**No. of Pages- 02**
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**A-07**

**B.Tech (CE/ME/TE/ECE/CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS) I/II Semester Examinations (Jun 2025)**

**Engineering Chemistry (ASH-108/ASH-CHE-108A)**

**Time- 3hrs**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each Question carries 12 marks. Question 1 is compulsory.**

| **Q1.** | | Marks |
|---|---|---|
| (a) | Give the working principles of reverse osmosis in water purification technologies. | 2 |
| (b) | Elaborate on the concept of calorific value. | 2 |
| (c) | What is corrosion? Classify the different types of corrosion based on environment. | 2 |
| (d) | Explain the terms shielding and deshielding in nuclear magnetic resonance (NMR) spectroscopy. | 2 |
| (e) | What are green solvents? Give 2 examples. | 2 |
| (f) | Define polymer composites and give their two applications. | 2 |

**Unit 1**

| | | |
|---|---|---|
| **Q2 (a)** | Describe the Lime-Soda water softening process in detail. Discuss the chemical reactions involved, procedure and advantages/disadvantage of this method. | 10 |
| **Q2 (b)** | A water sample contains the following impurities:<br>• $Mg^{2+}$ = 48 mg/L<br>• $HCO_3^-$ (bicarbonate) = 122 mg/L<br>Calculate the amount of lime ($Ca(OH)_2$) required to soften 1000 L of this water sample.<br>(Molar mass: $Ca(OH)_2$ = 74 g/mol) | 2 |
| **Q3 (a)** | Define temporary and permanent hardness. Explain the estimation of hardness by EDTA method in detail. | 8 |
| **Q3 (b)** | Write short note on electrodialysis. | 4 |

**Unit 2**

| | | |
|---|---|---|
| **Q4 (a)** | Classify fuels based on their natural occurrence and physical state. | 5 |
| **Q4 (b)** | Discuss the types and ranking of coal based on carbon content and calorific value. Explain the proximate analysis method used to determine coal quality. | 7 |
| **Q5 (a)** | What is sacrificial anodic protection? Explain it. | 4 |
| **Q5 (b)** | Write short notes on ant two of the following types of corrosion:<br>a) Differential aeration corrosion<br>b) Pitting corrosion<br>c) Waterline corrosion<br>d) Stress corrosion | 8 |

## Unit 3

| | | |
|---|---|---|
| **Q6 (a)** | Discuss the different types of electronic transitions observed in ultraviolet (UV) spectroscopy using suitable examples. | 8 |
| **Q6 (b)** | Write brief explanatory notes on any two of the following key concepts in UV-Visible spectroscopy:<br>(i) Bathochromic shift (Red shift)<br>(ii) Hyperchromic effect<br>(iii) Chromophores<br>(iv) Auxochromes | 4 |
| **Q7 (a)** | Define the Lambert-Beer Law and discuss its importance in quantitative spectrophotometric analysis. | 4 |
| **Q7 (b)** | Define Nuclear Magnetic Resonance (NMR) spectroscopy. Explain the basic principle behind NMR and describe the main components and functioning of an NMR spectrometer. | 8 |

## Unit 4

| | | |
|---|---|---|
| **Q8 (a)** | Discuss the preparation, properties and uses of:<br>a) Thermosetting polymer<br>b) Thermoplastic polymer | 6 |
| **Q8 (b)** | What is the environmental impact of polymers on society? Discuss both the beneficial uses and the negative effects on the environment and human health. | 6 |
| **Q9** | What are the twelve basic principles of Green Chemistry? Explain how these principles help in making chemical processes eco-friendlier and more sustainable. | 12 |

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**A-01**

**B.Tech (CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE/CE/ME/TE)**
**I Semester Examinations (Jun 2025)**
**Engineering Mathematics (ASH-01/ASH-MAT-101A)**

**Time- 3hrs**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each Question carries 12 marks. Question 1 is compulsory.**

Q.1

(a) The rank of the singular matrix of order 6, can be at most …….

(b) Let $A = \begin{bmatrix} 3 & 0 \\ 5 & -1 \end{bmatrix}$. The sum of the eigenvalues of $A^4$ is …….

(c) Define the index and signature of a quadratic form.

(d) The value of $\lim_{x \to 0} \frac{xe^x - \log(1+x)}{x^2}$ is …….

(e) The number of oblique asymptotes of the curve $x^2y^2 - a^2(x^2 + y^2) - a^3(x + y) + a^4 = 0$ is …….

(f) The value of $\beta(4, 5)$ is …….

## UNIT-I

Q.2(a) Reduce the matrix to normal form and find its rank.

$$\begin{bmatrix} 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \\ 9 & 10 & 11 & 12 \end{bmatrix}$$

(b) By applying the Gauss-Jordan method, find the inverse of the matrix

$$\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}.$$

Q.3(a) Examine the following vectors for linear dependence and find the relation if it exists.
$X_1 = (1, -1, 2, 0), X_2 = (2, 1, 1, 1), X_3 = (3, -1, 2, -1), X_4 = (3, 0, 3, 1).$

(b) Show that the equations $-2x + y + z = a,\ x - 2y + z = b,\ x + y - 2z = c$ have no solution unless $a + b + c = 0$. In which case they have infinitely many solut Find these solutions when $a = 1, b = 1\ and\ c = -2.$

## UNIT-II

Q.4(a) (i) Prove that the eigenvalues of an idempotent matrix are either zero or unity.
(ii) Prove that the modulus of each characteristic root of a unitary matrix is unity.

(b) Show that the transformation $y_1 = x_1 - x_2 + x_3, y_2 = 3x_1 - x_2 + 2x_3, y_3 = 2x_1 - 2x_2 + 3x_3$ is non-singular. Find the inverse transformation.

Q.5(a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find the matrix represented by $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.

(b) Reduce $x^2 + 3y^2 + 3z^2 - 2yz$ into canonical forms by orthogonal transformation. Write also rank, index, signature.

## UNIT-III

Q.6(a) If $f(x) = x^3 + 8x^2 + 15x - 24$, calculate the value of $f\left(\frac{11}{10}\right)$ by using Taylor's series.

(b) Prove that for the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $\rho = \frac{a^2 b^2}{p^3}$ where p is the perpendicular from the centre upon the tangent at (x, y).

Q.7(a) Trace the curve $r = 2 + 3\,cos\theta$.

(b) State and prove Lagrange's mean value theorem.

## UNIT-IV

Q.8(a) State and prove the relationship between Beta and Gamma functions.

(b) Find the volume generated by revolving about the x-axis the area cut off from the parabola $9y = 4(9 - x^2)$ by the line $4x + 3y = 12$.

Q.9(a) Evaluate the integral $\int_0^\infty \int_0^x x\, e^{-\frac{x^2}{y}}\, dy\, dx$ by changing the order of integration.

(b) Evaluate $\int_0^{log2} \int_0^x \int_0^{x+y} e^{x+y+z}\, dx\, dy\, dz$.

**No. of Pages- 2**

**A-02**

**B. Tech- CSE/IT I Semester Examinations (Jan 2025)**

**Semiconductor & Quantum Physics (ASH-103)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | Define a wave function and explain its physical significance. | 1.5 |
| (b) | What is a quantum mechanical operator. Give two examples? | 1.5 |
| (c) | What are the limitations of classical free electron theory? | 1.5 |
| (d) | How does the temperature affect the Fermi-Dirac distribution? | 1.5 |
| (e) | Why are direct band semiconductors preferred for optical applications? | 1.5 |
| (f) | How is the carrier concentration calculated for extrinsic semiconductors? | 1.5 |
| (g) | How does diffraction influence laser beam propagation? | 1.5 |
| (h) | What is the difference between step index and graded index fibers? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Explain the concept of wave particle dualism. Elaborate with the help of two examples. | 6 |
| Q.2(b) | Derive time independent Schrodinger wave equation for a free particle. | 6 |
| Q.3(a) | Describe the concept of a wave packet. Derive expressions for group velocity and velocity for a relativistic particle. | 8 |
| Q.3(b) | What will be the de-Broglie wavelength of an electron having kinetic energy of 500 electron-volt? | 4 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Define density of states. Derive an expression for density of states of a semiconductor material. | 9 |
| Q.4(b) | Write the assumptions of quantum free electron theory. | 3 |
| Q.5(a) | What is E-k diagram? Explain the concept of Brillion zones using E-k diagram. | 8 |
| Q.5(b) | What is the significance of Fermi-Dirac distribution in solids? How does temperature affect the Fermi Dirac distribution? | 4 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | What are intrinsic semiconductors? Derive the expression for intrinsic carrier concentration. | 6 |
| Q.6(b) | Give an account of the factors on which energy band gap depends in semiconductors. Derive the formula for measuring the band gap. | 6 |
| Q.7(a) | Describe an experiment for measurement of the Hall Co-efficient and derive its expression. | 8 |
| Q.7(b) | Calculate the Hall voltage in a semiconductor with current I = 1 Amp, magnetic field B = 0.17 Tesla, carrier concentration n = $10^{16}$ per $cm^3$ and sample thickness d = 1 cm. | 4 |

