

# INSTITUTE OF SCIENCE & TECHNOLOGY

## ASSIGNMENT QUESTIONS FOR EVEN SEM 2026

### B.TECH-2ND SEM-CSE-THEORY

**PAPER NAME: CHEMISTRY-I**

**PAPER CODE : BS-CH 201**

1. Draw the Band Structure of Solids and the Role of Doping on Band Structures.
2. Describe on Fluorescence and its applications in medicine.
3. Write the variations of s, p, d and f orbital energies of atoms in the periodic table.
4. Write down the synthesis of a commonly used drug molecule. (Any three).
5. Distinguish the ranges of electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
6. Describe major chemical reactions : a) Substitution reaction b) Elimination reaction c) Cyclization reaction

**PAPER NAME: MATHEMATICS IIA**

**PAPER CODE: BS-M 201**

1. Two urns contain respectively 5 white, 7 black balls, and 4 white and 2 black balls. One of the urns is selected by the toss of a fair coin and then 2 balls are drawn without replacement from the selected urn. If both balls drawn are white, what is the probability that the first urn is selected?
2. The chance that a doctor will diagnose a certain disease correctly is 60%. The chance that a patient will die by his treatment after correct diagnosis is 40% and the chance of death by wrong diagnosis is 70%. A patient of the doctor who had the disease dies. What is the probability that the disease was diagnosed correctly?.
3. A speaks the truth 8 times out of 10 times. A die is thrown. He speaks that it was 5. What is the probability that it was actually 5?.
4. Two events A and B are such that  $P(A) = 0.5$ ,  $P(B) = 0.3$  and  $P(A \cap B) = 0.1$ . Calculate
5. (a)  $P(A|B)$  (b)  $P(B|A)$  (c)  $P(A|A \cup B)$ ; (d)  $P(A|A \cap B)$ ; (e)  $P(A \cap B|A \cup B)$ .
6. Show that  $p(AB) \geq P(A) + P(B) - 1$ .
7. State and prove Baye's theorem.

**PAPER NAME: PROGRAMING FOR PROBLEM SOLVING**

**PAPER CODE: ES-CS 201**

1. What are the different types of operators in C? Explain with examples..
2. Explain the concept of pointers in C. Write a program to swap two numbers using pointers.
3. Write a C program to check whether a given number is prime or not using functions.
4. Discuss different string handling functions in C with examples.
5. Write a C program to find the sum and average of elements in an array.
6. Write a C program to check whether a given number is prime or not using functions.

**PAPER NAME: ENGLISH**

**PAPER CODE: HM-HU 201**

1. What are Compounding & Back formation? Give examples.
2. Write short note on i) Blending ii) Clipping
3. What are Redundancies?
4. Suppose you are the administrative head of an educational institution. Write a proposal to the Board of Directors requesting to provide financial aid for setting up language labs in the college.
5. Write a job application to the H.R. of an MNC for the post of "Junior Engineer". Provide your resume with all academic records and experiences if any.
6. Write an essay on i) Books are our best friends ii) Pleasures of reading.
7. Do as directed:-
  - i) I shall comply .....your request. (Insert preposition)
  - ii) He absented from the meeting. (Correct & rewrite)

- iii) The man proposes but the God disposes. (Correct & rewrite)
  - iv) He is too weak to stand. (Turn into complex sentence)
  - v) As soon as he got the news, he left. (Turn into compound sentence)
8. Use Prefix/Suffix for the following as applicable
9. i) understand    ii) Accept    iii) Self    iv) Build    v) Tell

## **B.TECH-2ND SEM-CSE-PRACTICAL**

**PAPER NAME: CHEMISTRY -I LAB**

**PAPER CODE: BS-CH 291**

1. Write something about Thin Layer Chromatography.
2. Explain Surface Tension and Viscosity.
3. Discuss about dissolved oxygen present in a water sample.

## **PAPER NAME: PROGRAMING FOR PROBLEM SOLVING LAB**

**PAPER CODE: ES-CS 291**

1. Write a C program to check whether a given number is even or odd.
2. Write a C program to find the largest and smallest elements in an array.
3. Write a C program to reverse a given number using a loop.
4. Write a C program to find the sum of digits of a given number.
5. Write a C program to count the number of vowels and consonants in a string.
6. Write a C program to find the factorial of a number using recursion.

## **PAPER NAME: ENGINEERING GRAPHICS & DESIGN**

**PAPER CODE: ES-ME291**

1. A room of building of 1000 m<sup>3</sup> volume is represented by a similar block of 125 cm<sup>3</sup> volume. Find the R.F. and construct a plain scale to measure up to 30m. Measure a distance of 24 m on the scale.
2. Draw the projections of regular hexagon of 30 mm side, having one of its sides in the H.P. and inclined at 60° to V.P. and its surface making angle of 45° with H.P. .
3. Construct an ellipse by four centre method having major axis 100 mm and minor axis 70 mm.
4. Construct a regular Heptagon about a circle of 100 mm diameter.

## **PAPER NAME: LANGUAGE LABORATORY**

**PAPER CODE: HM-HU291**

1. Write few lines about your Career Objective.
2. What are the main ideas for a successful Group Discussion (G.D.)?
3. Write in favour and against of "E learning : A substitute for classroom learning."

## **B.TECH-4TH SEM-CSE-THEORY**

**PAPER NAME: DISCRETE MATHEMATICS**

**PAPER CODE: PCC-CS 401**

1. Prove that any group of order 15 is cyclic
2. Prove that a simple graph with n vertices and k components can have at most  $\frac{1}{2(n-k)(n-k+1)}$  edges.
3. Prove by mathematical induction  $2^{2^n} - 1$  is always divisible by 7 for  $n \in \mathbb{N}$
4. What is De Morgan's Law in propositional logic? Provide both forms of the law.
5. In a ring R if  $x^3 = x$  for all  $x \in R$ , then show that R is commutative.
6. In a survey of 200 people:

- a. 120 like pizza. 100 like burgers. 80 like tacos. 60 like both pizza and burgers. 40 like both burgers and tacos. 30 like both pizza and tacos. 20 like all three: pizza, burgers, and tacos.
- b. How many people like at least one of these three foods?

