# CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**

**Course Name: Design and Drawing of Steel Structures**
### (Civil Engineering)

| Date: 09.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

**(Note: Assume suitable data if necessary)**

## PART-A
### Answer all TEN questions
### Each question carries TWO marks.                    10x2=20M

| | | |
|---|---|---|
| 1. | Define Plasticity and Yield Strength. | 2 M |
| 2. | What is Local Buckling? | 2 M |
| 3. | Define tension members. | 2 M |
| 4. | Define a built-up section. | 2 M |
| 5. | State the limitations of plastic analysis. | 2 M |
| 6. | Define web crippling. | 2 M |
| 7. | What is an Eccentric connection? | 2 M |
| 8. | Define Web angle. | 2 M |
| 9. | List the various components of plate girder. | 2 M |
| 10. | Define web splice. | 2 M |

## PART-B
### Answer the following. Each question carries TEN Marks.          5x10=50M

11.A). An ISA 65 x 65 x 10 carries a tensile load of 200 kN, applied along its centroidal axis. **10M** This angle is to be welded to a gusset plate. Find out the lengths of side fillet welds required at the heel and toe of the angle.
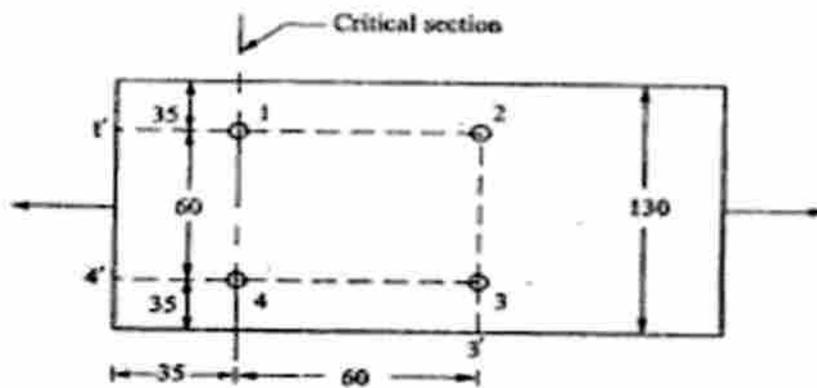
### OR

11. B). Two cover plates, 10mm and 18mm thick are connected by a double cover butt joint using **10M** 6mm cover plates as shown in the fig. Find the strength of the joint. Use M20 bolts of grade 4.6 and Fe 415 plates are used.
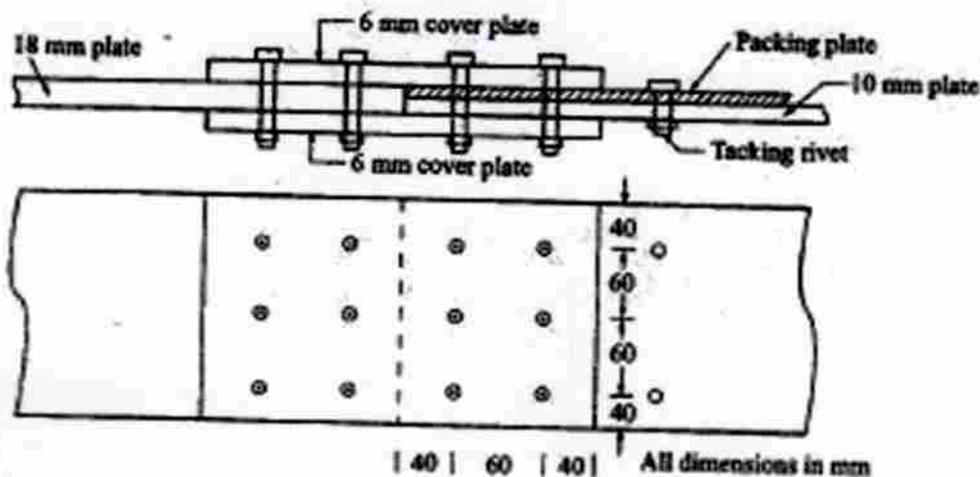


*(P.T.O..)*

12. A).  Solve for the design tensile strength of the plate 130mmx12mm with the holes for 16mm    10M
         diameter bolts as shown. Steel used is of Fe410 grade.



OR

12. B).  A column 4m long has to support a factored load of 6000kN. The column is effectively    10M
         held at both ends and restrained in direction at one of the ends. Design the column using
         beam sections and plates.

13. A).  Explain the procedure for design of purlins.                                          10M

OR

13. B).  Design a simply supported beam of 10m effective span carrying a total factored load of   10M
         60kN/m. The depth of beam should not exceed 500mm. The compression flange of the
         beam is laterally supported by floor construction. Assume stiff end bearing is 75mm.

14. A).  Design the web angle connection for a double angle tension member consisting of 2 ISA   10M
         90 × 60 × 6 mm angles placed back-to-back on either side of a gusset plate. The member
         carries a factored tensile load of 250 kN. The gusset plate is 10 mm thick, and M20 bolts
         of grade 4.6 are used.

OR

14. B).  Design an unstiffened seated beam connection to connect a simply supported ISMB 300   10M
         beam to a column flange using a seat angle and a cleat angle. The beam carries a factored
         reaction of 120 kN at its end.
         Use the following data: Steel grade: Fe 250; Bolts: M20, Grade 4.6; All bolts in single
         shear; The seat angle is welded to the column flange, and the beam rests on the horizontal
         leg of the angle. Assume the depth of beam = 300 mm, width of flange = 140 mm,
         thickness of flange = 10 mm, and thickness of web = 6 mm.

15. A).  Explain in detail about various steps involved in the design of welded plate girders.   10M

OR

15. B).  Design the end bearing stiffeners for a simply supported plate girder carrying a factored   10M
         reaction of 450 kN at each support. The girder has the following cross-section: Web plate:
         1000 mm × 10 mm; Flanges: 2 ISF 300 × 150 × 10 mm; Span of girder = 10 m; Material:
         Fe 250 steel. Check for both bearing and buckling of the stiffeners.