## UNIT-IV

| | | |
|---|---|---|
| Q.8(a) | What is meant by interference of light? State the fundamental conditions for the production of interference fringes. | 8 |
| Q.8(b) | Green light of wavelength 5100 $A^o$ from a narrow slit is incident on a double slit. If the overall separation of 10 fringes on a screen 200 cm away is 2 cm, find the slit separation. | 4 |
| Q.9(a) | Describe principle, construction and working of a semiconductor laser. | 9 |
| Q.9(b) | Explain the principal of optic fiber communication. | 3 |

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**A-02**

**B.Tech (ECE/CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS) I/II Semester Examinations (Jun 2025)**

**Semiconductor & Quantum Physics (ASH-103/ASH-PHY-103A)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| a) | The free particle wavefunction is $\psi(x) = e^{ikx}$ then find the momentum of the particle and also give comment on potential energy. | 1.5 |
| b) | A wave in a medium has a dispersion relation $\omega=3k^2$. Find the phase velocity and group velocity. | 1.5 |
| c) | According to the Drude model, what is the expression for electrical conductivity and why does the Drude model fail to explain the specific heat of metals? | 1.5 |
| d) | The energy momentum relation for an electron is $E= bk^2$ find the effective mass effective mass of the electron. | 1.5 |
| e) | A GaAs laser diode emits light efficiently. Is this due to its direct or indirect band gap? Justify your answer based on the band structure. | 1.5 |
| f) | A Hall coefficient measurement yields a negative value. What does this tell you about the semiconductor type and the charge carriers involved? | 1.5 |
| g) | Describe the role of meta stable state briefly in laser operation. | 1.5 |
| h) | How does having a lower refractive index in the cladding than the core help in guiding light inside an optical fiber? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Explain group velocity and phase velocity. Derive the expression for group velocity with which a wave packet travel. Also describe the relationship between group velocity and phase velocity. | 9 |
| Q.2(b) | Compare the implications of the uncertainty principle on a free particle versus a particle in a potential well. | 3 |
| Q.3(a) | Derive the Schrodinger time dependent wave equation and discuss the physical significance of wave function. | 9 |
| Q.3(b) | Explain the conditions under which wave function is acceptable. | 3 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Derive the expression for density of states for quantum free electron theory and discuss fermi-dirac distribution for different temperature | 10 |
| Q.4(b) | If the number of conduction electrons in a metal doubles, what happens to the Fermi energy? | 2 |

| | | |
|---|---|---|
| Q.5(a) | Discuss the behavior of electron in periodic potential and how it leads to the origin of bands in solids. | 9 |
| Q.5(b) | How does the value of **P** effect the energy bands in KP Model | 3 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Derive an expression for concentration of electrons in the conduction band for an n-type semiconductor and how the Fermi level in n-type semiconductor varies with temperature. | 10 |
| Q.6(b) | In the above n-type silicon with $n=10^{15}cm^{-3}$ and intrinsic carrier concentration $n_i=1.5\times10^{10}\ cm^{-3}$calculate the hole concentration. | 2 |
| Q.7(a) | Explain hall effect? Derive the expression for the hall coefficient and give the application of hall effect | 8 |
| Q.7(b) | Given the following graph of Hall voltage vs. magnetic field for two different materials A and B<br>**Material A**: linear graph, slope positive<br>**Material B**: linear graph, slope negative and steeper<br>**Questions:**<br>Which material has higher carrier concentration?<br>Which one is likely p-type or n-type?<br>Suggest one application for each based on their Hall characteristics. | 4 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | Explain the principle, construction and working of helium–neon laser with energy level diagram | 7 |
| Q.8(b) | Define the Einstein's coefficient of absorption, spontaneous emission and stimulated emission. Obtain the relationship between them. | 5 |
| Q.9(a) | Explain how light is guided by an optical fiber. Define acceptance angle and numerical aperture. How are they related to the refractive indices of the core and cladding | 10 |
| Q.9(b) | An optical fiber has a core refractive index of 1.50 and a cladding index of 1.48**.** Calculate the numerical aperture (NA). | 2 |

**No. of Pages- 2**

**A-03**

**B. Tech- CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE I Semester Examinations (Jan 2025)**

**Problem Solving using "C" (CSE-101)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | Draw the block diagram of a computer. | 1.5 |
| (b) | Perform the binary addition of 1011 and 1101. | 1.5 |
| (c) | What is the ternary operator in C language? | 1.5 |
| (d) | Write the syntax and use of a "switch" statement. Provide an example also. | 1.5 |
| (e) | Discuss array initialization with an example. | 1.5 |
| (f) | Explain string handling functions strcat() and strcmp() with examples. | 1.5 |
| (g) | How do you declare the Structure in C? | 1.5 |
| (h) | How do you declare the file pointer in C? Which function gives the current position in the file? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Explain the different types of storage devices used in computer. Also differentiate between primary and secondary storage. | 7 |
| Q.2(b) | Describe the role of a linker and loader in program execution. | 5 |
| Q.3(a) | Compare and contrast the roles of compiler, interpreter and assembler. | 6 |
| Q.3(b) | Draw a flowchart for calculating the sum of the first n natural numbers. | 6 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Discuss the difference between pre-increment and post-increment operators in C with examples. | 6 |
| Q.4(b) | Write C programme to find average marks of five subjects and calculate the Grade based on the following conditions:<br>(i) Percentage >=60 Grade is First Division<br>(ii) 50<=Percentage<=59 Grade is Second Division<br>(iii) 40<=Percentage<=49 Grade is Third Division<br>(iv) Percentage < 40 Grade is Fail | 6 |
| Q.5(a) | In C, how does the printf() function handle different types of data when they are printed in a single statement? Also what is the role of the width and precision modifiers in the printf() function? | 6 |
| Q.5(b) | Write a program in C to generate the first N prime numbers. | 6 |

## UNIT-III

| | | |
|---|---|---|
| Q.6(a) | Explain the various ways of passing parameters to a function with examples. | 6 |
| Q.6(b) | Differentiate between passing array to functions and returning array from functions with suitable example. | 6 |
| Q.7(a) | Write a program in C to find duplicate elements in an array? Discuss the approach you have used to detect the duplicate elements efficiently. | 6 |
| Q.7(b) | Write a program to count the number of vowels and consonants in a string entered by the user. | 6 |

## UNIT-IV

| | | |
|---|---|---|
| Q.8(a) | How can we access the element of structure in C? Write a program in C to maintain a record of n employee detail using an array of structures with three fields (id, name, salary) and print the details of employee. | 6 |
| Q.8(b) | How is a pointer variable different from an ordinary variable? Consider following declaration and Give the values of expressions from (i ) to (iii):<br>int x = 10, y = 10;<br>int *p1 = &x, *p2 = &y;<br>i. (*p1) --<br>ii. ++ (*p2)<br>iii. *p1 + (*p2) | 6 |
| Q.9(a) | What is dynamic memory allocation? Explain malloc( ), calloc( ) and sizeof() function with suitable example. | 6 |
| Q.9(b) | Explain and demonstrate file handling operations by creating a program in C to store and retrieve employee records in a file. | 6 |

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**No. of Pages- 02**

**A-03**

**B.Tech (CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE/CE/ME/TE)**

**I/II Semester Examinations (Jun 2025)**

**Problem Solving Using "C" (CSE-101/BT-CSE-101A)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each Question carries 12 marks. Question 1 is compulsory.**

| Q.1 | Question | Marks |
|---|---|---|
| (a) | Differentiate between impact and non-impact printers with examples. | 2 |
| (b) | What is the hexadecimal equivalent of $(255)_{10}$? | 2 |
| (c) | What is the output of printf("%d", 10 % 3);? | 2 |
| (d) | What is the output of:<br>char s[] = "Programming";<br>printf("%c", s[4]); | 2 |
| (e) | Differentiate between struct and union. | 2 |
| (f) | Write one advantage of a pointer over an array. | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Compare and contrast compilers, interpreter, and assemblers in terms of their working principles, advantages, and use cases. | 6 |
| Q.2(b) | Convert the following numbers and show steps: | |
| | (i) $(3A7)_{16}$ to binary | 3 |
| | (ii) $(247)_{8}$ to decimal | 3 |
| Q.3(a) | Develop an algorithm and corresponding flowchart for finding roots of a quadratic equation, considering all possible cases (real, equal, complex). | 6 |
| Q.3(b) | Differentiate between high-level, assembly, and machine languages: | |
| | (i) Abstraction level | 2 |
| | (ii) Execution speed | 2 |
| | (iii) Portability | 2 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Differentiate break, continue, and goto with examples. | 6 |
| Q.4(b) | Write a program to print:<br>1<br>2 3<br>4 5 6<br>7 8 9 10<br>using nested loops. | 6 |
| Q.5(a) | Analyze operator precedence and associativity in C with suitable examples. How does it affect expression evaluation? | 6 |

| | | |
|---|---|---|
| Q.5(b) | Develop a menu-driven program using switch-case that implements a simple calculator with options for all arithmetic operations. The program should handle invalid inputs appropriately. | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Given an array A = {12, 7, 9, 3, 15}, trace the selection sort algorithm, showing the array state after each iteration. | 6 |
| Q.6(b) | Write a recursive function to find the LCM of two numbers. | 6 |
| Q.7(a) | Explain how arrays are passed to functions in C. Write a function to concatenate two strings without using strcat(). | 6 |
| Q.7(b) | Given int arr[] = {5, 2, 8, 1, 9}, trace the insertion sort algorithm. | 6 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | Differentiate between:<br>(i) Structure and union with memory diagrams<br>(ii) typedef and #define with examples | <br>3<br>3 |
| Q.8(b) | Create a structure for a student record (name, roll, marks). Write a program to:<br>Store 5 records<br>Display toppers (marks > 90%) | 6 |
| Q.9(a) | Compare malloc(), calloc(), and realloc() with examples. | 6 |
| Q.9(b) | Create a structure for complex numbers. Write functions to add, subtract, and multiply two complex numbers. | 6 |