**PAPER NAME: COMPUTER ARCHITECTURE**  
**PAPER CODE: PCC-CS 402**

1. Explain the Von Neumann and Harvard architectures with a neat diagram.
2. Discuss the different types of addressing modes in a processor with examples.
3. What is pipelining? Explain its types and hazards in detail.
4. Compare RISC vs CISC architectures with advantages and disadvantages.
5. Explain the working of instruction execution cycle with a flowchart.
6. Discuss the role of cache memory and explain different cache mapping techniques

**PAPER NAME: FORMAL LANGUAGE & AUTOMATA THEORY**  
**PAPER CODE: PCC-CS 403**

1. Explain Moore and Mealy Machines with a proper example.
2. Describe the steps to convert an NFA to an equivalent DFA with an example.
3. Explain Minimization of a DFA using state equivalence methods.
4. What are Regular Expressions? Convert the Regular Expression  $(0+1)^*01(0+1)^*$  into an equivalent NFA.
5. Discuss Chomsky Normal Form (CNF) and convert the grammar  $S \rightarrow aSb \mid ab$  into CNF.
6. What is Pushdown Automata (PDA)? Construct a PDA for the language  $\{a^n b^n \mid n \geq 0\}$ .

**PAPER NAME: DESIGN & ANALYSIS OF ALGORITHMS**  
**PAPER CODE: PCC-CS 404**

1. Write the definition and impact of Greenhouse Gases.
2. Write the definition of pollutants and what is primary and secondary pollutants.
3. Write the structure & function of Desert ecosystem.
4. Write the Water pollution due to the toxic elements and their biochemical effects.
5. Write the effects of noise pollution.
6. What is Eutrophication and write its causes?

**PAPER NAME: BIOLOGY**  
**PAPER CODE: BSC 401**

1. Which Ions are called Zwitterions? Write the different types of protein.
2. Write the difference between nucleoside and nucleotide. Give some examples of nucleotide.
3. Explain the mechanism of enzyme action.
4. Give the characteristics of Genetic Codon.
5. Write the steps of Glycolysis process.
6. Explain the two stages of Photosynthesis.

**PAPER NAME: ENVIRONMENTAL SCIENCES**  
**PAPER CODE: MC401**

1. Write the definition and impact of Greenhouse Gases.
2. Write the definition of pollutants and what is primary and secondary pollutants.
3. Write the structure & function of Desert ecosystem.
4. Write the Water pollution due to the toxic elements and their biochemical effects.
5. Write the effects of noise pollution.
6. What is Eutrophication and write its causes?

**B.TECH-4TH SEM-CSE-PRACTICAL**  
**PAPER NAME: COMPUTER ARCHITECTURE LAB**  
**PAPER CODE: PCC-CS 492**

1. Write a program to implement addition and subtraction of binary numbers.
2. Implement a multiplication algorithm for signed binary numbers using Booth's Algorithm.
3. Simulate a 4-bit ALU that can perform AND, OR, ADD, and SUBTRACT operations.
4. Write a program to convert a decimal number to IEEE 754 floating-point representation.
5. Implement a cache memory mapping technique (Direct, Associative, Set-Associative).
6. Simulate the working of a simple instruction pipeline with different stages.

**PAPER NAME: DESIGN & ANALYSIS OF ALGORITHMS LAB**  
**PAPER CODE: PCC-CS 494**

1. Implement Insertion Sort, Bubble Sort, and Selection Sort and compare their time complexities.
2. Write a program for Merge Sort and Quick Sort and compare their performance.
3. Implement Binary Search and Linear Search and compare their execution time.
4. Implement Dijkstra's Algorithm to find the shortest path in a weighted graph.
5. Write a program to implement Floyd-Warshall Algorithm for all-pairs shortest path.
6. Implement Knapsack Problem using Dynamic Programming.

**B.TECH-4TH SEM-CE-THEORY**  
**PAPER NAME: INTRODUCTION TO FLUID MECHANICS**  
**PAPER CODE: CE(ES) 401**

1. Define viscosity, surface tension, and capillarity. Explain their significance in fluid mechanics with real-life examples.
2. Discuss the stability of submerged and floating bodies. Explain the concept of metacentric height and how it affects the stability of ships and submarines.
3. Derive the Bernoulli equation from Euler's equation of motion and state the assumptions involved. Discuss at least two practical applications of Bernoulli's theorem.
4. A venturimeter is installed in a horizontal pipeline to measure the flow rate of water. The diameter at the inlet is **200 mm**, and the throat diameter is **100 mm**. The pressure difference between the inlet and throat is **3 kPa**. If the coefficient of discharge ( $C_d$ ) is **0.98**, determine the discharge of water in the pipeline.
5. Explain the Buckingham  $\pi$  theorem and demonstrate its application in solving a fluid mechanics problem using dimensional analysis.
6. Explain the concept of equivalent pipes. Derive an expression for an equivalent pipe that replaces multiple pipes in series and parallel. Also, discuss how this concept is used in water distribution networks.

**PAPER NAME: INTRODUCTION TO SOLID MECHANICS**  
**PAPER CODE: CE(ES) 402**

1. Explain the basic concepts of stress and strain. Discuss the significance of Hooke's Law and Poisson's ratio in material deformation.
2. Derive the flexure formula for a symmetric beam bending and explain its application. Also, discuss the bending and shear stress distribution in a rectangular beam section.
3. A cantilever beam of length 3m carries a uniformly distributed load of 5 kN/m. Determine the deflection at the free end using the moment curvature relationship.
4. Discuss the method of sections for analyzing determinate plane trusses. Solve for the forces in the members of a simple truss using this method.
5. Explain Mohr's circle for stress analysis. Determine the principal stresses and maximum shear stress for a material subjected to 50 MPa tensile stress in the x-direction and 30 MPa compressive stress in the y-direction.
6. Discuss Euler's buckling theory for columns. Derive the Euler's formula and explain its limitations for practical applications.