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Foundation Engineering**
### (Civil Engineering)

Date: 10.12.2025 AN                 Time: 3 hours                 Max.Marks: 70

(Note: Assume suitable data if necessary)
### PART-A
**Answer all TEN questions**
**Each question carries TWO marks.**                 **10x2=20M**

| | | |
|---|---|---|
| 1. | Write the formula for the dilatancy correction and overburden correction of the SPT test. | 2 M |
| 2. | What is sampling? List the types of the samplers. | 2 M |
| 3. | List out the types of slope failures with neat sketch. | 2 M |
| 4. | What is the critical height of cohesive soil in dry condition? | 2 M |
| 5. | List various types of retaining walls. | 2 M |
| 6. | How is Coulomb's theory of earth pressure mainly different from Rankine's theory? | 2 M |
| 7. | Differentiate between shallow foundation and the deep foundation. | 2 M |
| 8. | Differentiate between general shear failure and the local shear failure. | 2 M |
| 9. | List the components of well. | 2 M |
| 10. | What is a pile? | 2 M |

### PART-B
**Answer the following. Each question carries TEN Marks.**                 **5x10=50M**

| | | |
|---|---|---|
| 11.A). | i) What is meant by boring? Explain any three types of borings with neat sketches. | 6M |
| | ii) Draw the bore hole log of investigation. | 4M |

**OR**

| | | |
|---|---|---|
| 11. B). | Explain how you would conduct a pressure meter test with a sketch. | 10M |
| 12. A). | Derive an expression for factor of safety of an infinite slope in cohesionless soils. | 10M |

**OR**

12. B). What will be factory of safety with respect to average shearing strength, cohesion and internal friction of a soil, for which the shear strength parameters obtained from the laboratory tests are c $32kN/m^2$ and $\phi$ $18^0$, the expected parameters of mobilized shearing resistance are $c_m$ $21kN/m^2$ and $\phi_m$ $13^0$ and the average effective pressure on the failure plane is $100 kN/m^2$. For the same value of mobilized shearing resistance determine.    10M
(i) Factory safety with respected to height and
(ii) Factory safety with respected to friction when that with respect to cohesion is unity.

13. A). i) Briefly Discuss the principles of the design of retaining walls.    5M
ii) What are the different types of earth pressure? Give examples. Derive an equation for determining the magnitude of earth pressure at rest.    5M

*(P.T.O..)*

<center>OR</center>

13. B).   i) Determine the active pressure on the retaining wall shown in Figure.          5M
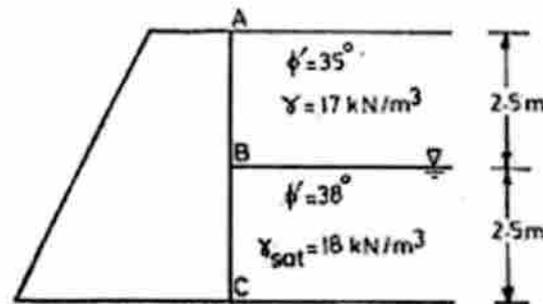


ii) What are the assumptions in Coulomb's theory? Compare Rankine's theory and          5M
Coulomb's theory.

14. A).   A square footing carries a net load of 800kN. The depth of the footing is 1.5m. The     10M
properties of the soil are c=0, $\varphi$=38$^0$, and $\gamma$=18.5kN/m$^3$. Determine the size of the footing
for a factor of safety of 3 against shear failure. What will be the changes in the size of the
footing, if the water table rises to ground level? (for $\varphi$=38$^0$, the $N_c$=52, $N_q$=49 and $N_\gamma$=64).

<center>OR</center>

14. B).   i) What are the different types of shear failures and explain?                 5M
ii) A 2.0m square footing is laid at a depth of 1.3m below the ground surface. Determine     5M
the net ultimate bearing capacity using IS code method. Take $\gamma$=20 kN/m$^3$, $\varphi$'=30$^0$ and
c'=0. (for $\varphi$=30$^0$, the $N_c$=30.14, $N_q$=18.4 and $N_\gamma$=22.4).

15. A).   Explain different types of piles based on material, function and their method of     10M
installation.

<center>OR</center>

15. B).   A group of piles arranged in square pattern 4 in a row with 60 cm diameter is arranged     10M
with a centre to centre spacing of 1.0 m. The piles are 12 m long and are embedded in soft
clay with cohesion 40 kN/m$^2$. Bearing resistance may be neglected for the piles. Adhesion
factor is 0.65. Determine the ultimate load capacity of the pile group.

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Estimation and Costing**

(Civil Engineering)

Date: 19.12.2025 AN                Time: 3 hours                Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**                    **10x2=20M**

| | | |
|---|---|---|
| 1. | Write a note on need for Estimation & Costing. | 2 M |
| 2. | List out the data required to prepare an estimate. | 2 M |
| 3. | Define lead and lift. | 2 M |
| 4. | Calculate the quantity of earthwork by using any one method for 200 meter length for a portion of a road in a uniform ground the heights of banks at the two ends being 1.00 m and 1.60m. The formation width is 10 meters and side slopes 2:1 (H: V). Assume that there is no transverse slope. | 2 M |
| 5. | Enumerate and explain about Overhead costs. | 2 M |
| 6. | Write a short note on task. | 2 M |
| 7. | State the requirements of contract. | 2 M |
| 8. | Draw some common types of reinforcement bars showing their total length. | 2 M |
| 9. | Write the differences between depreciation and obsolescence. | 2 M |
| 10. | Define the terms i) Annuity ii) Capital cost. | 2 M |

**PART-B**

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

11.A). Illustrate the following main items of work:                    10M

i) Earthwork   ii) Soling   iii) Concrete in foundation   iv) Masonry   v) Damp proof course.

**OR**

11. B). Estimate the quantities of following items of a two roomed building given in Fig.                    10M
    i.    Earthwork in excavation in foundation trench
    ii.    Lime concrete in foundation
    iii.    First class brick work in 1:6 cement mortar in foundation and plinth
    iv.    2.5 cm thick DPC (1:2:4) with water proofing compound
    v.    1st class brick work in cement mortar superstructure

**Using Centre line method**

D1=1.2 x 2.1 m W1=1.2 x 1.2m
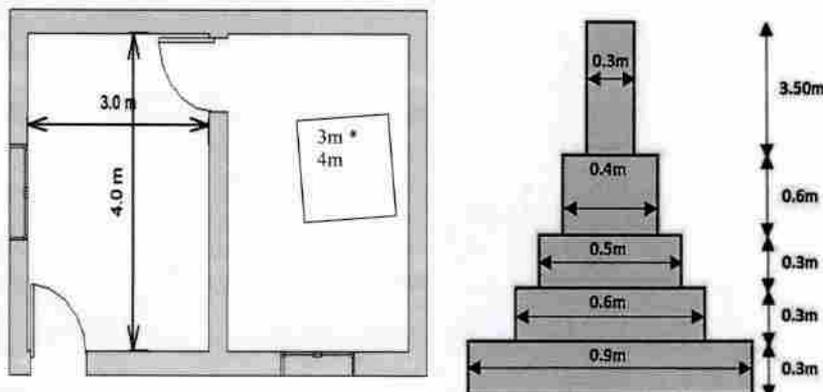


*(P.T.O..)*

12. A). Explain how you estimate the earthwork in canals for the following three cases of canals    10M
cross section. (i) Fully in excavation. (ii) Partly in Excavation and Partly in Embankment.
(iii) Fully in embankment.

**OR**

12. B). Estimate the quantity of earthwork required for 180m length of road in a tabular form by    10M
using standard Prismoidal formula from the following data.