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**Roll No.....**

**A-04**
**B. Tech (CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE/CE/ME/TE) I/II Semester Examinations (Jun 2025)**
**Essentials of English Language (ASH-105/ASH-HUM-105A)**

**Time- 3hrs**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each Question carries 12 marks. Question 1 is compulsory.**

**Q.1 Attempt the following short-answer type questions as per instructions (Any six, selecting at least one from each unit): (6x2=12)**

(a) What is a phoneme? Explain by giving examples.
(b) What is the pulmonary regressive speech mechanism? How does it help in the production of a speech sound?
(c) What is a gerund? How does it function as a noun?
(d) What is an infinitive? What are its different types?
(e) What is a homonym? Discuss by giving examples.
(f)What are specialised words or phrases used in a particular profession called? Explain by giving examples of such kinds of jargon.
(g) What do you understand by verb patterns? Explain by giving examples.
(h)What is a clause? What are its types?

**UNIT-I**

**Q.2** Give a detailed description of English speech sounds along with their classification. **(12)**
**Q.3** Give a detailed description of the following English sounds (any six): **(12)**
/p/, /t/, /f/, /v/, /j/, /s/, /e/, /I/, /u:/

**UNIT-II**

**Q.4** Attempt various subparts of this question as per the given instructions:
(a) Write the correct sentences after correcting the mistakes related to determiners and articles (any six): **(6)**

i. I saw cat in garden.
ii. He is honest man.
iii. She bought new car.
iv. He is best student in class.
v. Most of the people agree with decision.
vi. There are few books left on shelf.
vii. She gave me good information.

(b) Write the correct sentences after correcting the mistakes related to prepositions (any six): **(6)**

i. She is good in mathematics.
ii. He depends of his parents for money.
iii. I arrived to the station late.
iv. He is married with a doctor.
v. The meeting is at Monday.
vi. He is afraid from spiders.
vii. I prefer tea than coffee.

**Q.5** Attempt various subparts of this question as per the given instructions:
a) Convert the following sentences into passive voice (any six): **(6)**

i. The dog chased the cat.
ii. She will write a letter.
v. Doctors perform surgeries daily.
vi. He must clean his room.

iii. He had finished his work.
iv. The government will implement new policies.
vii. My brother painted the picture.

b) Write the correct sentences after correcting the mistakes related to gerunds and infinitives (any six): **(6)**

i. I enjoy to read books.
ii. They decided visiting the museum tomorrow.
iii. She offered lending me some money.
iv. He kept to talk loudly despite warnings.
v. She prepared not knowing anything.
vi. They stopped to talk when they saw us.
vii. I can't stand to wait in long queues.

## UNIT-III

**Q6**. Attempt various subparts of this question as per the given instructions:

a) Give one word substitutes for the following (any six): **(6)**
A lover of mankind, A partner in crime, A place for keeping birds, One who hates mankind, One who easily believes what others say, A person who eats human flesh, One who eats too much

b) Write the meaning of the given homophones and show the difference between them by using these in sentences (any three):
Write /right, cent / scent, coarse /course, pour / pore, weather / whether **(6)**

Q7. Attempt various subparts of this question as per the given instructions:

a) Write a synonym of the following words (any six):
Sparkling, Fearless, Approach, Cool, Arrive, Gorgeous, Launch **(3)**

b) Give antonyms of the following words (any six):
Absence, Alive, Approval, Abundant, Admit, Attack, Asleep **(3)**

c) Make new words by adding the given prefixes and suffixes to a suitable primary word (any twelve):
Anti-, dis-, im-, untra-, non-, en-, in-, -able, -ence, -ess, -ic, -ion, -ment, -th, -worthy **(6)**

## UNIT-IV

Q.8 Make suitable sentences using the given following verb patterns (any six): **(12)**

i. S + vi
ii. S + vi + (for) + adverbial adjunct
iii. S + vt + gerund
iv. S + vt + noun/pronoun
v. S + vt + that clause
vi. S + vt + dependent clause / question
vii. S + vt + noun/pronoun + present participle
viii. S + HAVE + noun/pronoun (DO) + past participle

Q.9

**a)** Place the punctuation mark in the right place in the following paragraph: **(6)**
The mailman reached with a worn envelope addressed in unfamiliar handwriting intrigued he carefully opened it revealing a faded map and a cryptic note inside "Follow the path to whispering pines there you will find your fortune" A shiver ran down my spine could this be real

b) Write the correct sentence (problems related to subject-verb agreement or dangling modifiers) (any six): **(6)**

i. Either my mother or my father (is, are) coming to the meeting.
ii. The dog or the cats (is, are) outside.
iii. The dog and cat is playing in the yard.
iv. Either the teachers or the principal are responsible for the decision.
v. The team are celebrating the victory.
vi. The news are not good today.
vii. He only works on Tuesdays

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**A-04**

**B. Tech- CSE/IT I Semester Examinations (Jan 2025)**

**Essentials of English Language (ASH-105)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | Identify the conjunctions in the following sentence: "He stayed at home because it was raining." | 1.5 |
| (b) | Define "suffix" with two examples. | 1.5 |
| (c) | What are speech sounds? | 1.5 |
| (d) | What is one-word substitution for "a person who writes dictionaries"? | 1.5 |
| (e) | Name two organs involved in the speech mechanism. | 1.5 |
| (f) | Name two types of composition writing. | 1.5 |
| (g) | Define "part of speech" and give one example. | 1.5 |
| (h) | Why is grammar important in composition? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Write a short note on the importance of phonetic transcription. | 3 |
| Q.2(b) | Describe the classification of English consonant sounds based on manner of articulati | 9 |
| Q.3(a) | Discuss the differences between vowels and consonants. | 4 |
| Q.3(b) | Explain the importance of phonetic transcription. | 8 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Rewrite the following sentences using appropriate articles:<br>• "She bought ___ orange."<br>• "He is ___ honest man." | 3 |
| Q.4(b) | Explain the use of voice (active and passive) in sentence construction. | 9 |
| Q.5(a) | Write three sentences using conjunctions, highlighting their types | 6 |
| Q.5(b) | Differentiate between gerunds and participles with examples. | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Differentiate between synonyms and antonyms with at least two examples for each. | 4 |
| Q.6(b) | Write a paragraph using the following words: "synonym," "abbreviation," "homophone," "technical jargon," "prefix." | 8 |
| Q.7(a) | Write four examples of homophones in sentences. | 4 |
| Q.7(b) | Discuss the importance of vocabulary building for effective communication. | 8 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | Explain the difference between phrases, clauses, and sentences with examples. | 5 |
| Q.8(b) | Explain the different types of tenses in English grammar with examples for each. | 7 |
| Q.9(a) | Describe verb patterns with examples, focusing on their role in sentence structure. | 6 |
| Q.9(b) | Explain the difference between phrases, clauses, and sentences with examples. | 6 |