**PAPER NAME: SOIL MECHANICS-I**

**PAPER CODE: CE(PC) 401**

1. Explain the significance of soil formation and the different types of soil classification.
2. Derive the basic weight-volume relationship for a three-phase soil system and explain its engineering importance.
3. Discuss the various methods for determining the permeability of soil. Compare the Constant Head and Falling Head permeability tests.
4. Explain the concept of seepage analysis in soils. Describe the role of Laplace's equation and flow nets in solving seepage problems.
5. A point load of 50 kN is applied at the ground surface. Calculate the vertical stress at a depth of 3m directly below the load using Boussinesq's equation.
6. Discuss the Mohr-Coulomb failure criterion for soil shear strength. How is the shear strength of soil determined in the laboratory?

**PAPER NAME: ENVIRONMENTAL ENGINEERING - I**

**PAPER CODE: CE(PC) 402**

1. Explain the different types of water demand and the factors affecting them.
2. Discuss various sources of water. Compare surface water and groundwater in terms of availability, quality, and sustainability.
3. Describe the physical, chemical, and biological parameters of water quality. Explain the importance of BIS, WHO, and USEPA standards in drinking water quality assessment.
4. Draw a typical flowchart for surface and groundwater treatment. Explain different unit operations involved in water treatment.
5. A city has a present population of 5,00,000 and is expected to grow at an annual rate of 2.5%. Calculate the projected population after 20 years using the geometric increase method.
6. Discuss the engineered systems for municipal solid waste (MSW) management, including methods of reuse, recycling, energy recovery, and disposal.

**PAPER NAME: SURVEYING AND GEOMATICS**

**PAPER CODE: CE(PC) 403**

1. Explain the principles and classification of surveying. Discuss different types of errors in chain surveying and their impact on measurements.
2. Describe the principles of leveling. Explain the concept of differential leveling with suitable numerical examples.
3. What are the different types of EDM instruments used in advanced surveying? Explain the working principle and applications of the Total Station.
4. Discuss the concept of photogrammetric surveying. Explain stereoscopic vision, parallax, and relief displacement in aerial photogrammetry.
5. A theodolite is set up at a station, and the following horizontal angles are observed:  
Angle A =  $42^{\circ}30'$   
Angle B =  $67^{\circ}15'$   
Angle C =  $70^{\circ}45'$   
If the sum of the three angles should be  $180^{\circ}$  in a closed traverse, calculate the error in measurement and suggest possible corrections.
6. Discuss the role of geomatics in civil engineering. Explain how remote sensing and GIS applications contribute to urban planning and disaster management.

**PAPER NAME: CONCRETE TECHNOLOGY**

**PAPER CODE: CE(PC) 404**

1. Explain the manufacturing process of cement. Discuss the composition and role of different oxides in cement properties.
2. Describe the classification and physical properties of aggregates. Discuss the importance of sieve analysis, fineness modulus, and specific gravity in concrete mix design.

3. What is workability of fresh concrete? Discuss the factors affecting workability and compare different workability tests such as slump test, vee-bee test, and compacting factor test.
4. Explain the properties of hardened concrete, including compressive strength, tensile strength, stress-strain characteristics, and modulus of elasticity. Discuss the impact of creep and shrinkage on concrete structures.
5. A concrete mix has a water-cement ratio of 0.45, and the weight of cement used is 350 kg/m<sup>3</sup>. Determine the amount of water required per cubic meter of concrete.
6. Discuss the principles and applications of non-destructive testing methods in concrete structures. Explain the rebound hammer and ultrasonic pulse velocity methods for assessing concrete quality.

**PAPER NAME: CIVIL ENGINEERING- SOCIETAL & GLOBAL IMPACT**  
**PAPER CODE: CE(HS) 401**

1. Discuss the impact of global warming and steady erosion on sustainability in civil engineering. What measures can be taken to mitigate these effects?
2. Explain the importance of Civil Engineering in shaping and impacting the world. Provide examples of ancient and modern marvels that showcase the evolution of civil engineering.
3. Describe futuristic transportation systems such as Hyperloop and underground sea tunnels. How do these innovations contribute to sustainability and efficiency?
4. Discuss various water purification and wastewater treatment techniques. How do multi-purpose water projects contribute to environmental sustainability?
5. Define the concept of "Intelligent Smart Buildings." How do energy-efficient built environments and security systems contribute to sustainability in civil engineering?
6. Explain the role of Civil Engineering in GDP contribution. How does employment generation in civil engineering projects help in economic growth and sustainable development?

**B.TECH-4TH SEM-CE-PRACTICAL**  
**PAPER NAME: FLUID MECHANICS LABORATORY**  
**PAPER CODE: CE(ES) 491**

1. Explain the procedure for the calibration of a notch and an orifice meter. Discuss the importance of these calibrations in fluid flow measurements and compare their applications.
2. Describe the working principle of a centrifugal pump and a reciprocating pump. Conduct a comparative analysis of their performance characteristics, advantages, and limitations in practical applications.
3. Derive the expression for minor losses in pipes due to sudden enlargement and sudden contraction. Explain how these losses affect fluid flow efficiency and suggest methods to minimize them in pipeline systems.

**PAPER NAME: SOLID MECHANICS LABORATORY**  
**PAPER CODE: CE(ES) 492**

1. **Explain the procedure and significance of the tension test on structural materials.** Discuss the stress-strain behavior of mild steel and HYSD bars and compare their mechanical properties.
2. **Describe the working principle of Brinell and Rockwell hardness tests.** How do these tests help in determining the mechanical properties of ferrous and non-ferrous metals? Provide a comparative analysis of both methods.
3. **Derive the equation for the torsion of a circular bar and explain the significance of the torsion test.** Discuss the effect of torsional stress on mild steel and its applications in structural engineering.

**PAPER NAME: ENGINEERING GEOLOGY LABORATORY**

**PAPER CODE: CE(ES) 493**

1. **Describe the classification of rocks based on their origin.** Discuss the key characteristics and identification methods for igneous, sedimentary, and metamorphic rocks in hand specimens.
2. **Explain the significance of geological structures in engineering applications.** Discuss the interpretation of geological maps, including horizontal, vertical, folded, and faulted structures, and their relevance in construction projects.
3. **What are the different types of crystal systems?** Explain with the help of crystal models how crystal structures influence the physical properties of minerals.