B=10m, S:1 =2:1

| Chainage (m) | 0 | 30 | 60 | 90 | 120 | 150 | 180 |
|---|---|---|---|---|---|---|---|
| R.L. of ground(m) | 112 | 111.8 | 111.70 | 111.60 | 111.50 | 111.30 | 111.40 |
| R.L. of formation(m) | ------------------------112.60 ---------------------- | | | | | | |

13. A). Estimate the Rate Analysis for R.C.C. work in columns1: 2: 4 – unit 1 cu m.    10M

**OR**

13. B). Estimate the Rate Analysis for 12 mm cement plastering in ceiling 1: 3 with coarse    10M
sand – unit 1 sq.m.

14. A). Discuss briefly about contract documents.    10M

**OR**

14. B). A simply supported reinforced concrete (R.C.C.) beam of 6 m span, 300 mm width, and    10M
500 mm effective depth is to carry a superimposed load of 30 kN/m (including self-
weight). The beam is designed using Fe 500 steel and M25 grade concrete.
prepare a comprehensive Bar Bending Schedule (BBS) for one beam, including all
necessary reinforcement details, based on the following design data:
- Main tension reinforcement: 3 bars of 20 mm diameter (bottom)
- Compression (top) reinforcement: 2 bars of 16 mm diameter
- Stirrups: 8 mm diameter two-legged bars @ 150 mm c/c near supports and @ 200
  mm c/c at midspan (assume spacing transition at 1.5 m from each end)
- Nominal cover: 25 mm on all sides.

15. A). An old building has been purchased by a person at a cost of 5,00,000/- excluding the cost    10M
of land. Calculate the amount of annual sinking fund at 5% interest assuming the future
life of the building as 30 years and the scrap value of the building as 12% of the cost of
purchase.

**OR**

15. B). Write specifications for workmanship in RCC and steel structural work.    10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**
(UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
**Course Name: Water Resources Engineering**
(Civil Engineering)
Date: 12.12.2025 AN                Time: 3 hours                Max.Marks: 70

(Note: Assume suitable data if necessary)
**PART-A**
**Answer all TEN questions**
**Each question carries TWO marks.**                    10x2=20M

| | | |
|---|---|---|
| 1. | What are the forms of precipitation? | 2 M |
| 2. | What is theissen polygon method for estimating mean precipitation? | 2 M |
| 3. | What is basin yield? | 2 M |
| 4. | Define hydrograph. | 2 M |
| 5. | Define the term transmissibility. | 2 M |
| 6. | Define specific yield. | 2 M |
| 7. | What are the standards of quality for irrigation water? | 2 M |
| 8. | What is crop rotation? | 2 M |
| 9. | What is the significance of design discharge? | 2 M |
| 10. | State the advantages of canal lining. | 2 M |

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

11.A). Describe the principle and working of a weighing bucket type recording rain gauge with a neat sketch. Mention its advantages and disadvantages.   10M

**OR**

11. B). i) List the factors affecting run-off from catchment area.   5M
ii) State what do you understand by infiltration index.   5M

12. A). Explain about Synthetic hydrograph.   10M

**OR**

12. B). A drainage basin area 650 km 2 has experienced a 6h storm with rainfall intensities of 1.5,1.0, 2 cm/hr respectively in successive periods of 2h each. The percentages of the distribution graphs for storms of 2h duration are 5, 15, 30, 20, 13, 9, 5.5 &amp; 2.5. Determine the ordinates of discharge hydrograph. Assume an Average Ø-index of 0.6 cm/h and base flow as 9cumecs.   10M

13. A). What are the assumptions of Dupuits equation.   10M

**OR**

13. B). (i). List out the assumptions made in the analysis of steady radial flow into well.   3M
(ii) Obtain the expression for steady radial flow in confined aquifer.   7M

*(P.T.O..)*

14. A). Define duty, delta, base period and crop period. Discuss the factors affecting duty.　　10M

**OR**

14. B). After how many days you will supply water to soil in order to ensure efficient irrigation of　10M
the given crop.
If; i) Field capacity of soil = 27%
ii) Permanent wilting point = 14%
iii) Dry density of soil = 15 KN/m 3
iv) Effective root zone depth = 75cm
v) Daily consumptive use of water for the given crop = 11mm.

15. A). Explain about canal outlets and their types with examples.　　10M

**OR**

15. B). Design a trapezoidal shaped concrete lined channel to carry a discharge of 100 cumecs at　10M
a slope of 25 cm/km. The side slope of the channels is 1.5:1. The value of N may be taken
as 0.016. Assume the limiting velocity as 1.5 m/sec.

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# CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
### Course Name: Microprocessors & Microcontrollers
### (Common for EEE & ECE)

| Date: 10.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)
## PART-A
### Answer all TEN questions
**Each question carries TWO marks.**  **10x2=20M**

1. List any four Architectural features of 8086µp.  2 M
2. Evaluate Physical address in 8086 µp, if segment address is 43A9h and offset address is 634Ah.  2 M
3. Define a macro in assembly language of 8086 µp explain with an example.  2 M
4. Evaluate the Value in AX register after executing the following 8086 instructions.  2 M
   MOV AX, 73F9h
   MOV CL,02h
   ROR AX, CL
5. Differentiate between synchronous and asynchronous communication.  2 M
6. Justify the significance of INTR and NMI pins in 8086 µp.  2 M
7. List any four applications of 8051 µc.  2 M
8. Draw the Port3 structure of 8051 µc and explain its operation.  2 M
9. Write the IE register configuration of 8051 µc.  2 M
10. Mention the methods of doubling the baud rate of 8051 µc.  2 M

## PART-B
**Answer the following. Each question carries TEN Marks.**  **5x10=50M**

11.A). i) With suitable timing diagram explain the memory write and memory read timing sequence in minimum mode for 8086 µp.  5M
   ii) Explain the functions and working of EU-Bus Interface unit of 8086 µp.  5M

### OR

11. B). i) Write is the function of the following pins of 8086 µp.  5M
   a) NMI  b) MN/MX'  c) READY  d) DT/R'  e) ALE
   ii) Explain the working of General purpose registers of 8086 µp.  5M

12. A). i) Define an Addressing mode? Explain the Indexed and direct addressing modes of 8086 µp with a suitable example.  5M
   ii) Discuss string manipulation instructions of 8086 µp. Write a program to compare two strings.  5M

### OR

12. B). i) Write a short note on shift instructions of 8086 µp with examples.  5M
   ii) Write a Program to count the number of EVEN and ODD numbers in the given array of 5 elements using 8086 µp.  5M

*(P.T.O..)*

| 13. A). | i) Design a memory interface around 8086µp with two chips of 16KX8 EPROM and two chips of 8KX8 SRAM? Select the address map suitably and draw the interface diagram. | 5M |
|---|---|---|
| | ii) Explain the role of stack in executing Interrupts of 8086 µp and write the steps involved in Interrupt response sequence. | 5M |

**OR**

| 13. B). | i) Explain the architecture of 8255 PPI with a neat diagram. | 5M |
|---|---|---|
| | ii) Discuss about Interfacing keyboard with 8086 µp. | 5M |

| 14. A). | i) Explain the architecture of 8051 µc with a neat diagram. | 5M |
|---|---|---|
| | ii) Explain the addressing modes of 8051 µc with an example of each. | 5M |