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**No. of Pages- 2**

**A-05**

**B. Tech- CSE/IT I Semester Examinations (Jan 2025)**

**Universal Human Values (ASH-107)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| **Q.1** | | **Marks** |
|---|---|---|
| (a) | What is the difference between values and moral? | (1.5) |
| (b) | How are wealth and prosperity differentiated? | (1.5) |
| (c) | Explain natural acceptance. | (1.5) |
| (d) | What is knowing and assuming? | (1.5) |
| (e) | Differentiate between glory and gratitude. | (1.5) |
| (f) | Differentiate society with crowed. | (1.5) |
| (g) | State the meaning of definitiveness of ethical human conduct. | (1.5) |
| (h) | What should be the basis of humanistic education? | (1.5) |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Now-a-days, there is a lot of talk about many techno-genic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmade problems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in your opinion? | 8 |
| Q.2(b) | What do you mean by values? How do they differ from skills? How are values and skills being complimentary? | 4 |
| Q.3(a) | What is the difference belief and understanding, explain with suitable example. | 6 |
| Q.3(b) | Do you feel that you have some pre-conditioning? How do you evaluate them? | 6 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | List down all your important activities. Observe whether the activity is of I or of Body or with the participation of both I and Body. | 6 |
| Q.4(b) | Explain the harmony at all level. | 6 |
| Q.5(a) | Explain the motivation of source of imagination with the help of suitable diagram. | 6 |

| | | |
|---|---|---|
| Q.5(b) | "I am seer, doer and enjoyer. The body is my instrument", explain. | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Define love. How can you say that love is the complete value? | 5 |
| Q.6(b) | Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation. | 7 |
| Q.7(a) | Suppose you are an officer in charge of implementing a social service scheme to provide support to old and destitute women. An old and illiterate woman comes to you to avail the benefits of the scheme. However, she has no documents to show that she fulfils the eligibility criteria. But after meeting her and listening to her you feel that she certainly needs support. Your enquiries also show that she is really destitute and living in a pitiable condition. You are in a dilemma as what to do. Putting her under the scheme without necessary documents would clearly be violation of rules. But denying her the support would be cruel and inhuman. Would you help the lady or not? Give Reasons | 6 |
| Q.7(b) | What do you mean by innateness? What is the innateness in four orders? | 6 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | What is the vision of Manviya Vyawastha? Explain. | 6 |
| Q.8(b) | What do you mean by holistic management model? List down a few specific characteristics of such a model. | 6 |
| Q.9(a) | Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order. | 6 |
| Q.9(b) | Propose a broad outline for humanistic Constitution at the level of Nation. | 6 |

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**No. of Pages- 02**
**Roll No…….**

**A-05**

**B.Tech CE, ME, TE, CSE-AIDS, CSE-AIML, CSE-CS, ECE, CSE, IT, BCA, BCA-CTIS, BCA-DS I/II Semester Examinations (Jun 2025)**

**Universal Human Values (ASH-107/ASH-HUM-107A)**

**Time- 3hrs**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit, and each Question carries 12 marks. Question 1 is compulsory.**

| | | **Marks** |
|---|---|---|
| Q.1 | | |
| (a) | How does self-exploration contribute to Value Education? | 2 |
| (b) | What do you mean by "Human Being is more than just the Body"? | 2 |
| (c) | What role does a family play in shaping human values and relationships? | 2 |
| (d) | Describe the basics for respect in human relationships. | 2 |
| (e) | Explain how values in relationships can be cultivated. | 2 |
| (f) | How can individuals cultivate competence in professional ethics? | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Analyze the relationship between happiness and prosperity in the context of Value Education. | 6 |
| Q.2(b) | How can individuals achieve a balance between the two- happiness and prosperity? | 6 |
| Q.3 | Discuss the importance of Value Education in today's world. Explain its content and process. | 4,8 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4 | Elaborate on the activities in the Self and the Body. How can individuals cultivate awareness and balance between these activities? | 5,7 |
| Q.5(a) | Discuss the concept of harmony in the human being | 6 |
| Q.5(b) | Explain how the Self and the Body coexist and interact. | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6 | Elaborate on the concept of comprehensive human goals and its five dimensions. How can individuals contribute to achieving this goal? | 7,5 |
| Q.7(a) | Discuss the importance of family as a basic unit of human interaction. | 6 |
| Q.7(b) | Explain how values in relationships can be cultivated | 6 |

## UNIT-IV

| | | |
|---|---|---|
| Q.8 | Analyze the current scenario of professional ethics and the issues that arise from it. How can individuals cultivate the right understanding and competence in professional ethics? | 5,7 |
| Q.9(a) | Discuss the importance of social and professional ethics in today's world. | 6 |
| Q.9(b) | Elaborate on the concept of universal human order and its relevance to professional ethics. | 6 |

**No. of Pages- 2**

**A-06**

**B. Tech- CSE-AIDS/CSE-AIML/CSE-CS I Semester Examinations (Jan 2025)**

**Basics of Electronics Engineering (ECE-101)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | Define passive components with illustrations. | 2 |
| (b) | Describe the working of diode as a switch. | 2 |
| (c) | Differentiate between various types of BJTs. | 2 |
| (d) | Describe the working of BJT as a switch. | 2 |
| (e) | Write a note on signed binary numbers. | 2 |
| (f) | Describe the working principle of LCDs. | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Define breakdown. Describe types of breakdown with diagrams. | 6 |
| Q.2(b) | Explain the working of full wave rectifiers in detail. | 6 |
| Q.3(a) | For the Zener diode network of Fig.1, determine $V_L$ , $V_R$ , $I_Z$ , and $P_Z$. | 6 |

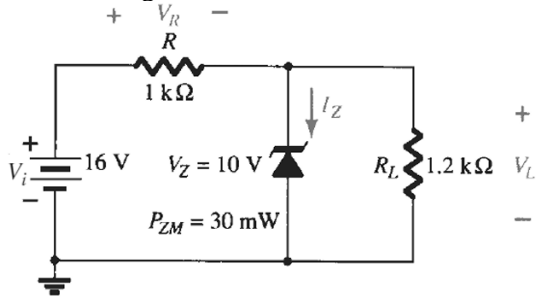


Fig. 1

| | | |
|---|---|---|
| Q.3(b) | Explain the working of Schottky diode. | 6 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Describe the input and output characteristics of common emitter configuration. | 6 |
| Q.4(b) | Explain the concept of operating point in detail. | 6 |
| Q.5(a) | Discuss the operation of the BJT in detail. | 6 |
| Q.5(b) | Describe the working principle of BJT as an amplifier. | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Convert the following hexadecimal numbers to decimal:<br>(a) $1C_{16}$ (b) $A85_{16}$ | 3+3 |
| Q.6(b) | Express the decimal number -39 as an 8-bit number in the sign-magnitude, 6 1's complement, and 2's complement forms. | 6 |

Q.7(a) Perform the following binary arithmetic operations: 3+3
(a) 101 * 111 (b) 1100 ÷ 011

Q.7(b) Add the following BCD numbers: 3+3
(a) 1001 + 0100 (b) 1001 + 1001

**UNIT-IV**

Q.8(a) A combination of inverters is shown in Fig.2. If a LOW is applied to point A, determine the net output at points E and F. 6

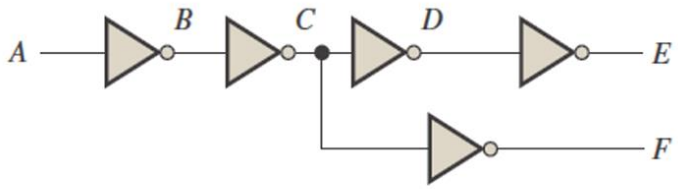


Fig. 2

Q.8(b) Convert the following Boolean expression into standard POS form: 6

$$(A + \overline{B} + C)(\overline{B} + C + \overline{D})(A + \overline{B} + \overline{C} + D)$$

Q.9(a) Write and explain DeMorgan's theorems. 6

Q.9(b) Describe the working of seven segment displays. 6

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**No. of Pages- 02**
**Roll No.……**

**A-06**
**B.Tech (CSE-AIDS/CSE-AIML/CSE-CS) I Semester Examinations (Jun 2025)**
**Basics of Electronics Engineering (ECE-101/BT-ECE-101A)**

**Time - 03hrs**
**Max. Marks - 60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| | | |
|---|---|---|
| Q1.(a) | Draw a well labeled circuit diagram for plotting VI characteristics of Solar cell. | **02** |
| Q1.(b) | Define quiescent point of a transistor. | **02** |
| Q1.(c) | Convert decimal number 125 to hexadecimal number | **02** |
| Q1.(d) | Write BCD equivalent of 1569. | **02** |
| Q1.(e) | Explain Idempotent Law in Boolean algebra. | **02** |
| Q1.(f) | Explain Canonical form in Boolean algebra. | **02** |

**Unit 1**

| | | |
|---|---|---|
| Q2.(a) | Draw and explain the working of Full wave rectifier. | **06** |
| Q2.(b) | Explain the Zener and Avalanche breakdown | **06** |
| Q3.(a) | Explain the VI characteristics of an ideal diode. Also explain diode equation. | **06** |
| Q3.(b) | Draw and explain the working of photocell with its characteristics | **06** |

**Unit 2**

| | | |
|---|---|---|
| Q4.(a) | Explain the operation and characteristics of a transistor in common-base configuration with the help of a diagram. | **06** |
| Q4.(b) | In a transistor circuit, collector load is 4KΩ whereas quiescent collector current is1mA. Given $V_{CC}$ =10 V, determine the operating point and calculate the base current and alpha assuming β=100 | **06** |
| Q5.(a) | With the help of a circuit diagram show that a transistor can act like a switch. | **06** |
| Q5.(b) | In a transistor circuit, the collector load resistor is $R_C$=3.3 KΩ_, and $V_{CC}$ =12 V. The transistor has a alpha = 0.99, and the base current $I_B$=20 μA. Find the collector current, collector-emitter voltage and emitter current | **06** |

