CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Design and Drawing of RCC Structures
(Civil Engineering)

Date: 25.11.2025 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 advantages of the Limit State Method over the Working Stress Method?	2 M
2.	How are stress block parameters defined as per IS 456:2000?	2 M
3.	What factors influence the value anchorage length?	2 M
4.	List the factors affecting the deflection in RC members.	2 M
5.	Define two way slab? What is the minimum reinforcement requirement for slabs as per IS code?	2 M
6.	Describe the design procedure for a continuous slab.	2 M
7.	Define slenderness ratio. How does it affect column design.	2 M
8.	Classify the columns based on forces action on it.	2 M
9.	Differentiate between isolated and combined footings.	2 M
10.	List the various types of RC staircase.	2 M

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

11.A).	Determine the ultimate moment capacity of a rectangular beam section 230×546 mm (effective depth), reinforced with 4-20mm dia bars in tension zone.	10M

OR

11. B).	Derive the expressions for M.R. of T-beam section under various conditions.	10M
12. A).	Design a rectangular beam for an effective span of 5m. The superimposed load is 40 kN/m and the size of beam is limited to 230mm x 600 mm overall. Use M20 and Fe415. Width of support 300mm.	10M

OR

12. B).	A rectangular simply supported beam of span 5.5m is of size 300mm x 600mm. It is reinforced with 4 bars of 20mm with a cover of 25mm. Determine the short term deflection due to an imposed working load of 25 kN/m. Assume grade of concrete as M20 and grade of steel as Fe415.	10M
13. A).	Design a two way slab for a room of clear dimensions 5m x 7.5m, with all the four sides discontinuous and corners held down. The live load on the slab is 3kN/m². Sketch the reinforcement details.	10M

OR

13. B).	A cantilever RC slab of span 2.0 m and width 3.0 m is to be designed to support a live load of 2.0 kN/m² and a floor finish load of 1.0 kN/m². Assume M20 grade concrete and Fe 415 steel. Design the slab section.	10M

(P.T.O..)

14. A). Explain the design procedure of short columns under various conditions. 10M

OR

14. B). Design a short axially loaded column of effective length of 3m to carry an axial load of 1600kN. Use M-25 grade of concrete and Fe-415 grade of steel. Draw reinforcement details. 10M

15. A). Design a rectangular isolated footing of uniform thickness of RR column bearing a vertical load of 600kN and having a base size of 400x600mm. The SBC of soil may be taken as 120kN/m^2 Use M20 concrete and Fe415 steel. 10M

OR

15. B). Show a typical detailing of reinforcement in dog legged staircase. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Geotechnical Engineering
(Civil Engineering)

Date: 29.11.2025 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 index properties?	2 M
2.	How are Soils formed?	2 M
3.	What are the factors affecting permeability?	2 M
4.	List out the uses of flow net.	2 M
5.	Write the assumptions of Boussinesq's theory.	2 M
6.	What is compaction of soils?	2 M
7.	Define OCR.	2 M
8.	What is pre-consolidation pressure?	2 M
9.	Define Mohr's Coulombs equation.	2 M
10.	What are the factors effecting shear strength of cohesive soils?	2 M

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

11.A). i) Explain the phenomena of formation and transportation of soils.   3M
        ii) Explain I.S classification of soils.   7M

OR

11. B). A sample of saturated soil in a container weighs 650gm. On drying in an oven in the   10M
         container it weighs 600gm. The weight of container is 350gm. The grain specific gravity
         is 2.65. Determine the void ratio, water content, and bulk unit weight. Assume necessary
         data.

12. A). Explain any one laboratory method in detail for determination of coefficient permeability   10M
         of soil.

OR

12. B). Define Permeability.   10M

         A constant head permeability test was run on a sand sample 30cm in length and 20cm^2 in
         area. When a loss of head was 60cm, the quantity of water collected in 2 minutes was
         250ml. Determine the coefficient of permeability of the soil.

13. A). Compare Boussinesq's and Westergard's theories of stress distribution of soils.   10M

OR

13. B). Define compaction. Discuss the effect of compaction on properties of soil.   10M

14. A). Explain the procedure for determining pre-consolidated pressure.   10M

OR

14. B). A clay Stratum has 3m thickness and has an initial overburden pressure of 40kN/m^2. The   10M
         clay is over consolidated with a pre-consolidation pressure of 60kNm2. Determine the
         final settlements due to an increase in pressure of kN/m^2 at the middle of the clay layer.
         Take recompression index = 0.05, Compression index = 0.28, initial voids ratio = 1.3.

(P.T.O..)