**OR**

| 14. B). | i) Write a program to transfer the elements of an array of size 5 elements from 40h memory location to 60h memory location. | 5M |
|---|---|---|
| | ii) Write a program to arrange the elements of an array in descending order using 8051 µc. | 5M |

| 15. A). | i) Write a program to generate a square wave of 2KhZ by programming Timer1of8051µc in mode1? (Assume Xtal freq=11.0592Mhz). | 5M |
|---|---|---|
| | ii) Explain the process of converting Level triggered inputs to Edge triggered in 8051 µc. | 5M |

**OR**

| 15. B). | i) Write a program to transfer the word "EXAM" through serial port of 8051µc at abaud rate of 9600? (Assume Xtal freq=11.0592Mhz). | 5M |
|---|---|---|
| | ii) Define an Interrupt and write the interrupt vector table of 8051 µc. | 5M |

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### CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
**Course Name: Microwave Engineering**
(Electronics & Communication Engineering)

Date: 19.12.2025 AN          Time: 3 hours          Max.Marks: 70

(Note: Assume suitable data if necessary)
**PART-A**
**Answer all TEN questions**
**Each question carries TWO marks.**          **10x2=20M**

| | | |
|---|---|---|
| 1. | List any four applications of Microwaves. | 2 M |
| 2. | What is a Degenerate Mode in a rectangular waveguide? | 2 M |
| 3. | What is the function of a 'Matched Load' in a waveguide? | 2 M |
| 4. | Give the need of tuning screws and Posts in microwave applications. | 2 M |
| 5. | Draw and explain the Applegate diagram of 2-cavity klystron. | 2 M |
| 6. | Interpret the effect of Repeller voltage on output power of reflex klystron. | 2 M |
| 7. | List two methods to suppress oscillations in a Traveling Wave Tube (TWT). | 2 M |
| 8. | Distinguish between 'Frequency Pushing' and 'Frequency Pulling' in a magnetron. | 2 M |
| 9. | List the four basic modes of operation of a Gunn diode. | 2 M |
| 10. | What is VSWR? Give its range. | 2 M |

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

11.A). Derive the field equations in rectangular waveguide in TM mode with help of Maxwell's equations.          10M

**OR**

11. B). An air-filled wave guide operates at 7GHz, the dimensions of the wave guide is 3 cm X 2cm. Calculate: i) $f_c$   ii) $V_p$   iii) $\lambda_g$   iv) Impedance.          10M

12. A). Explain the working principle of H-plane and E-plane Tee junctions.          10M

**OR**

12. B). i) A 20 dB coupler has a directivity of 30 dB. Calculate the value of isolation.          5M
ii) Derive the S-matrix for Magic Tee junction.          5M

13. A). i) Give the classification of O-type and M-type tubes in microwave.          5M
ii) Derive expressions for bunched beam current and efficiency in two cavity klystron amplifiers.          5M

**OR**

13. B). Describe with a neat sketch the constructional details and principle of operation of a reflex klystron tube.          10M

14. A). What is slow wave structure? Explain and differentiate between different structures.          10M

**OR**

14. B). Define M-type tubes? List out the techniques for Pi-mode separation.          10M

15. A). Explain about a GUNN diode with help of RWH theory.          10M

**OR**

15. B). Explain about measurement of attenuation using a microwave bench setup.          10M

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: VLSI Design**

(Electronics & Communication Engineering)

Date: 12.12.2025 AN          Time: 3 hours          Max.Marks: 70

(Note: Assume suitable data if necessary)

### PART-A
### Answer all TEN questions
### Each question carries TWO marks.          10x2=20M

| | | |
|---|---|---|
| 1. | What are the main advantages of ICs over discrete components? | 2 M |
| 2. | How does threshold voltage affect the operation of a MOS transistor? | 2 M |
| 3. | List the main steps involved in the VLSI design process. | 2 M |
| 4. | What are the advantages of using stick diagrams before layout design? | 2 M |
| 5. | What is meant by gate-level design? | 2 M |
| 6. | How is sheet resistance related to resistivity and thickness of a layer? | 2 M |
| 7. | List the major steps involved in system-level design. | 2 M |
| 8. | Compare the speed and power consumption of SRAM with DRAM. | 2 M |
| 9. | What are standard cells in VLSI design? | 2 M |
| 10. | What are the advantages of CPLDs over simple PLDs? | 2 M |

### PART-B
Answer the following. Each question carries TEN Marks.          5x10=50M

| | | |
|---|---|---|
| 11.A). | Explain NMOS fabrication process flow with diagrams. | 10M |

**OR**

| | | |
|---|---|---|
| 11. B). | i) Evaluate an equation for Ids of an n-channel Enhancement MOSFET operating in Saturation region. | 5M |
| | ii) Compare CMOS and BI-CMOS technology. | 5M |
| 12. A). | Explain VLSI design flow. | 10M |

**OR**

| | | |
|---|---|---|
| 12. B). | i) Explain the various symbols used in stick diagram notation? Draw the stick diagram of CMOS inverter. | 5M |
| | ii) Explain scaling of MOS circuits. Give merits and demerits of scaling. | 5M |
| 13. A). | i) What are the issues involved in driving large capacitor loads in VLSI circuit regions? Explain. | 5M |
| | ii) Define fan-in and fan-out. Explain their effects on propagation delay. | 5M |

**OR**

| | | |
|---|---|---|
| 13. B). | i) Explain about the constraints in choice of layers. | 5M |
| | ii) What is meant by sheet resistance Rs? Explain the concept of Rs applied to MOS transistors. | 5M |
| 14. A). | i) Outline the nature of a parity generator and explain its structured design approach. | 5M |
| | ii) Explain Content Addressable memory. | 5M |

**OR**

| | | |
|---|---|---|
| 14. B). | i) Explain Working of ROM Architecture with an example. | 5M |
| | ii) Explain multiplier architecture in VLSI design. | 5M |

*(P.T.O..)*

15. A). i) Discuss the Chip level test techniques.                                    5M
      ii) What are FPGAs? Explain the principle and operation.              5M

**OR**

15. B). i) Discuss about Standard Cells.                                               5M
      ii) Explain the architecture of a CPLD with circuit diagram.         5M

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Operating System**

(Electronics & Communication Engineering)

| Date: 13.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

### PART-A
### Answer all TEN questions
### Each question carries TWO marks.     10x2=20M

| | | |
|---|---|---|
| 1. | List any two main functions of an Operating System. | 2 M |
| 2. | Differentiate between batch and time-sharing systems. | 2 M |
| 3. | What is process scheduling? | 2 M |
| 4. | What is interprocess communication (IPC)? | 2 M |
| 5. | What is the critical section problem? | 2 M |
| 6. | List the necessary conditions for a deadlock. | 2 M |
| 7. | What is swapping? | 2 M |
| 8. | Mention two page replacement algorithms. | 2 M |
| 9. | What is the purpose of stat() system call? | 2 M |
| 10. | What is a directory structure? | 2 M |