**Unit 3**

| | | |
|---|---|---|
| Q6.(a) | Convert hexadecimal number EB.C7 to Decimal, Octal and Binary form. | **06** |
| Q6.(b) | Convert decimal 35 into Gray code. | **06** |

| | | |
|---|---|---|
| Q7.(a) | Subtract 25 from 50 using 2's complement form. | **06** |
| Q7.(b) | Convert Octal number 345**.**57 to Decimal, Hexadecimal and Binary form. | **06** |

**Unit 4**

| | | |
|---|---|---|
| Q8.(a) | Explain the working of seven segment display. | **06** |
| Q8.(b) | Simplify the following Boolean expression using Boolean algebra laws: F=A′(A+BC) + (AC+B′C). Also, write the law used in each step. | **06** |
| Q9.(a) | Explain the construction and working of LCD display. | **06** |
| Q9.(b) | Simplify the following Boolean expression using Boolean algebra laws for $\overline{A + \overline{BC} + \overline{A}C}$ Also, write the law used in each step | **06** |

**No. of Pages- 2**

**A-07**

**B. Tech- CE/ME/TE/ECE/CSE-AIDS/CSE-AIML/CSE-CS I Semester Examinations (Jan 2025)**

**Engineering Chemistry (ASH-108)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | What cause hardness in water? | 1.5 |
| (b) | Why is hard water unsuitable for boiler operation? | 1.5 |
| (c) | How does high alkalinity affect pH levels? | 1.5 |
| (d) | What is caloric value of a fuel? | 1.5 |
| (e) | How does the carbon content influence the quality of coal? | 1.5 |
| (f) | How does moisture affect corrosion? | 1.5 |
| (g) | Name a disadvantage of biodiesel. | 1.5 |
| (h) | What type of polymerization involved in Phenol- Formaldehyde resin? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | What causes hardness in water? Discuss any two methods of water softening in details. | 8 |
| Q.2(b) | A 100 ml water sample is titrated with 0.01 M EDTA solution, and it requires 10 ml of EDTA to reach end point. Calculate total hardness of water Sample in mg/l as $CaCO_3$ | 4 |
| Q.3(a) | What is scale and sludge formation? What are its disadvantages and how it is it prevented? | 7 |
| Q.3(b) | How is hardness estimated by EDTA method? | 5 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Describe the analysis of coal by proximate and ultimate analysis methods. | 6 |
| Q.4(b) | Write note on Flash point and fire point of liquid fuel. | 6 |
| Q.5(a) | What is corrosion? Explain the following types of corrosion in details. i) Galvanic corrosion ii) Pitting corrosion iii) Stress Corrosion | 9 |
| Q.5(b) | Discuss sacrificial anodic protection method. | 3 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Describe principle and selection rule in spectroscopy. | 6 |
| Q.6(b) | How Lambert –Beer law relate absorbance to concentration. Why this law fail at high concentration. What factors affect molar absorptivity in Lambert-Beer law | 6 |
| Q.7(a) | Explain basic principles of fluorescence spectroscopy. What factors affect the fluorescence intensity of molecule? | 6 |
| Q.7(b) | What do you understand by chemical shift in NMR spectroscopy? Discuss the factors affecting chemical shift in NMR. How is MRI different from NMR? | 6 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | Discuss preparation, properties and industrial applications of Teflon. | 6 |
| Q.8(b) | What do you understand by thermosetting plastic? Discuss in brief about UF and PF resins. | 6 |
| Q.9(a) | Writes notes on i) Biodegradable polymer ii) Conducting polymer | 8 |
| Q.9(b) | Discuss alternative solvents used in green chemistry. | 4 |

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**No. of Pages- 02**

**A-08**

**B. Tech- CSE-AIDS/CSE-AIML/CSE-CS/ECE I Semester Examinations (Jan 2025)**

**Basics of Communication Skills (ASH-106)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | How many levels does Bloom's taxonomy have, name them. | 1.5 |
| (b) | In what way does asking questions improve listening skills? | 1.5 |
| (c) | Explain the 'statement language is a tool of Communication'. | 1.5 |
| (d) | Write a short note on Scanning. | 1.5 |
| (e) | What is Descriptive Writing? | 1.5 |
| (f) | Why is brevity important in written communication? | 1.5 |
| (g) | The message sent is not always the same as the message received. How? | 1.5 |
| (h) | What are the Oral Forms of Communication? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | What are the key stages involved in practicing effective listening? | 8 |
| Q.2(b) | How can we overcome the barriers to listening? | 4 |
| Q.3(a) | Explain the following terms:<br>i Sequencing,<br>ii Note-making,<br>iii Summarizing | 9 |
| Q.3(b) | How can paraphrasing and summarizing enhance active listening? | 3 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | What is situational speaking? How is it different from Public Speaking? | 9 |
| Q.4(b) | How can expanding/appropriate vocabulary improve your speaking skills? | 3 |
| Q.5(a) | What strategies can be used to keep the audience engaged during a long presentation or speech? | 6 |
| Q.5(b) | What strategies can you use to present your argument logically and persuasively in a debate? | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | What does Algernon symbolize in the story *Flowers for Algernon*? | 6 |
| Q.6(b) | Does Bacon's advice in *Of Studies* apply to modern education and learning? | 6 |
| Q.7(a) | What is the significance of the setting of the mental asylum in the story *Toba Tek Chand?* | 4 |
| Q.7(b) | Explain how *The Proposal* is a Farcical play. | 8 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | What are the key differences between argumentative writing and persuasive writing? | 5 |
| Q.8(b) | What is Redundancy and cliché in Writing? How can we avoid these for effective writing? | 7 |
| Q.9(a) | What tone and practices should be used while writing a message to a colleague about a sensitive topic? | 6 |
| Q.9(b) | What are the key elements of a well-structured business email? | 6 |

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**No. of Pages- 2**

**Roll No.....**

**A-08**

**B. Tech (CE/ME/TE/ECE/CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS)**

**I/II Semester Examinations (June 2025)**
**Basics of Communication Skills (ASH-106/ASH-HUM-106A)**

**Time-3Hours**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each question carries 12 marks. Question 1 is Compulsory.**

**Q.1**

(a) Define Active Listening.

(b) List any four barriers to Effective Speaking.

(c) Explain the difference between Skimming and Scanning in reading.

(d) What are the Oral Forms of communication?

(e) Name the four types of writing.

(f) Describe any two strategies for effective writing.

**UNIT-I**

**Q.2 (a)** Write a detailed note on the four types of listening. **6**

(b) What are the barriers to good listening. 6

**Q. 3**

(a) Write short notes on the following terms : 6

(i) Note Making

(ii) Paraphrasing

(iii) Asking Questions

(b) Compare and contrast active listening and passive listening with real-world examples. 6

## UNIT-II

**Q. 4**

(a) Discuss the role of non-verbal cues such as facial expressions and gestures in enhancing spoken communication. 6

(b) Explain how confidence and clarity together influence the effectiveness of a speaker. 6

**Q. 5**

(a) Evaluate the importance of vocabulary and tone in adapting your speech to different situations like debates, storytelling and casual conversations. 6

(b) What are the common barriers to effective speaking ? Suggest strategies to overcome them. 6

## UNIT-III

**Q. 6**

(a) What is skimming, and how is it useful in reading? 6

(b) How does reading a one-act play like *The Proposal* by Anton Chekhov help improve your reading skills? 6

**Q.7**

(a) What is the central theme of *Flowers for Algernon* by Daniel Keyes? 6

(b) How does *Toba Tek Singh* reflect the confusion and tragedy of partition? 6

## UNIT-IV

**Q. 8**

(a) How is creative writing different from other types of writing? Give examples. 6

(b) What are the key elements of an effective email? 6

**Q. 9**

(a) How do regular writing assignments contribute to the development of better writing skills? 6

(b) What are some common clichés and redundancies in writing. Why should they be avoided? 6

**No. of Pages- 02**

**A-09**

**B. Tech- CE/ME/TE/ECE I Semester Examinations (Jan 2025)**

**Basics of Electrical and Electronics Engineering (ECE-102)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | Define capacitance and its role in an AC circuit? | 1.5 |
| (b) | State Thevenin's theorem? | 1.5 |
| (c) | In a delta-connected system, if the phase current is 5A, calculate the line current. | 1.5 |
| (d) | What is the difference between a step-up and a step-down transformer? | 1.5 |
| (e) | Define the quality factor (Q-factor) of an RLC circuit? | 1.5 |
| (f) | What happens when a PN junction is reverse biased? | 1.5 |
| (g) | Define the term "peak value" in an AC signal? | 1.5 |
| (h) | What are the types of DC motors based on excitation? | 1.5 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Derive the conversion of star-connected resistor into delta connection. | 3 |
| Q.2(b) | Calculate the current in 4Ω resistor in Fig. 1 using Thevenin's theorem: | 9 |