**PAPER NAME: SURVEYING & GEOMATICS LABORATORY**

**PAPER CODE: CE(PC) 493**

1. **Explain the procedure of conducting a traverse survey using a prismatic compass.** Discuss the computation, error checks, field book preparation, and plotting of the traverse. Also, list the common sources of errors in this method.
2. **Describe the working principle of a Total Station and its applications in surveying.** Explain the process of traversing and leveling using a Total Station and compare its advantages over traditional surveying instruments.
3. **What is digital image classification in remote sensing?** Discuss the different classification techniques used for image analysis and explain how accuracy assessment is performed in digital image classification.

**PAPER NAME: CONCRETE TECHNOLOGY LABORATORY**

**PAPER CODE: CE(PC) 494**

1. **Explain the different tests conducted on fine and coarse aggregates.** Discuss the significance of specific gravity, bulk density, percentage voids, and fineness modulus in determining the quality of aggregates.
2. **Describe the process of concrete mix design.** Explain the various workability tests performed on fresh concrete, including slump test, compacting factor test, and Vee-Bee test, along with their importance in practical applications.
3. **What are the different strength tests performed on hardened concrete?** Explain the split-tensile strength test, flexure test, and non-destructive testing (NDT) methods such as the rebound hammer and ultrasonic pulse velocity test. Discuss their applications in assessing concrete quality.

**B.TECH-4TH SEM-ME-THEORY**

**PAPER NAME: MATERIALS ENGINEERING**

**PAPER CODE: ESME401**

1. Explain the various purpose of heat treatment. What are various method of heat treatment of steel
2. What is re-crystallization? Define re-crystalline temperature. Differentiate between hot and cold working.
3. Describe the method of improving the machinability. Explain the term creep and fatigue.
4. Draw the iron carbon diagram and explain.
5. What is powder metallurgy ? Why it is necessary to use lubricants in the press compacting of powders ? State the advantages and disadvantages of powder metallurgy.
6. Write short notes on the following: (i) ultrasonic test (ii) Nitriding (iii) Cyaniding (iv) Induction Hardening (v) radiography test
7. What is corrosion? Explain the different mechanism of corrosion. Discuss the method of preventing corrosion
8. Describe with neat sketch of one common method used for forming plastic sheets.
9. State the thermoplastic & thermosetting plastic.
10. Characteristic and application of ferrous materials and nonferrous material.
11. Classify carbon steel and their uses.
12. What is stainless steel? Classify the difference types of stainless steel with their properties and application.
13. Write the short notes on (a) Free cutting steels and (b) Spring steels.
14. Describe the process of steel making by open hearth process.

**PAPER NAME: APPLIED THERMODYNAMICS**

**PAPER CODE: PCME401**

1. Explain briefly Otto cycle with the help of p-v and T-S diagram, and derive an expression for ideal efficiency of Otto cycle.
2. Explain briefly Diesel cycle with the help of p-v and T-S diagram, and derive an expression for ideal efficiency of Diesel cycle.
3. What do you understand by the term 'psychrometry'.
4. Define the following: specific humidity, DPT, WBT and absolute humidity.
5. Show Rankine cycle on p-v and T-S diagram and explain the processes involved.
6. Derive the expression for the work done when compression is isothermal and isentropic for reciprocating compressor.
7. In an Otto cycle, the temperature at the beginning and end of the isentropic compression is 316 K and 596 K respectively. Determine the air standard efficiency and the compression ratio.

**PAPER NAME: FLUID MECHANICS & FLUID MACHINES**

**PAPER CODE: PCME402**

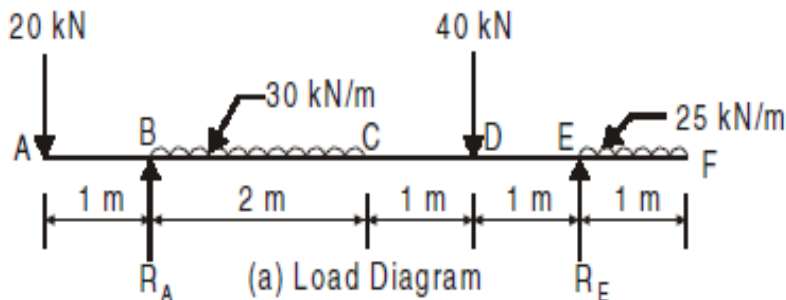
1. The rate of flow of water through a horizontal pipe is  $0.25 \text{ m}^3/\text{s}$ . The diameter of the pipe which is 200 mm is suddenly enlarged to 400mm. The pressure intensity of the smaller pipe is  $11.79 \text{ N/cm}^2$ ,  
Determine: (i) loss of head due to sudden enlargement  
(ii) Pressure intensity of larger pipe  
(iii) Power lost due to enlargement
2. Deduce the Hagen-Poiseuille equation for steady, laminar, fully-developed incompressible flow through a circular pipe in the form  $Q = \frac{\pi D^4 \Delta P}{128 \mu L}$ .
3. (a) What do you mean by similitude & what are the different types of similarities that must exist between a model & prototype.  
(b) State Buckingham's  $\pi$  theorem.  
(c) The efficiency  $\eta$  of a fan depends on density  $\rho$ , dynamic viscosity  $\mu$  of the fluid, angular velocity  $\omega$ , diameter  $D$  of the rotor & the discharge  $Q$ .  
Express  $\eta$  in terms of dimensionless parameter.
4. Prove that for most economical rectangular channel section,  
(i) Depth of flow = Half of bottom width.  
(ii) Hydraulic radius = Half the depth of flow.
5. (a) State the working principle of a Pelton wheel.  
(b) Derive the expression of discharge through a rectangular weir.  
(c) Write a short note on Francis turbine.
6. A Kaplan turbine develops a shaft power of 24650 kW at an average head of 39m. Assuming a speed ratio of 2, Flow ratio 0.6, diameter of the boss equal to 0.35 times the diameter of the runner & an overall efficiency of 90%. Calculate the diameter, speed & specific speed of the runner.
7. A centrifugal pump having an overall efficiency of 70% delivers water  $1500 \text{ l/m}$  through a pipe 12 cm diameter & 100m long. Calculate the power required to drive the pump if its lift water to height of 22m. The coefficient of friction for the pipe may be taken as 0.01.
8. Define displacement thickness & momentum thickness in boundary layer flow.