15. A).   Explain the merits and demerits of triaxial test over direct shear test.   10M

OR

15. B).   A direct shear test was performed on 60 mm x 60 mm sample of dry sand. The normal   10M
load was 360 N. The failure occurred at a shear load of 180 N. Plot the Mohr strength
envelope and determine ϕ. Assume c = 0. Also, Identify the principal stresses at failure.

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

Course Name: Structural Analysis-II

(Civil Engineering)

Date: 04.12.2025 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 Distribution factor.	2 M
2.	What is meant by absolute maximum bending moment?	2 M
3.	Write the general Slope-deflection equation.	2 M
4.	Give the application of two hinged stiffening girders.	2 M
5.	Recall the significance made in Substitute frame method.	2 M
6.	Identify the Limitation made in Portal method.	2 M
7.	List the properties of stiffness matrix.	2 M
8.	Specify the element flexibility matrix for a truss member.	2 M
9.	Recite the Properties of influence lines.	2 M
10.	Define Static Indeterminacy.	2 M

PART-B

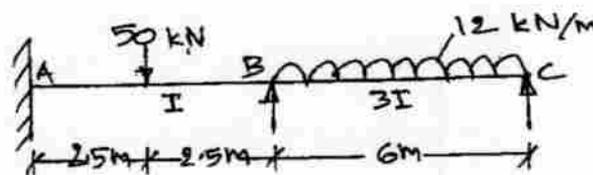**Answer the following. Each question carries TEN Marks.**   **5x10=50M**

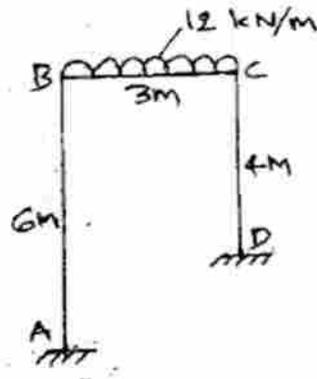11.A).   Analyze the given portal frame using moment distribution method.   10M
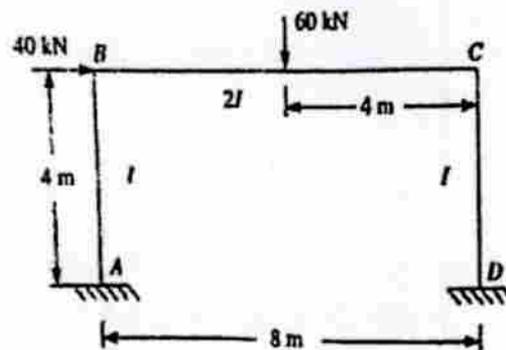
OR

11. B).   Analyze the continuous beam shown in figure using Kani's method such that support B   10M
sinks by 4 mm take E = 200 GPA and I = 9×10^7 mm^4 Draw SFD and BMD diagrams.


(P.T.O..)

12. A). Analyze the single bay single storey portal frame by slope deflection method and draw SFD and BMD diagrams.   10M


OR

12. B). A two hinged parabolic arch of span 40 m and rise 6 m Carrying a point load of 100 kN at 15 m from the left support and a UDL of 40 kN/m acting for a distance of 10 m from the right support Determine the reactions and draw BMD.   10M

13. A). Using portal frame method of Analysis Draw BMD for the given frame.   10M
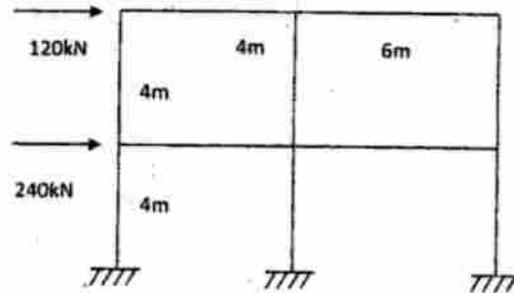
OR

13. B). Analyse the mid span Bending moments and sketch the moment envelop for any one beam member in the substitute frame shown in below figure. Assume beam size is 230 mm x 450 mm and column size is 230 mm x 300 mm dimensions. The beams are spaced 4 m C/C distance along one direction. Dead load of slab = 3 kN/sq.m. Live load = 4 kN/sq.m.   10M
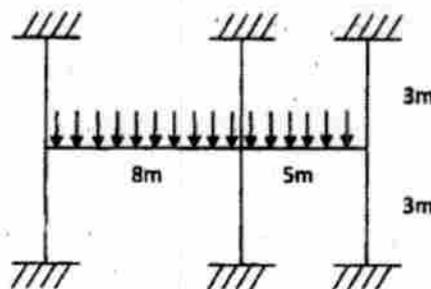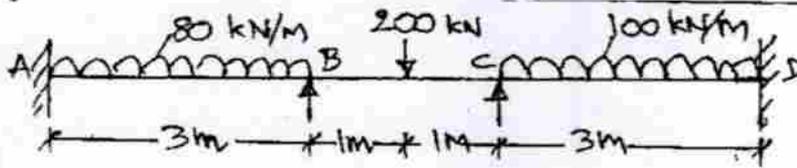