### PART-B
### Answer the following. Each question carries TEN Marks.     5x10=50M

| | | |
|---|---|---|
| 11.A). | Describe the services provided by an OS with examples. | 10M |
| | **OR** | |
| 11. B). | Discuss the structure of a modern OS and its components. | 10M |
| 12. A). | Explain multiple-processor scheduling and its challenges. | 10M |
| | **OR** | |
| 12. B). | Describe the process state transition diagram. | 10M |
| 13. A). | Explain deadlock characterization and handling methods. | 10M |
| | **OR** | |
| 13. B). | Explain classical synchronization problems. | 10M |
| 14. A). | Describe paging and segmentation with neat diagrams. | 10M |
| | **OR** | |
| 14. B). | Explain various memory allocation techniques. | 10M |
| 15. A). | Explain various file access methods with examples. | 10M |
| | **OR** | |
| 15. B). | Describe protection mechanisms in file systems. | 10M |

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**

**Course Name: Web Technologies**

**(Common for CSE & IT)**

| Date: 09.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

**(Note: Assume suitable data if necessary)**

### PART-A
**Answer all TEN questions**
**Each question carries TWO marks.**                    **10x2=20M**

| | | |
|---|---|---|
| 1. | How to create a simple PHP program to display 'Hai' message? | 2 M |
| 2. | Explain about time syntax in PHP. | 2 M |
| 3. | Explain <img> tag in HTML with an example. | 2 M |
| 4. | What is XML? | 2 M |
| 5. | What is Servlet life cycle? | 2 M |
| 6. | What are cookies? | 2 M |
| 7. | What is Java Server Pages Technology? | 2 M |
| 8. | Write the steps involved in JSP life cycle. | 2 M |
| 9. | Write short notes on creating object in java script. | 2 M |
| 10. | What is the difference between Class and ID in JavaScript? | 2 M |

### PART-B
**Answer the following. Each question carries TEN Marks.**          **5x10=50M**

| | | |
|---|---|---|
| 11.A). | Explain the basic steps in running a PHP script on your computer. | 10M |

**OR**

| | | |
|---|---|---|
| 11. B). | Write a PHP script to accept email address and print domain name of the email and result of validation. | 10M |
| 12. A). | What is HTML? Explain its significance in web development. Explain ANY 5 basic HTML tags with its syntax. | 10M |

**OR**

| | | |
|---|---|---|
| 12. B). | What is table and frame in HTML? Explain an example of an HTML table and explain how frames can be used to organize content on a web page. | 10M |
| 13. A). | Define what is a servlet and explain its role in Java-based web applications. Discuss how Servlets interact with web clients and servers. | 10M |

**OR**

| | | |
|---|---|---|
| 13. B). | Write a simple Java Servlet that processes a basic HTTP GET request and responds with a "Hello, World!" message. Explain the code and steps involved in creating and deploying the Servlet. | 10M |
| 14. A). | Describe the life cycle of a JSP page. Explain the phases of translation, compilation, initialization, execution and cleanup and the methods involved at each stage. | 10M |

**OR**

| | | |
|---|---|---|
| 14. B). | Write a simple JSP page that displays a "Hello, World!" message. Explain the steps involved in creating, deploying and accessing the JSP page in a web application. | 10M |
| 15. A). | Write JavaScript to find the L.C.M. and G.C.D. of two numbers. | 10M |

**OR**

| | | |
|---|---|---|
| 15. B). | Write java scripts for validating username, password, phone number and email address. | 10M |

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
### B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
### Course Name: Compiler Design
### (Common for CSE & CSD)

| Date: 10.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

### PART-A
### Answer all TEN questions
### Each question carries TWO marks.          10x2=20M

| | | |
|---|---|---|
| 1. | What are the major phases in the structure of a compiler? | 2 M |
| 2. | Differentiate between DFA and NFA with an example. | 2 M |
| 3. | What is a context-free grammar (CFG)? | 2 M |
| 4. | Differentiate between top-down and bottom-up parsing. | 2 M |
| 5. | Define syntax-directed definition (SDD). | 2 M |
| 6. | What is an L-attributed definition? | 2 M |
| 7. | Define activation record. | 2 M |
| 8. | What is garbage collection? | 2 M |
| 9. | What is machine-independent optimization? | 2 M |
| 10. | Define data-flow analysis. | 2 M |

### PART-B
### Answer the following. Each question carries TEN Marks.          5x10=50M

| | | |
|---|---|---|
| 11.A). | Describe how tokens are recognized using finite automata. Explain the conversion of regular expressions to finite automata with an example. | 10M |

### OR

| | | |
|---|---|---|
| 11. B). | Discuss the role and responsibilities of the lexical analyzer. | 10M |
| 12. A). | Explain the construction of SLR parsing table with an example. | 10M |

### OR

| | | |
|---|---|---|
| 12. B). | Describe bottom-up parsing with an example. | 10M |
| 13. A). | Explain syntax-directed translation schemes in detail. | 10M |

### OR

| | | |
|---|---|---|
| 13. B). | Explain type checking with a suitable example. | 10M |
| 14. A). | Explain stack and heap memory management in runtime environments. | 10M |

### OR

| | | |
|---|---|---|
| 14. B). | Explain the construction and optimization of basic blocks. | 10M |
| 15. A). | Explain the principal sources of code optimization. | 10M |

### OR

| | | |
|---|---|---|
| 15. B). | Explain partial-redundancy elimination with suitable illustrations. | 10M |

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# CMR COLLEGE OF ENGINEERING & TECHNOLOGY
## (UGC AUTONOMOUS)
### B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
### Course Name: Scripting Languages
#### (Common for CSE & IT)

Date: 19.12.2025 AN     Time: 3 hours     Max.Marks: 70

(Note: Assume suitable data if necessary)

## PART-A
### Answer all TEN questions
### Each question carries TWO marks.     10x2=20M

| | | |
|---|---|---|
| 1. | How to represent comments in Ruby? What will happen when comment is used? | 2 M |
| 2. | How to represent block structure in Ruby? | 2 M |
| 3. | What is the use of Jukebox extension? | 2 M |
| 4. | What do you mean by duck typing? | 2 M |
| 5. | List the characteristics of scripting languages. | 2 M |
| 6. | What do you mean by web scripting? | 2 M |
| 7. | What is the use of eval operator? | 2 M |
| 8. | What is the purpose of packages? List two packages. | 2 M |
| 9. | How TK is associated with TCL? | 2 M |
| 10. | What is the use of up level commands? | 2 M |

## PART-B
### Answer the following. Each question carries TEN Marks.     5x10=50M

| | | |
|---|---|---|
| 11.A). | How Package Management is done with RubyGems? Discuss. | 10M |
| | **OR** | |
| 11. B). | Illustrate with an example how to use Widget's bind method. | 10M |
| 12. A). | Pictorially represent the workflow when building an extension of Jokebox. | 10M |
| | **OR** | |
| 12. B). | Discuss the different ways of embedding a Ruby Interpreter. | 10M |
| 13. A). | What are the different control structures supported in PERL? Explain with examples. | 10M |
| | **OR** | |
| 13. B). | Define Hashes. With an example illustrate how to create hashes and how to access hash elements. | 10M |
| 14. A). | What do you mean by dirty hands internet programming? Discuss. | 10M |
| | **OR** | |
| 14. B). | How to use pack and unpack function? Explain with examples. | 10M |
| 15. A). | Discuss the basic widgets that are supported in Tk applications. | 10M |
| | **OR** | |
| 15. B). | Explain TCL Script to illustrate string comparison. | 10M |