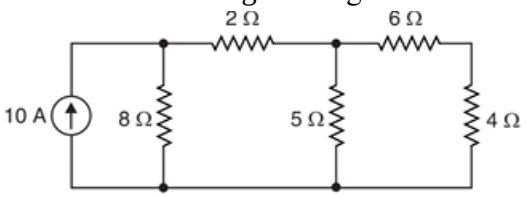


Fig. 1

| | | |
|---|---|---|
| Q.3(a) | State and prove the maximum power transfer theorem. | 4 |
| Q.3(b) | Find the current in 8Ω resistor in Fig. 2 using Superposition theorem: | 8 |

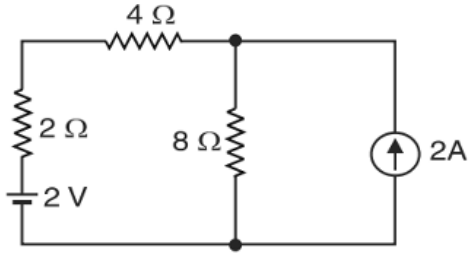


Fig. 2

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Find the Average value of output voltage of half-wave rectifier circuit. | 5 |
| Q.4(b) | Explain the sinusoidal AC response of series R-C circuit with waveforms and phasor diagrams. | 7 |

| | | |
|---|---|---|
| Q.5(a) | Given for a series ac circuit: $V_1=10 \sin\omega t$, $V_2= 15 \sin(\omega t+\pi/4)$, $V_3= 20 \cos(\omega t-\pi/6)$. Find the expression of resultant or total voltage. | 6 |
| Q.5(b) | A series RLC circuit has maximum current of 0.5A obtained by varying value of inductance L. The supply voltage is fixed at 230V, 50 Hz. When maximum current flows, the voltage across inductor is 350V. What are the values of circuit parameters? | 6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6(a) | Derive the EMF equation of a single-phase transformer. | 3 |
| Q.6(b) | Discuss the speed control methods of DC shunt motor. | 9 |
| Q.7(a) | Describe the losses in a single-phase transformer. | 4 |
| Q.7(b) | Explain the four-quadrant operation of DC motor. | 8 |

**UNIT-IV**

| | | |
|---|---|---|
| Q.8(a) | Discuss the diode operation as a switch. | 5 |
| Q.8(b) | Explain the operation of full-wave rectifier circuit with waveforms and circuit diagrams. | 7 |
| Q.9(a) | Explain the operation of diode in avalanche breakdown region. | 6 |
| Q.9(b) | Explain the common collector configuration of transistor. | 6 |

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**No. of Pages- 02**

**A-09**

**B.Tech. (CE/ME/TE/ECE/CSE/IT) I/II Semester Examinations (Jun. 2025)**

**Basics of Electrical & Electronics Engineering (ECE-102/BT-ECE-102A)**

**Time: 3 hrs.**

**Max. Marks: 60**

**Attempt 5 questions in all, selecting one question from each unit. Question no. 1 is compulsory. Each question carries 12 marks.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | An ideal current source (with rated source current 5 A) delivers a current of 5 A to a 1 **Ω** resistor connected to the terminals of the current source. What current will be drawn by a 5 **Ω** resistor if it replaces the 1 **Ω** resistor? | 2 |
| (b) | If a bulb with resistance 10 **Ω** connected to an ideal voltage source of 14.142 V dissipates a power of 20 W, then a bulb designed to dissipate 10 W (when connected to same voltage source) will have what resistance? | 2 |
| (c) | How are active, reactive and apparent powers related to each other, if at all? What are the units of each of these powers? | 2 |
| (d) | If the Thevenin equivalent of a circuit works out to $V_{TH}$ = 100 V, and $Z_{TH}$ = 10 **Ω**, then deduce therefrom (using duality between Thevenin and Norton Theorems) or otherwise find the Norton equivalent $I_N$ and $Z_N$, and also draw the Norton Equivalent diagram. | 2 |
| (e) | What is the purpose of commutator in a D.C. motor? Of what material it is made? | 2 |
| (f) | Draw a basic voltage regulator using Zener Diode. Is there a need to connect any resistance in this regulator circuit? If yes, where and why? | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | If a delta has resistances 5 **Ω**, 10 **Ω** and 15 **Ω** connected between terminals CA, AB and BC, then calculate the equivalent star resistances. Also calculate the equivalent delta resistances if a star has resistances $R_{AO}$ = 5 **Ω**, $R_{BO}$ =10 **Ω** and $R_{CO}$ =15 **Ω**. | 6 |
| Q.2(b) | Calculate the equivalent resistance (at terminals AB) of the network given in Fig.1 and the current drawn from the battery. | 6 |

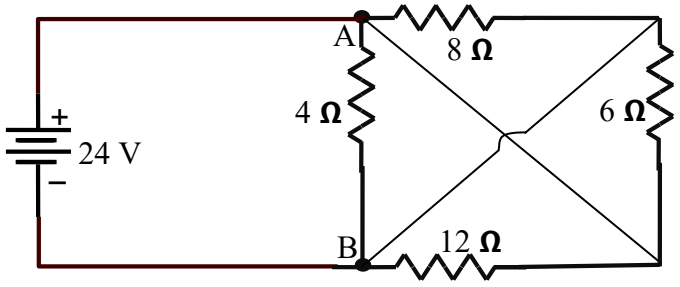


Fig.1

Q.3(a) Find the voltage across 3-ohm resistor using Norton's theorem for Fig.2 below. 8

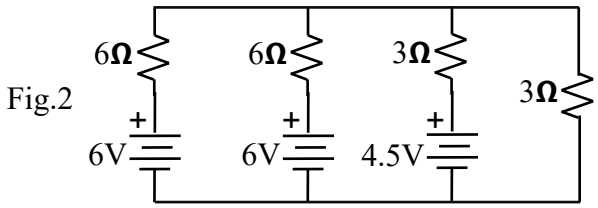

Fig.2

Q.3(b) State Superposition theorem. Is this theorem applicable to non-linear systems? Also state Maximum Power Transfer theorem. 4

**UNIT-II**

Q.4(a) Add the three phasors $15\angle 270^{o}$, $10\angle 90^{o}$ and $5\angle 0^{o}$, and express the resultant in polar as well as in rectangular forms. Draw the resultant phasor also. 6

Q.4(b) Define Power factor (in two different ways), R.M.S. value and the Average value of sinusoidal A.C. 6

Q.5 12

Find the current drawn (expressed in Polar and rectangular forms) from the source in Fig.3.

Also find the currents (expressed in polar form) in the two parallel branches.

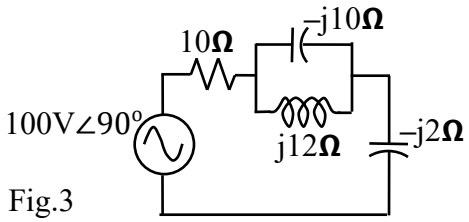

Fig.3

**UNIT-III**

Q.6(a) Describe the working principle of a single-phase transformer. In what quantities it causes changes and in what quantity / quantities it does not cause change(s)? 7

Q.6(b) What are eddy currents? How are these different from normal induced currents? What is done to reduce eddy currents and how does that measure / method work to reduce eddy currents? 5

Q.7(a) Derive an expression for back e.m.f. of a D.C. machine. 6

Q.7(b) Explain any one type of braking of D.C. motor. Is braking same as breaking? 6

**UNIT-IV**

Q.8(a) Explain how can a BJT (in any configuration) be used as an amplifier? What does it amplify? 9

Q.8(b) For amplification, does amplifier take power from the input signal itself? If not, then wherefrom does it take additional power to amplify the signal? 3

Q.9(a) Distinguish between avalanche breakdown & Zener breakdown. 4

Q.9(b) Draw and explain the I/O characteristics of Common Base configuration of BJT. 8

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**No. of Pages- 02**

**A-10**

**B. Tech CE/ME/TE/ I Semester Examinations (Jan 2025)**

**Engineering Graphics and Design(ME-104)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

**Assume necessary dimension/data if not given.**

| Q.1 | **Attempt any six questions:** | **Marks** |
|---|---|---|
| (a) | Draw the "Chain thin, thick at ends" type of line and state its application also? | 2 |
| (b) | Draw the sketch of "Top" view of a square prism? | 2 |
| (c) | Define "Auxiliary" view in brief? | 2 |
| (d) | What do you mean by an "Isometric view"? | 2 |
| (e) | Draw any one type of "Dimensioning" style? | 2 |
| (f) | Draw the symbol of "First" angle projection? | 2 |
| (g) | State the ratio of Isometric length to True length? | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Draw the projections of the point P, which is 45 mm below H.P and 35 mm behind V.P? | 5 |
| Q.2(b) | A straight line EF, 60 mm makes and angle of 35º to the H.P and 40º to the V.P. The end E is 14 mm in front of V.P and 20 mm above H.P Draw the projections of line EF? | 7 |
| Q.3(a) | Draw the projections of the point R, which is in H.P and 30 mm behind V.P? | 5 |
| Q.3(b) | The length of the top view of a straight line MN parallel to the V.P, and inclined at 45º to H.P is 65 mm. The end M is 15 mm above H.P and 30 mm in front of V.P. Draw the projections and determine the true length of the line MN? | 7 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Draw the projections of a circular lamina of diameter 45 mm, whose centre is 35 mm from H.P and 25 mm in front of V.P. The circular lamina is perpendicular to V.P and inclined at 40º to H.P? | 6 |
| Q.4(b) | A pentagonal prism, side of base 30 mm and axis 60 mm, is resting on one of its base edges on horizontal plane with its axis inclined at 45º to H.P. Draw the projections of prism? | 6 |
| Q.5(a) | A circular lamina of Ø70 mm is perpendicular to V.P and inclined at 35º to H.P. The centre of the lamina is 60 mm from the horizontal trace of the inclined plane. Draw the Front and Top view of lamina? | 6 |
| Q.5(b) | A hexagonal pyramid, side of base 30 mm and axis 60 mm long, is resting on an edge of its base on the H.P with its axis inclined at 40º to H.P and parallel to V.P. Draw its projections? | 6 |