**PAPER NAME: STRENGTH OF MATERIALS**

**PAPER CODE: PCME403**

1. What is modulus of section? A rectangular beam, simply supported over a span of 4m, is carrying a uniformly distributed load of 60 kN/m. Find the dimension of the beam, if depth of the beam section is 3.5 times its width. Take maximum bending stress in the beam section as 75 Mpa.
2. Prove that a hollow shaft can withstand higher torque than a solid shaft of same length and weight if the two shafts are the same material.
3. Determine the diameter of solid shaft which transmits 740 kW at 350 rpm. The angle of twist must not exceed one degree per meter length and the maximum torsional shear stress is to be limited to  $55 \text{ N/mm}^2$ . Assume  $G = 84 \text{ kN/mm}^2$ .
4. Derive the equation for strain energy stored in a body due to shear stress.

- a weight of 2600N is dropped on a closely helical spring consisting of 60 turns. find the height by which the weight is dropped before by striking the spring so that the spring may be compressed by 220mm and diameter of spring wire is 30mm
- A closed helical spring has stiffness of 10N/mm. it's when fully compressed, with adjacent coils touching each other is 400mm. The modulus of rigidity of the materials of the spring is  $8 \times 10^4 \text{ N/mm}^2$
- What is the corresponding maximum shear stress in the spring?
- Derive an expression for the critical load in a long column when one end is fixed and other end free.
- Draw BM and SF diagrams for the beam shown in Fig. indicating the values at all salient points and maximum bending moment also show the point of contra flexure



**PAPER NAME: METROLOGY AND INSTRUMENTATION**  
**PAPER CODE: PCME404**

- Describe with sketch the construction and use of gear tooth vernier caliper. How is the gear tooth thickness at PCD measured? Explain piezo-electric crystal type microphone with suitable diagram.
- What is an effective diameter of threads? State its significance. Explain with sketch Measurement of effective diameter by two wire method stating limitation
- In the measurement of surface roughness, height of 20 successive peaks and valleys measured from a datum are as follows 45, 25, 40, 25, 35, 16, 40, 22, 25, 34, 25, 40, 20, 36, 28, 18, 20, 25, 30, 38. If these measurements were made over a length of 20mm, determine C.L.A and R.M.S value of these.
- Show that the gauge factor  $F$  of a resistance strain gauge is given by
- $F = 1 + 2\mu + \{(\delta\rho/\rho)/(\delta L/L)\}$
- Where  $\mu$  is Poisson's ratio,  $\rho$  is the resistivity of the material of wire of strain gauge, and  $L$  is the length of the wire.
- What is comparator? Explain its used and essential parts.
- A strain gauge is bonded to a beam which is 12cm long and has a cross sectional area of  $3.8 \text{ cm}^2$ . The unstrained resistance and gauge factor are  $220\Omega$  and 2.2 respectively. On the application of load the resistance of the gauge change by  $0.015\Omega$ . If the modulus of elasticity for steel is  $207 \text{ GN/m}^2$ . Calculate
  - The change in length of the steel beam.
  - The amount of applied force to the beam.
- What do you mean by MML and LML?
- A 200mm sine bar is to set to an angle of  $32^\circ 5' 6''$ . Find the length of gauge block required using any appropriate set of gauge block.
- List and explain with neat sketch types of expansion thermometer stating application.
- The following 10 observations in degree Celsius were recorded when measuring a temperature 41.7, 42.0, 41.8, 42.00, 42.1, 41.9, 42.0, 41.9, 42.5, and 41.8. Calculate (a) arithmetic mean, (b) standard deviations, (c) probable error of one reading, (d) probable error of mean, (e) range
  - Differentiate between the "Threshold" and "Resolution" giving suitable examples.
  - What is drift? Explain different types of drifts with sketches of input-output relationships in case.
- Draw block diagram of a closed loop system. Give an example of closed loop system. What are the advantages and disadvantages of closed loop system?
- Write down the principle of magnetic pick-up type tachometer with the help of neat sketch. States its advantages.
- Describe with neat sketch International prototype meter (Material length standard) stating material composition and limitation.
- Explain with a neat sketch the working principle of an electromagnetic flow meter.



**B.TECH-4TH SEM-EE-THEORY**  
**PAPER NAME: ELECTRIC MACHINE-I**  
**PAPER CODE: PC-EE 401**

1. Explain the construction and working principle of a DC generator.
2. Derive the EMF equation of a DC generator.
3. What are the different types of DC motors? Explain any one type in detail.
4. Explain the significance of back EMF in a DC motor
5. Explain the working principle of a transformer.
6. Derive the EMF equation of a transformer.
7. What are no-load and load conditions in a transformer? Explain with phasor diagrams.
8. Explain the equivalent circuit of a transformer and its components.

**PAPER NAME: DIGITAL ELECTRONIC**  
**PAPER CODE: PC-EE 402**

1. Briefly explain the difference between the Binary, octal and decimal number system.
2. What do you mean by Efficiency of Rectification of Bridge Rectifier?
3. What is the difference between Analog signal and Digital signal?
4. Draw & Explain the circuit diagram of Flash type AD converter.
5. What do you mean by DAC & ADC?
6. Briefly explain the De-Morgan's Theorem in Digital Electronics
7. Briefly explain the operation of P-N Junction diode.
8. What do you mean by – Doping of the Semiconductor?
9. Explain Zener Breakdown & Avalanche Breakdown?
10. Briefly Explain on Digital Signal & its characteristics.

**PAPER NAME: ELECTRICAL AND ELECTRONICS MEASUREMENT**  
**PAPER CODE: PC-EE 403**

1. Why secondary of C.T should not be open?
2. With neat figure explain the working of an ac potentiometer..
3. Explain type of errors in Electrical measurement.
4. How do you measure current and voltage using potentiometer?.
5. Explain the difference between Dynamometer type wattmeter and induction type wattmeter.
6. Draw the circuit diagram of a Wheatstone bridge and derive the conditions for balance.
7. What are the limitation of dual beam CRO?
8. Difference between potential transformer & current transformer.
9. Explain how insulation resistance of a cable can be measured with a help of Loss of charge method?.
10. Derive the balance equation for AC bridges.