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Software Project Management**

(Information Technology)

Date: 12.12.2025 AN | Time: 3 hours | Max.Marks: 70

**(Note: Assume suitable data if necessary)**

### PART-A
### Answer all TEN questions
### Each question carries TWO marks.  10x2=20M

| | | |
|---|---|---|
| 1. | What is the need of SPM? | 2 M |
| 2. | What is meant by software economics? | 2 M |
| 3. | Compare Management artifacts and Engineering artifacts. | 2 M |
| 4. | What is the concept of iteration workflows? | 2 M |
| 5. | What is the life cycle objective milestone? | 2 M |
| 6. | Define Pragmatic planning. | 2 M |
| 7. | What are the building blocks of automation technology? | 2 M |
| 8. | What do you mean by project environment? | 2 M |
| 9. | What is pragmatic software metric? | 2 M |
| 10. | What is CCPDS? | 2 M |

### PART-B
### Answer the following. Each question carries TEN Marks.  5x10=50M

11.A). Explain Boehm's top ten lists of the industrial software metrics. 10M

**OR**

11. B). Discuss the characteristics which makes software projects different from other projects? 10M

12. A). Describe the various phases of software project life cycle. 10M

**OR**

12. B). Discuss about seven top-level workflows. 10M

13. A). Explain general status of plans, requirements and product across the major milestones. 10M

**OR**

13. B). Elaborate the stages in iterative process planning. 10M

14. A). Discuss the default role in a software Line-of-Business Organization. 10M

**OR**

14. B). Explain about the Automation building blocks in a project environment. 10M

15. A). List out the management indicators that can be used as core metrics on software projects. Briefly specify meaning of each. 10M

**OR**

15. B). Explain the various characteristics of good software metric. Discuss the metrics Automation using appropriate example. 10M

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Deep Learning**

**(Common for CSM & AIM)**

| Date: 10.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

**(Note: Assume suitable data if necessary)**

### PART-A
### Answer all TEN questions
### Each question carries TWO marks.                    10x2=20M

| | | |
|---|---|---|
| 1. | What is Deep Learning? | 2 M |
| 2. | State the Bayes rule. | 2 M |
| 3. | What are the features in machine learning? | 2 M |
| 4. | What are the evaluation measures in machine learning? | 2 M |
| 5. | Difference between over fitting and under fitting. | 2 M |
| 6. | Define pooling. | 2 M |
| 7. | State the main applications of GRU. | 2 M |
| 8. | Define forword propagation. | 2 M |
| 9. | Define Pruning. | 2 M |
| 10. | What is sparse decomposition? | 2 M |

### PART-B
### Answer the following. Each question carries TEN Marks.         5x10=50M

| | | |
|---|---|---|
| 11.A). | Explain in detail about bayes theorem with suitable example. | 10M |
| | **OR** | |
| 11. B). | Explain single value decomposition with suitable example. | 10M |
| 12. A). | Discuss neural networks and explain briefly about Back Propagation algorithm in detail. | 10M |
| | **OR** | |
| 12. B). | Explain in detail about RMSProp. | 10M |
| 13. A). | Discuss in detail about Dropout. | 10M |
| | **OR** | |
| 13. B). | Explain in detail about Convolution Neural Network(CNN) layers and their functionality. | 10M |
| 14. A). | Explain in detail about Long Short – Term Memory (LSTM) model. | 10M |
| | **OR** | |
| 14. B). | Discuss about Back propagation through time (BPTT) With suitable example. | 10M |
| 15. A). | Write in detail about applications of GAN. | 10M |
| | **OR** | |
| 15. B). | Explain Briefly about Q Learning in detail. | 10M |

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
### Course Name: Soft and Evolutionary Computing
(CSM)

| Date: 19.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

### PART-A
#### Answer all TEN questions
#### Each question carries TWO marks.　　　　　　　　10x2=20M

| | | |
|---|---|---|
| 1. | Define Soft Computing and list its main components. | 2 M |
| 2. | What is Evolutionary Computing? Give two examples. | 2 M |
| 3. | What is the McCulloch-Pitts Neuron? | 2 M |
| 4. | What is an ART Network? | 2 M |
| 5. | What is fuzzification? Give one example. | 2 M |
| 6. | Define fuzzy propositions. | 2 M |
| 7. | Define ANFIS. | 2 M |
| 8. | What is Inverse Kinematics Problem? | 2 M |
| 9. | List the Basic Operators for Genetic Algorithms. | 2 M |
| 10. | Mention applications of GA. | 2 M |

### PART-B
#### Answer the following. Each question carries TEN Marks.　　　5x10=50M

| | | |
|---|---|---|
| 11.A). | Explain the architecture and learning process of an Artificial Neural Network. | 10M |
| | **OR** | |
| 11. B). | Describe the recent trends in Soft Computing with suitable examples. | 10M |
| 12. A). | Discuss auto associative and hetero-associative memory networks with examples. | 10M |
| | **OR** | |
| 12. B). | Compare and contrast LVQ, CP networks, and ART networks. | 10M |
| 13. A). | Discuss the features of membership functions and different methods of membership value assignment. | 10M |
| | **OR** | |
| 13. B). | Consider two fuzzy sets A={(1,0.2)(2,0.3)(3,0.4)(4,0.5)} and B={(1,0.1 (2,0.1) (3,0.2) (4,1)} Find the algebraic sum, algebraic product, bounded sum, and bounded difference of the given fuzzy sets. | 10M |
| 14. A). | Explain the architecture of Adaptive Neuro-Fuzzy Inference Systems (ANFIS). | 10M |
| | **OR** | |
| 14. B). | Compare and contrast ANFIS with traditional fuzzy inference systems. | 10M |
| 15. A). | Explain the basic concepts and terminology used in Genetic Algorithms. | 10M |
| | **OR** | |
| 15. B). | Discuss various crossover operators in genetic algorithms with an example for each. | 10M |

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Internet Technologies**

**(CSM)**

Date: 12.12.2025 AN          Time: 3 hours          Max.Marks: 70

(Note: Assume suitable data if necessary)

### PART-A
**Answer all TEN questions**
**Each question carries TWO marks.**          10x2=20M

| | | |
|---|---|---|
| 1. | What is a variable in PHP? | 2 M |
| 2. | Write the syntax to open a file in read mode in PHP. | 2 M |
| 3. | Define the syntax for an inline CSS style. | 2 M |
| 4. | Explain the role of DTD in XML. | 2 M |
| 5. | Write the purpose of the init () method in a servlet. | 2 M |
| 6. | Which method is used to handle POST requests in a servlet? | 2 M |
| 7. | Name any two implicit objects in JSP. | 2 M |
| 8. | Write the syntax of connecting to a database using JDBC in JSP. | 2 M |
| 9. | What keyword is used to define a function in JavaScript? | 2 M |
| 10. | Name any two types of variable scopes in JavaScript. | 2 M |