## UNIT-III

Q.6(a) Define "Half" Sectional view? 3

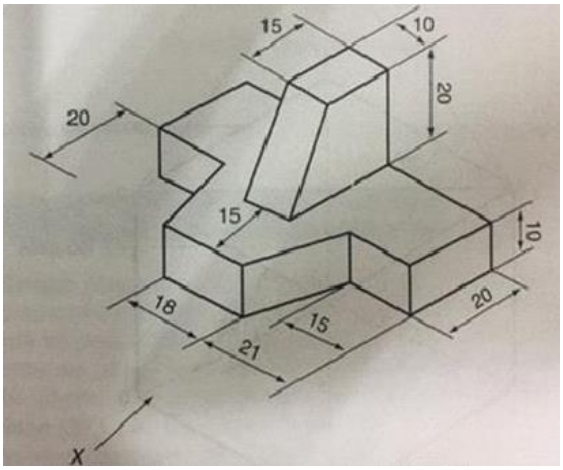
Q.6(b) Draw the development of the lateral surfaces of a square pyramid of base side 45 mm and axis 70 mm long, resting on its base on the H.P such that all the sides of base are equally inclined to V.P? 9

Q.7(a) A triangular prism, side of base 40 mm and length of axis 80 mm is lying on one of its rectangular faces on H.P such that its axis is parallel to both H.P and V.P. The prism is cut by a section plane parallel to the H.P at a distance of 26 mm from the H.P. Draw the Front view and sectional Top view? 9

Q.7(b) Define "development of surfaces"? 3

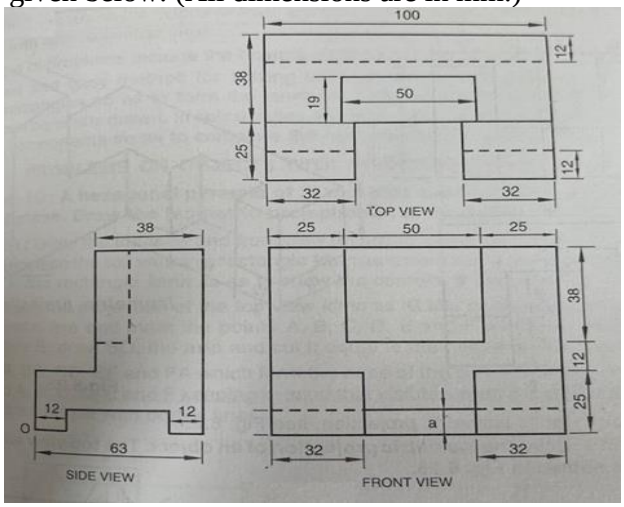
## UNIT-IV

Q.8(a) Draw the orthographic views of below figure in first angle projection. (All dimensions are in mm.) 9




Q.8(b) Differentiate between "Isometric axis" and "Isometric lines"? 3

Q.9(a) Draw the Isometric projection of a solid whose three orthographic projections are given below. (All dimensions are in mm.) 9




Q.9(b) What do you understand by "Orthographic projection"? 3

**No. of Pages- 02**
**Roll No.:…….**

**A-10**

**B. Tech CE/ME/TE I Semester Examinations (Jun 2025)**
**Engineering Graphics and Design(ME-104/BT-ME-104A)**

**Time- 3hrs**
**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and each Question carries 12 marks. Question 1 is compulsory.**

| **Q.1** | | **Marks** |
|---|---|---|
| **(a)** | Mentioned the various types of line used in engineering graphics and design. | 2 |
| **(b)** | Define the term projections. Discuss its types. | 2 |
| **(c)** | What do you mean by traces? | 2 |
| **(d)** | What is an isometric projection? | 2 |
| **(e)** | What is the need of sectional view in drawing? | 2 |
| **(f)** | Discuss the need and application of development of surface in industry. | 2 |

**UNIT-I**

| | | |
|---|---|---|
| **Q.2** | Two points A and B are in the H.P. The point A is 30 mm in front of the VP while B is behind the V.P. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45° with XY. Find the distance of the point from the V.P | 12 |
| **Q.3(a)** | A line PQ, 90 mm long, is in the H.P. and makes an angle of 30° with the V.P. Its end P is 25 mm in front of the V.P. Draw its projections. | 6 |
| **Q.3(b)** | A line AB, 50 mm long, has its end A in both the H.P. and the V.P. It is inclined to the H.P. and at 45° to the V.P. Draw its projections. | 6 |

**UNIT-II**

| | | |
|---|---|---|
| **Q.4** | Draw the projections of a circular plane of 50 mm diameter, having its plane vertical and inclined at 30° to the V.P. Its center is 30 mm above the H.P. and 20 mm in front of the V.P. | 12 |
| **Q.5** | A pentagonal prism is resting on one of the corners of its base on the HP. The longer edge containing that comer is inclined at 45° to the HP. The axis of the prism makes an angle of 30° to the VP. Draw the projection the solid | 12 |

**UNIT-III**

| | | |
|---|---|---|
| **Q.6** | A pentagonal pyramid, base 30 mm side and 65 mm long, has its base horizontal and an edge of the base parallel to the VP. A horizontal section plane cuts it at a distance of 25 mm above the base. its front view and sectional top view | 12 |
| **Q.7** | A cylinder of base diameter 40 mm and axis height 75 mm is kept on the ground on its base. An auxiliary inclined plane inclined at 45° to the HP cuts the cylinder through the midpoint of the axis. Draw the development. | 12 |

## UNIT-IV

**Q.8** Draw the front view, top view and side view of the figure as shown below. 12

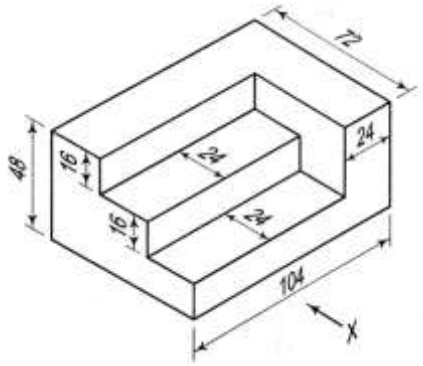



**Fig-1**

**Q.9** The projection of the frustum of the cone is shown in figure below. Draw its isometric view. 12

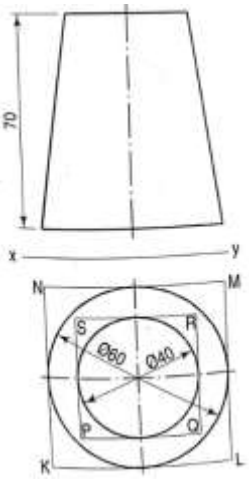



**Fig-2**

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**No. of Pages- 02**

**B-01**

**B.Tech (CE/ME/TE/ECE/CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS) II Semester Examinations (June 2025)**

**Engineering Mathematics II (ASH-MAT-102A)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

**Q. No. 1** **MARKS**

a) Define Bernoulli's equation with an example. **1.5**
b) Define exact differential equation with an example. **1.5**
c) State Euler's theorem for homogeneous functions with example. **1.5**
d) State Taylor's series for function of two variables. **1.5**
e) What are measures of central tendencies? **1.5**
f) Define Skewness. **1.5**
g) State Bay's Theorem. **1.5**
h) Define Random variables **1.5**

**UNIT I**

**Q. No. 2**

a) Solve $(3x^2y^4 + 2xy)\,dx + (2x^3y^3 - x^2)\,dy = 0$ **6**
b) Solve $(x^2y^2 + xy + 1)y\,dx + (x^2y^2 - xy + 1)x\,dy = 0$ **6**

**Q. No. 3**

a) Solve $(2x+3)^2\frac{d^2y}{dx^2} - 2(2x+3)\frac{dy}{dx} - 12y = 6x$ **6**
b) Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$ using method of variation of parameters. **6**

**UNIT II**

**Q. No. 4**

a) Verify Euler's theorem for the function $f(x,y,z) = 3x^2yz + 5xy^2z + 4z^4$. **6**
b) $If\ u = \frac{x^2y^2}{x+y}, show\ that\ x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial x} = 3u$ **6**