**PAPER NAME: THERMAL POWER ENGINEERING**  
**PAPER CODE: ES-EE 401**

1. What is difference between SI engine and CI engine?
2. Derive the efficiency of Otto cycle with P-V and T-S diagram.
3. Derive the efficiency of Diesel cycle with P-V and T-S diagram.
4. Write down the fuel characteristic of SI and CI engine.
5. What is the difference between water tube and fire tube boiler?
6. Derive the boiler mounting and accessories in details.
7. What is the significance of draught in boiler practice?
8. A chimney is 28 m high and the temperature of the hot gas in the chimney is 3200C. the temperature of outside air is 230C and the furnace is supplied with 15 kg of air per kg of coal burnt. Calculate draught in mm of water.
9. What is the difference between gas turbine and IC engine.
10. What is the difference between closed gas turbine and open gas turbine.

**PAPER NAME: VALUES AND ETHICS IN PROFESSION**  
**PAPER CODE: HM-EE401**

1. Briefly explain the need of Engineering Ethics.
2. Explain Heinz's Dilemma.
3. What are Engineers' responsibility towards safety and risk for sustainable development?
4. What are the difference between Morals, Values and Ethics?
5. Write a note on Utilitarianism.
6. What are the Principles of Harmony?

**B.TECH-4TH SEM-EE-PRACTICAL**  
**PAPER NAME: ELECTRIC MACHINE-I LABORATORY**  
**PAPER CODE: PC-EE 491**

1. Determination of the characteristics of a separately excited DC generator.
2. Study of methods of speed control of DC motor
3. Determination of the characteristics of a DC motor
4. To determination of speed of DC series motor as a function of load torque
5. Polarity and ratio test of single phase transformers.

**PAPER NAME: DIGITAL ELECTRONICS LABORATORY**  
**PAPER CODE: PC-EE 492**

1. To verify the truth tables for all logic gates – NOT, OR, AND, NAND, NOR, XOR and XNOR using CMOS Logic gates
2. Implement and realize Boolean Expressions with different Logic Gates
3. Implement Half Adder, Full Adder, Half Subtractor and Full subtractor by using different digital ICs
4. Realization of parallel and serial full-adder using ICs (IC- 74LS83)
5. To implement encoder (IC-74147), decoder (IC-74138), multiplexer (IC-74151) and demultiplexer (IC-74138).
6. Construct a Single digit Decade Counter (0-9) with 7 segment display (74LS90)
7. To construct 2 bit parity generator and checker & 2 bit comparator by using logic gates.
8. To verify the Truth Table of SR, D, JK and T Flip-flops ( IC-74LS76)
9. To construct binary synchronous and asynchronous counter.
10. To design programmable up / down counter.

**PAPER NAME: ELECTRICAL AND ELECTRONIC MEASUREMENT LABORATORY**  
**PAPER CODE: PC-EE 493**

1. Measurement of 3-phase reactive power using single wattmeter.
2. Measurement of 3 phase power with 2 wattmeters.
3. Calibration and testing of single phase electronic energy meter.
4. Measurement of low resistance by kelvin's double bridge
5. Measurement of medium resistance wheatstone bridge

**PAPER NAME: THERMAL POWER ENGINEERING LABORATORY**  
**PAPER CODE: ES-ME 491**

1. Study of steam generators (boiler) and turbines.
2. Load test on 4 stroke petrol engine.
3. Load test to find 4 stroke of a diesel engine.
4. Heat balance test on a four – stroke diesel engine.
5. Valve timing diagram for a four stroke diesel engine

## **B.TECH-4TH SEM-EEE-THEORY**

### **PAPER NAME: ELECTRIC MACHINE-I**

#### **PAPER CODE: PC-EEE 401**

1. Explain the construction and working principle of a DC generator.
2. Derive the EMF equation of a DC generator.
3. What are the different types of DC motors? Explain any one type in detail.
4. Explain the significance of back EMF in a DC motor
5. Explain the working principle of a transformer.
6. Derive the EMF equation of a transformer.
7. What are no-load and load conditions in a transformer? Explain with phasor diagrams.
8. Explain the equivalent circuit of a transformer and its components.

### **PAPER NAME: DIGITAL ELECTRONIC**

#### **PAPER CODE: PC-EEE 402**

1. Briefly explain the difference between the Binary, octal and decimal number system.
2. What do you mean by Efficiency of Rectification of Bridge Rectifier?
3. What is the difference between Analog signal and Digital signal?
4. Draw & Explain the circuit diagram of Flash type AD converter.
5. What do you mean by DAC & ADC?
6. Briefly explain the De-Morgan's Theorem in Digital Electronics
7. Briefly explain the operation of P-N Junction diode.
8. What do you mean by – Doping of the Semiconductor?
9. Explain Zener Breakdown & Avalanche Breakdown?
10. Briefly Explain on Digital Signal & its characteristics.

### **PAPER NAME: ELECTRICAL AND ELECTRONICS MEASUREMENT**

#### **PAPER CODE: PC-EEE 403**

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7. What is the significance of draught in boiler practice?
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**PAPER NAME: VALUES AND ETHICS IN PROFESSION**  
**PAPER CODE: HM-EEE 401**

1. Briefly explain the need of Engineering Ethics.
2. Explain Heinz's Dilemma.
3. What are Engineers' responsibility towards safety and risk for sustainable development?
4. What are the difference between Morals, Values and Ethics?
5. Write a note on Utilitarianism.
6. What are the Principles of Harmony?

**B.TECH-4TH SEM-EEE-PRACTICAL**  
**PAPER NAME: ELECTRIC MACHINE-I LABORATORY**  
**PAPER CODE: PC-EEE 491**

1. Determination of the characteristics of a separately excited DC generator.
2. Study of methods of speed control of DC motor
3. Determination of the characteristics of a DC motor
4. To determination of speed of DC series motor as a function of load torque
5. Polarity and ratio test of single phase transformers.

**PAPER NAME: DIGITAL ELECTRONICS LABORATORY**  
**PAPER CODE: PC-EEE 492**

1. To verify the truth tables for all logic gates – NOT, OR, AND, NAND, NOR, XOR and XNOR using CMOS Logic gates
2. Implement and realize Boolean Expressions with different Logic Gates
3. Implement Half Adder, Full Adder, Half Subtractor and Full subtractor by using different digital ICs
4. Realization of parallel and serial full-adder using ICs (IC- 74LS83)
5. To implement encoder (IC-74147), decoder (IC-74138), multiplexer (IC-74151) and demultiplexer (IC-74138).
6. Construct a Single digit Decade Counter (0-9) with 7 segment display (74LS90)
7. To construct 2 bit parity generator and checker & 2 bit comparator by using logic gates.
8. To verify the Truth Table of SR, D, JK and T Flip-flops ( IC-74LS76)
9. To construct binary synchronous and asynchronous counter.
10. To design programmable up / down counter.