14. A). Analyze the given continuous beam using stiffness method take EI Constant and draw SFD and BMD diagram   10M
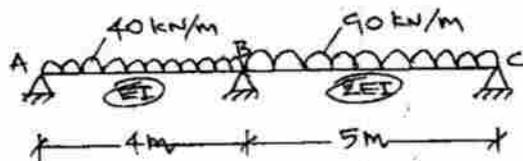
OR

14. B). Analyze the given continuous beam using Flexibility method take EI Constant and draw SFD and BMD diagram   10M

15. A). Determine the influence line for RA for the two span continuous beam with 4m span length. EI=Constant. Support A and C with roller support and support B with Pinned support. Compute ordinates at 1m interval   10M

OR

15. B). Analyze the given truss using Castigliano's second theorem.   10M
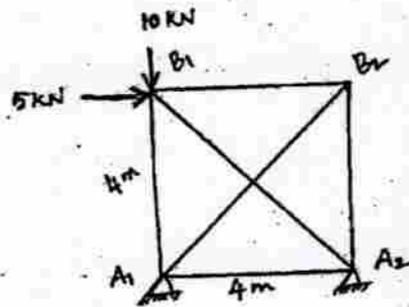
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Transportation Engineering-I
(Civil Engineering)

Date: 08.12.2025 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 highway planning.	2 M
2.	Illustrate highway alignment.	2 M
3.	Recall the term OSD.	2 M
4.	What is stopping sight distance?	2 M
5.	Why data collection is needed?	2 M
6.	Mention the need of traffic volume studies.	2 M
7.	Define intersection of a road.	2 M
8.	Write the concept of rotary.	2 M
9.	List some highway materials.	2 M
10.	Illustrate surface dressing.	2 M

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

11.A). Discuss in detail the various classification of roads with sketches.   10M

OR

11. B). Describe the various factors affecting the highway alignment.   10M

12. A). Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite direction at 90 and 60 kmph. Assume a reaction time of 2.5 seconds coefficient of friction of 0.7 and brake efficiency of 50 % in either case.   10M

OR

12. B). Explain the factors influencing overtaking sight distance and also types of gradients.   10M

13. A). Discuss in detail the various causes of road accidents and precautions undertaken to prevent.   10M

OR

13. B). Describe the importance of traffic volume studies and how it is carried out along with its applications.   10M

14. A). Describe the various channelized and un-channelized intersections with neat sketches.   10M

OR

14. B). Describe in detail about conflicts at intersections and grade intersections.   10M

15. A). Enumerate the various steps involved in the construction of cement concrete road.   10M

OR

15. B). Discuss the construction procedure of water bound Macadam roads.   10M

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

Course Name: Power Systems-II

(Electrical & Electronics Engineering)

Date: 25.11.2025 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 corona in transmission lines?	2 M
2.	What is the skin effect?	2 M
3.	What is the sag in overhead transmission lines?	2 M
4.	Write the formula for calculating string efficiency and explain its terms.	2 M
5.	Define the reflected coefficient of voltage.	2 M
6.	Write the disadvantage of low power factor.	2 M
7.	What is a symmetrical line?	2 M
8.	Define the per unit quantity.	2 M
9.	Define short circuit MVA.	2 M
10.	Mention the boundary conditions in case of symmetrical fault.	2 M

PART-B

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

11.A). Derive the transmission parameters of a long transmission line.   10M

OR

11. B). What is the maximum length in km for a 1-phase transmission line having copper   10M
conductor of 0·775 cm2 cross-section over which 200 kW at unity power factor and at
3300V are to be delivered? The efficiency of transmission is 90% Take specific resistance
as 1725 µ Ω cm.

12. A). Derive the expression for string efficiency and discuss the factors affecting it. Also   10M
explain the methods used to improve string efficiency.

OR

12. B). A transmission line conductor crossing a river is supported from two towers at a height of   10M
45 m and 75 m above the water level. The horizontal distance between the two towers is
300m. If the tension in the conductor is 2050 Kg and weight of the conductor is 0.85
Kg/m. Find the minimum clearance of the conductor and water and clearance midway
between the supports.

13. A). What are the causes of low power factor? Discuss the various methods for power factor   10M
improvement.

OR

13. B). Derive the refracted coefficients of voltage and current waves, when the transmission line   10M
is terminated through a resistor.