**Q. No. 5**

a) Find the extreme values of $x^3 + y^3 + 3xy$. **6**
b) Find the maximum and minimum distances from the origin to the curve $5x^2 + 6xy + 5y^2 - 8 = 0$. **6**

## UNIT III

**Q. No. 6**

a) Calculate Standard Deviation from the following data: **6**

| x | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|
| f | 3 | 7 | 22 | 60 | 85 | 32 | 8 |

b) Find first four moments of a distribution about the value a=5 are -2, 10, -25 and 50. Find fist four moments about mean. **6**

**Q. No. 7**

a) Calculate Spearman's coefficient of correlation from the following data: **6**

| x | 80 | 78 | 75 | 75 | 6 | 67 | 60 | 59 |
|---|---|---|---|---|---|---|---|---|
| y | 12 | 13 | 14 | 14 | 14 | 16 | 15 | 17 |

b) Find $b_{xy}$ from the following data **6**

| X | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 6 | 8 | 7 | 6 | 8 |

## UNIT IV

**Q. No. 8**

a) A box contains 4 red and 6 white balls. Two balls are drawn one after the other without replacement. Find the probability that both are red. **6**

b) In a Poisson distribution, the mean is 3. Find the probability of getting:
(i) No success
(ii) At most two successes
(iii) More than four successes. **6**

**Q. No. 9**

a) State and derive mean and variance of Binomial distribution. **6**

b) A factory has 3 machines A, B, and C producing 30%, 50%, and 20% of items respectively. The defect rate is 2% for A, 4% for B, and 5% for C. If an item is selected at random and is found defective, find the probability it was produced by machine B. (Use Bayes' Theorem) **6**

**No. of Pages- 02**

**B-02**

**B.Tech (CE/ME/TE) II Semester Examinations (Jun 2025)**

**Mechanics and Mechanical Properties of Materials (ASH-PHY-104A)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit, and each Question carries 12 marks. Question 1 is compulsory.**

| Q.1 | | **Marks** |
|---|---|---|
| (a) | What is the difference between conservative and non-conservative systems? | 2 |
| (b) | Explain radius of gyration. | 2 |
| (c) | State the parallel and perpendicular axis theorems. | 2 |
| (d) | What is simple harmonic motion? Derive the differential equation for SHM. | 2 |
| (e) | What is meant by the restoring force in SHM? How is it related to displacement? | 2 |
| (f) | What are strain hardening and strain softening? | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Discuss Kepler's laws of planetary motion. | 6 |
| Q.2(b) | Derive the trajectory of a particle in a gravitational system. | 6 |
| Q.3(a) | Discuss the concept of conservation of momentum and its applications. | 6 |
| 3(b) | Derive the equations of motion for a particle in a central force field. | 6 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4 | Discuss the concept of rigid body mechanics. Derive the moment of inertia for a ring. | 6,6 |
| Q.5 | Derive the equation for rotational kinetic energy. What is the difference between rolling and sliding motions? | 6,6 |

**UNIT-III**

| | | |
|---|---|---|
| Q.6 | Explain with the help of a graph, the difference between under damped and over damped, and critically damped oscillations. Derive the differential equation for damped harmonic oscillations and obtain its general solution. Discuss the nature of motion based on the damping constant. | 6,6 |
| Q.7 | Derive the equation for the speed of a wave in a string. What is the difference between transverse and longitudinal waves, Explain? | 7,5 |

## UNIT-IV

Q.8 Discuss the mechanical properties of materials, including elasticity, plasticity, and failure. Explain the concept of fracture mechanics and its significance in engineering applications. 5,7

Q. Derive the following relations: 4,4,4

(a) **$Y = 3K(1 - 2\sigma)$ ,** where Y is Young's modulus, K is bulk modulus, and σ is Poisson's ratio.

(b) **$Y = 2n(1 + \sigma)$,** where Y is Young's modulus, n is rigidity modulus, and σ is Poisson's ratio.

Derive the relation: $\boldsymbol{Y = \frac{9GK}{3K+G}}$ , where Y is Young's modulus, K is bulk modulus, and G is shear modulus.

No. of Pages- 02

B-03

**B.Tech (CSE/IT/CSE-AIDS/CSE-AIML/CSE-CS/ECE) II Semester Examinations (Jun 2025)**

**Programming with Python (BT-CSE-102A)**

**Time- 3hrs**

**Max.Marks-60**

**Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory and each Question carries 12 marks.**

| Q.1 | | Marks |
|---|---|---|
| (a) | What is the purpose of comments in Python? Give an example. | 2 |
| (b) | Explain the difference between a variable and a constant in Python with examples. | 2 |
| (c) | Explain how list comprehension works in Python with a simple example. | 2 |
| (d) | What is the use of the lambda function in Python? Give an example. | 2 |
| (e) | Name any two attributes of a NumPy array. | 2 |
| (f) | Describe the purpose of the groupby() function in Pandas. | 2 |

**UNIT-I**

| | | |
|---|---|---|
| Q.2(a) | Develop a Python program to check if a given number is even or odd using if-else statement. | 6 |
| Q.2(b) | Write a program that demonstrates string operations like slicing, concatenation, and changing case. | 6 |
| Q.3(a) | Compare for loop and while loop with examples. When would you prefer one over the other? | 6 |
| Q.3(b) | Consider a scenario where the user input is a sentence. Evaluate different string functions that can be used to count words, convert to lowercase, and remove whitespace. Provide code snippets. | 6 |

**UNIT-II**

| | | |
|---|---|---|
| Q.4(a) | Explain the differences between lists, tuples, and sets in Python with suitable examples. | 6 |

| | | |
|---|---|---|
| Q.4(b) | Describe how indexing and slicing work in lists and tuples. Provide examples for both positive and negative indexing. | 6 |
| Q.5(a) | Write a Python program to count the number of occurrences of each character in a string using a dictionary. | 6 |
| Q.5(b) | Create a program to demonstrate set operations like union, intersection, and difference between two sets. | 6 |

## UNIT-III

| | | |
|---|---|---|
| Q.6(a) | Explain the purpose and syntax of default and keyword arguments in Python functions. Provide examples. | 6 |
| Q.6(b) | Analyze the use of finally block in exception handling. Explain with an example when and why it is executed. | 6 |
| Q.7(a) | Evaluate different types of errors in Python (syntax error, runtime error, logical error) and suggest ways to handle them. | 6 |
| Q.7(b) | Create a program using a recursive function to calculate the factorial of a number. | 6 |

## UNIT-IV

| | | |
|---|---|---|
| Q.8(a) | Demonstrate the use of slicing and indexing in a 2D Numpy array with appropriate examples. | 6 |
| Q.8(b) | Analyze the attributes of a Numpy array (ndim, shape, size, dtype, itemsize) using a sample array and interpret the output. | 6 |
| Q.9(a) | Describe the differences between a Pandas Series and a DataFrame with suitable examples. | 6 |
| Q.9(b) | Evaluate the advantages and disadvantages of using Seaborn over Matplotlib for statistical data visualization. | 6 |

**No. of Pages- 1**

**Roll No…….**

**B-04**

**B. Tech. (CE/ME/TE) II Semester Examinations (Jun 2025)**

**Environmental Studies (BT-CE-102A)**

**Time- 3hrs**
**Max.Marks-60**

**The paper is divided into 2 parts: A and B. Both parts are compulsory.**

**1. Part A contains 6 Short Answer Type Questions, all are compulsory. Each question carries 2 marks.**

**2. Part B contains 8 Long Answer Type Questions, two questions from each unit. Attempt four questions by selecting one from each unit. Each question from one unit is compulsory and carries 12 marks.**

## Part – A- Short Answer Type

1. (a) Write the importance of Environmental Studies?
   (b) Enlist the renewable and non-renewable resources?
   (c) Mention the causes of marine pollution?
   (d) What are the sources of Solid waste generation in residential areas?
   (e) What do you mean by Sustainability?
   (f) Give a list of all ISO standards related to Industrial Safety?

## Part – B- Long Answer Type

### Unit – 1

2. (a) Write the need for the awareness of environmental studies programme?
   (b) Discuss the role of an individual in conservation of natural resources?

**OR**

3. (a) Describe the impact of human activities on water resources? List the benefits of a Dam?
   (b) Write a short note on Water Shed management?

### Unit-2

4. Explain the causes of Air pollution? Mention the main features of Air (Prevention & Control of pollution) Act?

**OR**

5. Describe the causes, effects and control measures of Solid waste generation in Industry?

### Unit – 3

6. (a) Give a brief description of pillars of sustainability?
   (b) How, population growth impact environment? Explain.

**OR**

7. (a) Discuss any two models of sustainability?
   (b) Explain the goals of sustain development?

### Unit - 4

8. (a) Elaborate the objectives of Industrial safety management?
   (b) What do you mean by Risk Assessment? Describe.

**OR**

9. Write short notes on – (i) EMS (ii) OSHA