### PART-B
**Answer the following. Each question carries TEN Marks.**          5x10=50M

11.A). Discuss how to handle file uploads in PHP. Write a script to upload an image file and check its size and type.          10M

**OR**

11. B). Explain how to connect PHP with MySQL. Write a script to insert and retrieve data from a database.          10M

12. A). Illustrate different types of CSS (inline, internal, external) with examples.          10M

**OR**

12. B). Differentiate between DOM and SAX parsers in Java. Write code snippets to demonstrate XML parsing using either.          10M

13. A). Explain the complete life cycle of a servlet with a diagram and methods involved.          10M

**OR**

13. B). Write a Java servlet program that connects to a database using JDBC and displays data from a table.          10M

14. A). Explain the anatomy of a JSP page with suitable example and explain how to use JavaBeans in a JSP page.          10M

**OR**

14. B). Write a JSP page to connect to a MySQL database, retrieve student records, and display them in a table format.          10M

15. A). Explain the features and advantages of JavaScript. Describe how variables are declared in JavaScript.          10M

**OR**

15. B). Describe how JavaScript is used for client-side form validation.          10M

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
### Course Name: Natural Language Processing
#### (Common for CSM & AIM)

| Date: 13.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

### PART-A
**Answer all TEN questions**
**Each question carries TWO marks.**   10x2=20M

| | | |
|---|---|---|
| 1. | How does the script diversity of Indian languages impact NLP? | 2 M |
| 2. | Explain the role of a parser in grammar-based models. | 2 M |
| 3. | Define indexing in IR. | 2 M |
| 4. | Explain what kind of annotations does Frame Net provide. | 2 M |
| 5. | How does Inverse Document Frequency (IDF) indicate? | 2 M |
| 6. | Describe what is a context-free grammar. | 2 M |
| 7. | Explain the ambiguity in NLP. | 2 M |
| 8. | What is semantic analysis in NLP? | 2 M |
| 9. | What are the main components of an NLG system architecture? Explain. | 2 M |
| 10. | Define Machine Translation (MT). | 2 M |

### PART-B
**Answer the following. Each question carries TEN Marks.**   5x10=50M

11.A). Explain the role of grammar in natural language processing. Compare different types of grammar used in NLP and highlight their importance in syntactic analysis.   10M

**OR**

11. B). What is a language model in NLP? Explain its objectives, types, and importance in various NLP tasks. Illustrate with examples.   10M

12. A). Describe how information retrieval systems are evaluated. What metrics are used, and how do they reflect the performance and usefulness of the system?   10M

**OR**

12. B). Explain the structure and significance of Word Net as a lexical database. How does it support various NLP applications?   10M

13. A). Explain the concept of Finite State Automata and its application in NLP. How does it help in word recognition and morphological analysis?   10M

**OR**

13. B). What is parsing? Describe different parsing techniques and their applications in NLP.   10M

14. A). What is lexical semantics? Discuss its role in understanding word meaning and the relationships among words.   10M

**OR**

14. B). Explain the concept of cohesion in discourse. Describe different types of cohesive devices with examples.   10M

15. A). Describe the architecture of a typical Natural Language Generation system. Explain the function of each module.   10M

**OR**

15. B). Compare and contrast the different approaches to Machine Translation — Rule-Based, Statistical, and Neural   10M

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### CMR COLLEGE OF ENGINEERING & TECHNOLOGY
#### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Artificial Intelligence**

**(CSD)**

Date: 13.12.2025 AN                 Time: 3 hours                 Max.Marks: 70

(Note: Assume suitable data if necessary)

## PART-A
### Answer all TEN questions
### Each question carries TWO marks.                 10x2=20M

| | | |
|---|---|---|
| 1. | Define the term "artificial intelligence" in the context of problem-solving. | 2 M |
| 2. | What is meant by "Local Search"? | 2 M |
| 3. | Define a knowledge-based agent. | 2 M |
| 4. | Differentiate between forward and backward chaining. | 2 M |
| 5. | Define a predicate in the context of First-Order Logic. | 2 M |
| 6. | What is ontological engineering in AI? | 2 M |
| 7. | Define the term "planning under time and resource constraints". | 2 M |
| 8. | What is the role of resources in real-world AI planning systems? | 2 M |
| 9. | State Baye's theorem. | 2 M |
| 10. | What is the role of probability in managing uncertainty? | 2 M |

## PART-B
### Answer the following. Each question carries TEN Marks.                 5x10=50M

| | | |
|---|---|---|
| 11.A). | Explain the characteristics and roles of intelligent agents in artificial intelligence. | 10M |
| | **OR** | |
| 11. B). | What is a heuristic function? Illustrate how it is used in informed search strategies. | 10M |
| 12. A). | Compare and contrast backtracking and local search techniques. | 10M |
| | **OR** | |
| 12. B). | Discuss Alpha–Beta Pruning in detail. | 10M |
| 13. A). | Discuss how First-Order Logic is used for knowledge representation with an example. | 10M |
| | **OR** | |
| 13. B). | What is resolution in First-Order Logic? Explain its working with a suitable example. | 10M |
| 14. A). | Discuss Planning Graphs. Provide a detailed explanation with a diagram. | 10M |
| | **OR** | |
| 14. B). | Explain Hierarchical Planning. How does it differ from classical planning? Illustrate with an example. | 10M |
| 15. A). | What are full joint probability distributions? How are they used in reasoning under uncertainty? | 10M |
| | **OR** | |
| 15. B). | Explain explanation-based learning and inductive logic programming with suitable examples. | 10M |

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# CMR COLLEGE OF ENGINEERING & TECHNOLOGY
## (UGC AUTONOMOUS)
### B.Tech VI Semester Supplementary Examinations Nov/Dec-2025
**Course Name: Machine Learning**

(CSD)

| Date: 19.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

## PART-A
### Answer all TEN questions
### Each question carries TWO marks.     10x2=20M

| | | |
|---|---|---|
| 1. | Identify the difference between regression and classification tasks of machine learning. | 2 M |
| 2. | In machine learning, how is a class learned from examples in supervised learning? | 2 M |
| 3. | Mention the role of Bias and Variance in evaluating an estimator model. | 2 M |
| 4. | Define Bayesian decision theory with an example. | 2 M |
| 5. | Write short notes on Mixtures of Latent Variable Models in the context on clustering. | 2 M |
| 6. | Highlight the role of eigenvalues and eigenvectors in identifying the principal components that capture the most variance in the data. | 2 M |
| 7. | Define multivariate trees in decision tree learning, and how do they differ from univariate trees in terms of splitting criteria? | 2 M |
| 8. | What is pairwise separation in Linear Discriminant Analysis (LDA). | 2 M |
| 9. | Compare the concepts of Bagging and Boosting in ensemble learning. | 2 M |
| 10. | Give short notes on Backpropagation Through Time (BPTT). | 2 M |

## PART-B
### Answer the following. Each question carries TEN Marks.     5x10=50M

11.A).   i) Discuss the importance of formulating well-posed machine learning problems in the development of intelligent machines. Provide a real-world example illustrating the impact of problem formulation on the success of a machine learning application.    5M

ii) Compare and contrast the various types of machine learning techniques using suitable examples.    5M

### OR

11. B).   The data listed in Table below, show the sugar content of a fruit (SUGAR) for different numbers of days after picking (DAYS).    10M

| Days | Sugar |
|---|---|
| 0 | 7.9 |
| 1 | 12.0 |
| 3 | 9.5 |
| 4 | 11.3 |
| 5 | 11.8 |
| 6 | 11.3 |
| 7 | 4.2 |
| 8 | 0.4 |

Obtain the estimated regression line to predict sugar content based on the number of days the fruit is left on the tree.