**PAPER NAME: ELECTRICAL AND ELECTRONIC MEASUREMENT LABORATORY**  
**PAPER CODE: PC-EEE 493**

1. Measurement of 3-phase reactive power using single wattmeter.
2. Measurement of 3 phases power with 2 wattmeters.
3. Calibration and testing of single phase electronic energy meter.
4. Measurement of low resistance by kelvin's double bridge
5. Measurement of medium resistance wheatstone bridge

**PAPER NAME: THERMAL POWER ENGINEERING LABORATORY**  
**PAPER CODE: ES-ME 491**

1. Study of steam generators (boiler) and turbines.
2. Load test on 4 stroke petrol engine.
3. Load test to find 4 stroke of a diesel engine.
4. Heat balance test on a four – stroke diesel engine.
5. Valve timing diagram for a four stroke diesel engine

**B.TECH-4TH SEM-ECE-THEORY**  
**PAPER NAME: ANALOG COMMUNICATION**  
**PAPER CODE: EC-401**

1. Define FM and draw its frequency spectrum.
2. Define the Elements of communication system.
3. Explain White noise, thermal noise & Figure of Merit.
4. Explain Narrow and Wide-band angle modulation.
5. Compare AM and FM with respect to broadcast band and intermediate frequency.
6. What is PLL?

**PAPER NAME: ANALOG ELECTRONIC CIRCUITS**  
**PAPER CODE: EC-402**

1. Draw the pin diagram of OPAMP & also Explain it,s Applications.
2. What are the Biasing schemes for BJT and FET amplifiers?
3. What is Barkhausen criterion?
4. What are the frequency response of single stage and multistage amplifiers?
5. Describe the operations of a Current mirror & cascade amplifier.
6. Explain-low frequency analysis of multistage amplifiers.

**PAPER NAME: MICROPROCESSOR & MICROCONTROLLERS**  
**PAPER CODE: EC-403**

1. Explain- A/D and D/A converters
2. Explain the Arithmetic coprocessors & System level interfacing design.
3. Discuss the Concepts of virtual memory & Cache memory.
4. Discuss the operation of RISC processors.
5. Explain the interface design of ARM microcontrollers.
6. Explain the Advanced coprocessor architectures- 286, 486.

**PAPER NAME: DESIGN AND ANALYSIS OF ALGORITHMS**  
**PAPER CODE: ES-CS401**

1. Explain the Travelling Salesman Problem (TSP) and its complexity.
2. Explain Dijkstra's algorithm for shortest path with example.
3. Describe Minimum Spanning Tree (MST) and explain Prim's or Kruskal's algorithm.
4. Define P, NP problems with examples.
5. Explain Cook's Theorem and its significance.
6. Explain NP-complete, and NP-hard problems with examples.

**PAPER NAME: NUMERICAL METHODS**  
**PAPER CODE: BS-M-401**

1) Given

X :	1	2	3	4	5	6	7	8
F(x):	1	8	27	64	125	216	343	512

Find i)f(1.5) and ii)f(7.5)

2) Solve the system of equations, by Gauss – elimination method

$$2x_1 + 3x_2 + x_3 = 9$$

$$x_1 + 2x_2 + 3x_3 = 6$$

$$3x_1 + x_2 + 2x_3 = 8$$

3) Approximate the area under the curve  $y = f(x)$  between  $x = 0$  and  $x = 8$  using Trapezoidal Rule with  $n = 4$  subintervals. A function  $f(x)$  is given in the table of values.

x	0	2	4	6	8
f(x)	3	7	11	9	3

- 4) Evaluate  $\int_0^1 e^x dx$ , by Simpson's  $\frac{1}{3}$  rule.  
 5) Write down the Newton's backward Interpolation Formula.  
 6) Solve the system of linear equations by Gauss-Seidel method

$$8x + 2y - 2z$$

$$x - 8y + 3z = -4$$

$$2x + y + 9z = 12$$

**PAPER NAME: BIOLOGY FOR ENGINEERS**  
**PAPER CODE: BS-B-401**

1. Differentiate between prokaryotic and eukaryotic cells based on ultrastructure.
2. Classify organisms based on nitrogenous waste excretion (aminotelic, ureotelic, uricotelic).
3. What are alleles? What is molecular taxonomy and how does it classify life into three domains?
4. What is gene mapping? Compare mitosis and meiosis in terms of genetic significance (not phases).
5. How did observations by Robert Brown lead to the concept of Brownian motion?
6. What is the most exciting aspect of Biology as an independent discipline?
7. What are biomolecules? Differentiate between monosaccharides, disaccharides, and polysaccharides.

**B.TECH-6TH SEM-ECE-PRACTICAL**  
**PAPER NAME: ANALOG COMMUNICATION LAB**  
**PAPER CODE: EC-491**

1. Study of distortion of the demodulated output with varying modulation index of an AM signal (for both DSB-SC & SSB)
2. Design & set up a PLL using VCO & measurement the lock frequency
3. Measurement of modulation index of an AM signal.
4. Super-heterodyne receiver.
5. Innovative experiment
6. Design a FM demodulator using PLL

**PAPER NAME: ANALOG ELECTRONIC CIRCUITS LAB**  
**PAPER CODE: EC-492**

1. Study of waveform at the output of full wave rectifier with & without filter capacitor
2. Study of zener diode as voltage regulator & calculate load regulation
3. Experiment to test diode clamping & clamping circuits
4. study of class B Push pull power amplifier
5. Study and calculate frequency of Wein Bridge Oscillator.

