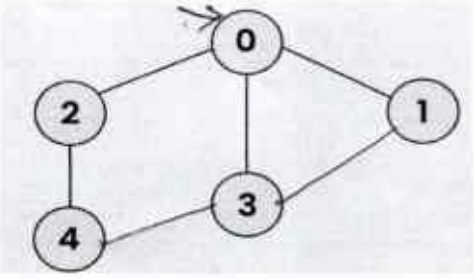
13. A). Explain Properties of Red-Black Trees and Construct the Red-Black Tree for following list of elements. 16,9,27,7,11,21,45,36,63 10M

OR

13. B). Explain AVL tree Rotations and Construct an AVL tree by inserting the following elements in the given order. 63, 9, 19, 27, 18, 108, 99, 81. 10M

(P.T.O..)

14. A). Identify the undirected graph below; perform a Breadth-first **Search (BFS) and Depth First Search (DFS)** traversal. 10M



OR

14. B). Demonstrate the Merge Sort Algorithm and Sort the array elements given below using Merge Sort. 39, 9, 81, 45, 90, 27, 72, 18. 10M

15. A). i) Write a C program to implement Brute force algorithm. 5M

ii) Identify the pattern in a given text using Brute force algorithm with neat diagram. 5M

Text: AABABABABABAABAB

Pattern: BAAB

OR

15. B). Explain about different types of tries in detail with an example. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Basic Electronic Circuits**
Course Code : **A404201**
Branch : **Electronics & Communication Engineering**
Date & Session : **07-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Draw the symbol of an ideal diode and its corresponding *v-i* characteristics? 1 M
2. Illustrate the significance of dynamic resistance in diode? 1 M
3. Define peak inverse voltage (PIV). 1 M
4. Draw a circuit to transmit that part of a sine wave, which is below + 6 V 1 M
5. If the collector current of a transistor in CE configuration is 5mA with a β=50, Calculate I_B 1 M
6. What is the most commonly used transistor biasing configuration? 1 M
7. Demonstrate the biasing method which provides better thermal stability? 1 M
8. Why MOSFET is called as a capacitor in certain operations? 1 M
9. Draw the symbol of varactor diode. 1 M
10. Distinguish between tunnel diode and ordinary pn-junction diode. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Derive the expression for semiconductor diode current equation and define each term used in the equation. 10M

OR

11. B). What is a p-n junction diode? Explain the formation of the depletion region in a p-n junction diode. How does the width of this region change when the junction is (i) forward biased (ii) reverse biased. 10M

12. A). Analyze the operation of positive clamping circuit with the help of neat circuit diagram and waveforms. 10M

OR

12. B). With neat diagrams, explain the operation of full wave rectifier. Also derive the expression for transformer utilization factor. 10M

13. A). Draw the circuit diagram of NPN transistor in common base (CB) configuration. Describe its input- output characteristics of CB configuration clearly. 10M

OR

13. B). What are the different bias compensation techniques? Explain them briefly. 10M

(P.T.O.)

14. A). i. Describe the construction of N-channel depletion MOSFET and draw its transfer and drain characteristics. 5M

ii. When a reverse gate voltage of JFET changes from 4 to 3.9 V, the drain current changes from 1.3mA to 1.6mA. Find the value of transconductance. 5M

OR

14. B). Explain the construction and principle of operation of JFET with relevant diagrams. 10M

15. A). What is tunneling? From energy band diagrams, explain V – I characteristics of tunnel diode 10M

OR

15. B). i. Discuss, how zener diode can act as a voltage regulator? 5M

ii. The base one of an UJT has resistance of 4.7KΩ and the value of intrinsic stand off ratio of the device is 0.58. if an inter base voltage od 10V is applied across the two bases, Calculate the value of I_B. 5M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Building Materials, Construction and Planning**
Course Code : **A401301**
Branch : **Civil Engineering**
Date & Session : **09-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark. **10x1=10M**

1. List the structural requirements of building stones. 1 M
2. What is the composition of brick earth? 1 M
3. Define the term "hydration of cement." 1 M
4. Differentiate between mineral and chemical admixtures. 1 M
5. State the function of lintels in construction. 1 M
6. What is meant by damp proof course? 1 M
7. Give a short note on composite masonry. 1 M
8. What do you mean by scaffolding in construction? 1 M
9. What is the role of building bye-laws in construction? 1 M
10. Why is building orientation significant in construction? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the classifications of building stones and their importance in construction. 10M

OR

11. B). Explain how timber defects affect its structural properties and suggest remedies for the same. 10M

12. A). Describe the wet and dry processes involved in the manufacturing of cement, accompanied by a detailed flowchart. 10M

OR

12. B). i) Compare the roles of field tests and lab tests in assessing the quality of cement. 5M
ii) How do chemical admixtures affect the properties of concrete? Provide at least two examples 5M

13. A). Write a detailed note on different types of staircases with neat sketches. 10M

OR

13. B). i) Discuss the types of foundations and their suitability for different soil conditions. 5M
ii) Discuss the functional requirements of a good ventilation system. 5M

14. A). Write a detailed note on the methods and purposes of shoring and underpinning. 10M

OR

14. B). Describe the different types of brick masonry and the bonds used in brickwork with neat sketches. 10M

(P.T.O..)

15. A). i) Explain the factors affecting the selection of a site for building construction. 5M

ii) Explain the classification of buildings based on occupancy and use. 5M

OR

15. B). Discuss the principles of building planning and their significance in achieving functionality and aesthetics. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech II Semester Regular & Supplementary Examinations June/July-2025**
Course Name : **Engineering Materials**
Course Code : **A403301**
Branch : **Mechanical Engineering**
Date & Session : **09-07-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark. **10x1=10M**

1. Define Engineering Materials? Give two examples. 1 M
2. What parameters are typically plotted on an Ashby chart? 1 M
3. Where Aluminium alloy is used? 1 M
4. What is high-speed steel (HSS)? 1 M
5. What are reinforcements in composites? 1 M
6. What are prepregs? 1 M
7. Why diamond is a good insulator? 1 M
8. Write electrical properties of ceramics. 1 M
9. List two applications of zinc oxide nanomaterials. 1 M
10. Define biomaterials. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). With a neat sketch, explain the stress-strain curve for a ductile material. 10M

OR

11. B). Define engineering materials. Classify them into metallic and non-metallic materials with examples and applications. 10M

12. A). Explain how the composition of a metal alloy affects its physical and chemical properties. Provide two examples. 10M

OR

12. B). Describe the various types of steels. What are the distinctive characteristics and industrial applications of steels. 10M

13. A). How does the choice of fibers and resin systems impact the final properties of the composite? 10M

OR

13. B). Explain the hand lay-up and spray lay-up methods for manufacturing composites. Highlight their advantages and limitations. 10M

14. A). Explain the various applications of ceramic materials in engineering and daily life. 10M

OR

14. B). What are the properties and application of ceramics? Discuss briefly. 10M

(P.T.O..)

15. A). Analyze the role of ceramic nanomaterials in modern technology, including their advantages and limitations. 10M

OR

15. B). Compare and contrast semiconductor nanomaterials with metal nanoparticles in terms of structure, properties, and applications. 10M

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