*(P.T.O..)*

12. A). A grocery store tracks the purchases of its customers to understand buying patterns. The 10M
following table shows the transactions of five customers, where each row represents a
transaction and the items purchased:

| Transaction ID | Items Purchased |
|---|---|
| T1 | Milk, Bread, Butter |
| T2 | Bread, Butter, Cheese |
| T3 | Milk, Bread |
| T4 | Milk, Bread, Cheese |
| T5 | Bread, Butter |

Calculate the Support for the rule:

Bread → Butter.

Calculate the Confidence for the rule:

Milk → Bread.

Calculate the Lift for the rule:

Bread → Butter.

**OR**

12. B). In machine learning, how are model selection and generalization influenced by ill-posed 10M
problems, inductive bias, underfitting, and overfitting?

13. A). Suppose the visitors to a website need to be grouped using their age as follows: {15, 15, 10M
16, 19, 19, 20, 20, 21, 22, 28, 35, 40, 41, 42, 43, 44, 60, 61, 65}.

Considering initial clusters as 2, and centroids as $c_1 = 16$, $c_2 = 22$ derive the grouping
using the K-Means algorithm. Furnish all the results in the table format. Show the final
listing comprising of iteration number and centroids.

**OR**

13. B). Explain how Subset Selection, Principal Components Analysis (PCA), and Factor 10M
Analysis are used to reduce dimensionality in datasets. Compare their objectives, methods
of implementation, and the types of data or scenarios in which each technique is most
suitable.

14. A). Why decision tree is considered as a nonparametric model? In comparison to K- NN as a 10M
nonparametric model, give a scenario where decision tree is expected to have higher
performance than K-NN.

**OR**

14. B). A robot is navigating through a grid-based environment to reach its destination. The grid 10M
includes both obstacles and open spaces, and the robot must make decisions at each grid
cell to determine its next move. To assist in path planning, you plan to use a decision tree
classifier with the Gini index as the splitting criterion.

Given a sample dataset with the following features and labels: Evaluate the Gini index for
each feature to identify the best feature and split point for the root node of the decision
tree based on the dataset provided. Afterwards, visually represent the final decision tree in
the table format.

Table: Dataset for grid-based environment

| Grid Cell | Obstacle | Terrain Type | Visibility | Action |
|---|---|---|---|---|
| 1 | Clear path | Open Space | Clear | Move Forward |
| 2 | Solid Rocks | Rough Terrain | Partially Obscured | Turn Left |
| 3 | Water bodies | Obstacle | Obscured | Stop |
| 4 | Clear path | Open Space | Clear | Move Forward |
| 5 | Solid rock | Rough Terrain | Partially Obscured | Turn Right |

15. A). Compare and contrast Time Delay Neural Networks (TDNN) and Recurrent Neural    10M
Networks (RNN) in terms of their architecture, functionality, and applications.

**OR**

15. B). Explain the concept of backpropagation in neural networks and its role in training a    10M
multilayer perceptron (MLP). In your explanation, describe the process of forward
propagation and how it helps in calculating the output, the significance of the loss
function in measuring prediction errors, and how it is used to update the network's
weights.

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## CMR COLLEGE OF ENGINEERING & TECHNOLOGY
### (UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations Nov/Dec-2025

**Course Name: Business Management & Financial Analysis**

(Common for EEE, ME, ECE, AIM & AID)

| Date: 09.12.2025 AN | Time: 3 hours | Max.Marks: 70 |
|---|---|---|

(Note: Assume suitable data if necessary)

### PART-A
**Answer all TEN questions**
**Each question carries TWO marks.**                    10x2=20M

| | | |
|---|---|---|
| 1. | Define 'Management'. | 2 M |
| 2. | What do you mean by Motivation? | 2 M |
| 3. | List the goals of Financial Management. | 2 M |
| 4. | Define 'Human Resources Management'. | 2 M |
| 5. | What is 'Business Cycle'? | 2 M |
| 6. | Illustrate 'Law of Demand' | 2 M |
| 7. | What is 'Production Function'? | 2 M |
| 8. | Show 'Break Even Chart'. | 2 M |
| 9. | List any 4 types of Business Enterprises. | 2 M |
| 10. | How do you interpret Current Ratio of firm? | 2 M |

### PART-B
**Answer the following. Each question carries TEN Marks.**          5x10=50M

| | | |
|---|---|---|
| 11.A). | Explain the functions of Management. | 10M |
| | **OR** | |
| 11. B). | Discuss in detail Maslow's need hierarchy theory of motivation. | 10M |
| 12. A). | Explain the different types of Plant Layout. | 10M |
| | **OR** | |
| 12. B). | Explain the functions of HR Management in modern business. | 10M |
| 13. A). | Examine the scope of Managerial Economics in business decision making. | 10M |
| | **OR** | |
| 13. B). | Discuss the Price, Income and Cross Elasticity of demand. | 10M |
| 14. A). | i) Show the classification of costs in short run. | 5M |
| | ii) Construct a demand and supply schedule for equilibrium price. | 5M |
| | **OR** | |
| 14. B). | From the following information, calculate (i) P/V Ratio (ii) Fixed Cost (iii) Break-even point iv) Profit when sales are Rs 250000/- | 10M |

| Year | Sales (Rs) | Profit (Rs) |
|---|---|---|
| 2019 | 1,50,000 | 20,000 |
| 2020 | 1,70,000 | 25,000 |

*(P.T.O..)*

15. A). Distinguish between a sole trader and partnership business firm.  10M

**OR**

15. B). The following is the Balance Sheet of X Ltd., as on 31st March 2025.  10M

| Liabilities | Amount (Rs) | Assets | Amount (Rs) |
|---|---|---|---|
| Share capital | 110000 | Buildings | 150000 |
| Long term debt | 110000 | Sundry debtors | 60000 |
| Sundry Creditors | 35000 | Closing stock | 20000 |
| Bank overdraft | 35000 | Cash at bank | 60000 |
| Total | 290000 | | 290000 |
| | | | |

Additional information: Net Sales on credit 100000/- Gross profit Rs. 30000/- Net Profit after Tax 20000/-

Calculate- i) Current ratio ii) Gross Profit Ratio iii) Debt-Equity Ratio iv) Debtors Turnover Ratio.

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