6. Static characteristics of n- channel MOSFET and hence to determine the output resistance and Trans conductance.

**PAPER NAME: MICROPROCESSOR & MICROCONTROLLERS LAB**  
**PAPER CODE: EC-493**

1. Familiarization with 8085 and 8051 Simulators on PC
2. Study of Prewritten Programs Using Basic Instruction Set on 8085 Simulator
3. Programming Tasks Using 8085 Simulator/Kit
4. Subroutine Calls and IN/OUT Instructions with 8255 PPI on Trainer Kit
5. Study of Timing Diagram of an Instruction on Oscilloscope
6. Interfacing 8255: Keyboard and Multi-Digit Display with Multiplexing.

**PAPER NAME: NUMERICAL METHODS LAB**  
**PAPER CODE: BS-M-491**

- 1) Numerical Solution of initial value problem using Gauss Seidel method.
- 2) Numerical solution of central difference interpolation by using Lagrange interpolation method .
- 3) Solution of simultaneous non-linear equations using Newton Raphson Method(Two variables).
- 4) Numerical solution of integrals using Trapezoidal & Simpson's method.
- 5) Prove that the nth order divided difference of a polynomial of degree n is constant.
- 6) Numerical Solution of initial value problem using Euler's & Runge Kutta method.

**PAPER NAME: SOFT SKILL DEVELOPMENT LAB**  
**PAPER CODE: HS-(HU) 481**

1. Presentation skills
2. Etiquette
3. Speaking skills
4. Writing skills
5. Mock Interview

**B. TECH-4TH SEM-AEIE-THEORY**  
**PAPER NAME: ELECTRICAL AND ELECTRONIC MEASUREMENT**  
**PAPER CODE: PC-EI-401**

1. Write a short note on PMMC type instruments.
2. Write a short note on Digital Frequency meter.
3. Explain how temperature can be measured with the use of Thermistor.
4. Shortly explain the working of M.I. type instruments. Write down the advantages & disadvantages of Electrodynamometer type instruments.
5. Explain type of errors in Electrical measurement.
6. Explain the difference between Dynamometer type wattmeter and induction type wattmeter.

**PAPER NAME: INDUSTRIAL INSTRUMENTATION**  
**PAPER CODE: PC-EI-402**

1. What is the Industrial Safety Measurement?
2. Explain working principle of RTD & Thermocouple.
3. Describe different components & types of a Manometer.
4. What are the fundamental features of McLeod Gauge & Thermal conductivity Gauges?
5. Explain the working principle of Electromagnetic & Ultrasonic flow meter.
6. Explain Float Type Level Measurement

**PAPER NAME: MICROPROCESSOR & MICROCONTROLLER**  
**PAPER CODE: PC-EI-403**

1. Explain the Hardware Architecture of 8051 Micro Controller.
2. Explain the I/O Ports & data transfer concepts of 8051 Micro Controller.
3. Discuss the architecture of peripheral interfacing with ICS-8255, 8254, 8251.
4. Explain the Architecture of Intel 8086 Microprocessor
5. Explain the Operations of 8085 processor.
6. Discuss the operation of PUSH and POP Instructions of 8085 Microprocessor

**PAPER NAME: DATA STRUCTURE AND ALGORITHM**  
**PAPER CODE: ES-CS401**

1. Explain the necessity of data structures in computer science.
2. Define data and data structure with suitable examples.
3. What is an Abstract Data Type (ADT)? Differentiate it from a Data Type.
4. Explain algorithm efficiency and discuss time and space complexity.
5. Describe different asymptotic notations (Big-O, Big-Ω, Big-θ) with examples.
6. Explain array representation of polynomials with an example.

**PAPER NAME: BIOLOGY**  
**PAPER CODE: BS-BIO-401**

1. Differentiate between prokaryotic and eukaryotic cells based on ultrastructure.
2. Classify organisms based on nitrogenous waste excretion (aminootelic, ureotelic, uricotelic).
3. What are alleles? What is molecular taxonomy and how does it classify life into three domains?
4. What is gene mapping? Compare mitosis and meiosis in terms of genetic significance (not phases).
5. How did observations by Robert Brown lead to the concept of Brownian motion?
6. What is the most exciting aspect of Biology as an independent discipline?

**PAPER NAME: VALUES AND ETHICS IN PROFESSION**  
**PAPER CODE: HM-HU-401**

1. What is the relationship between ethics and the law?
2. Explain - Whistle blowing & beyond and Energy crisis in Environmental degradation and pollution.
3. Explain the social & Ethical responsibilities of Technologists.
4. What are five unethical behaviours found in the workplace?
5. Give an account of the nature, definition and scope of Ethics.
6. Explain the Assembly line and automation & also define Human centred Technology

## **B.TECH-4TH SEM-AEIE-PRACTICAL**

### **PAPER NAME: ELECTRICAL AND ELECTRONIC MEASUREMENT LAB**

#### **PAPER CODE: PC-EI-491**

1. Measurement of low resistance by Kelvin's double bridge.
2. Calibration & Testing of AC Energy Meter.
3. Measurement of Inductance by Anderson bridge
4. Measurement of medium resistance Wheatstone bridge
5. Measurement of capacitance by Schering Bridge.
6. Use cro for the measurement of frequency, phase angle.

### **PAPER NAME: MICROPROCESSOR & MICROCONTROLLER LAB**

#### **PAPER CODE: PC-EI-492**

1. Familiarization with 8085 Trainer Kit Components
2. Familiarization with 8085 Simulator on PC
3. Study of Prewritten Programs Using Basic Instruction Set on 8085 Simulator
4. Programming Tasks Using 8085 Simulator/Kit
5. Study of 8051 Microcontroller Kit and Programming Tasks
6. Interfacing with I/O Modules Using 8051 Microcontroller.

### **PAPER NAME: DATA STRUCTURE AND ALGORITHM LAB**

#### **PAPER CODE: ES-CS491**

1. Perform Linear or Binary search for search an element from a list
2. Perform sorting using Insertion sort, Bubble sort or Selection sort
3. Linked list operation insertion, deletion and search, reverse the list and concatenate two linked lists
4. Insertion and Deletion operation on circular linked list.
5. Stack operations using Linked List implementation

### **PAPER NAME: ADVANCED LANGUAGE LAB**

#### **PAPER CODE: HM-(HU) 481**

1. Speaking skills
2. Reading skills
3. Write your resume for future career.
4. Discuss the process of Communication Models.
5. Writing skills
6. Mention different types of Communication.