(P.T.O..)

14. A). Sketch the sequential network of the following network. 10M
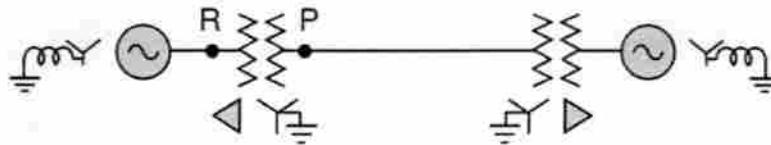
OR

14. B). Explain clearly what you mean by compensation of line and discuss briefly different methods of compensation. 10M

15. A). The voltages across a 3-phase unbalanced load are Va = 300 V, Vb = 300 ∠ – 90° V and Vc = 800 ∠ 143.1° V respectively. Determine the sequence components of voltages. Phase sequence is abc. 10M

OR

15. B). Formulate the fault current equation for a single line-to-ground fault scenario. 10M

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

Course Name: Control Systems

(Electrical & Electronics Engineering)

Date: 27.11.2025 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.	Classify the types of control systems.	2 M
2.	State Mason's gain formula.	2 M
3.	Name the types of test signals.	2 M
4.	What is the significance of integral controller and derivative controller in a PID controller?	2 M
5.	What is the necessary and sufficient condition for stability?	2 M
6.	What are the effects of adding a zero to a system?	2 M
7.	What do you understand frequency response plot?	2 M
8.	Draw the circuit of the lag compensator and write its transfer function.	2 M
9.	Define state variables. How are they selected?	2 M
10.	Name the methods of evaluation of state transition matrix.	2 M

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

11.A).   Reduce the block diagram shown in figure below and determine the transfer function.   10M
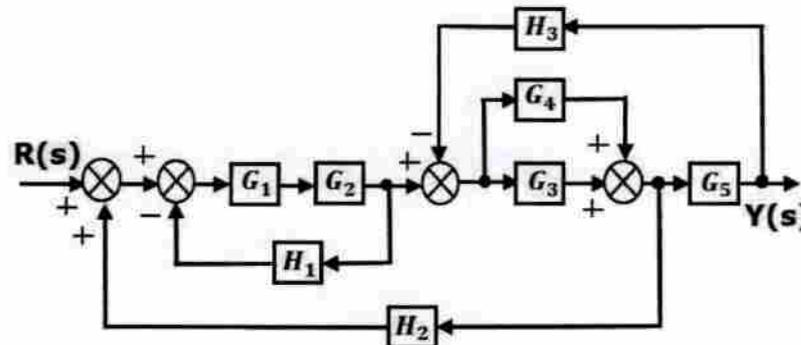
OR

11. B).   What is servomotor and obtain the transfer function of DC servomotor.   10M

12. A).   Define time response and derive the transient response of a second order system subjected   10M
to unit step input.

OR

12. B).   A second order system is given by $\frac{C(S)}{R(S)} = \frac{25}{S^2+6S+25}$. Find its rise time, peak time, peak   10M
overshoot and settling time if subjected to unit step input.

(P.T.O..)

13. A). Draw the root locus for the open loop transfer function of unity feedback control system   10M
given G (s) H(s) = K / s (s+1) (s+3).

OR

13. B). Sketch the bode plot for the following transfer function and determine phase margin and   10M
gain margin. $G(s) = \dfrac{75(1+0.2s)}{s(s^2+16s+100)}$.

14. A). A system has $G(s)H(s) = \dfrac{K}{s(1+2s)(1+0.1s)}$. Find the value of K which makes the system   10M
just unstable. Use polar plot.

OR

14. B). Describe various steps involved to design of lead compensator.   10M

15. A). Explain how to obtain the state model from a block diagram using direct decomposition.   10M

OR

15. B). Describe the properties of the state transition matrix. Mention at least five important   10M
properties.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Power Electronics
(Electrical & Electronics Engineering)

Date: 02.12.2025 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 holding Current.	2 M
2.	What is a snubber circuit?	2 M
3.	Define inversion mode and explain how it can achieved using single phase rectifier.	2 M
4.	What is meant by input power factor in controlled rectifier?	2 M
5.	Write down the expression for the average output voltage for step down and step up chopper.	2 M
6.	What is meant by commutation in power electronics converters.	2 M
7.	Why thyristors are not preferred for inverters?	2 M
8.	What is meant by PWM control?	2 M
9.	What are the three main limitations of a cycloconverter compared ac voltage controller	2 M
10.	What is the difference between single phase ac voltage controller and single phase cycloconverter?	2 M

PART-B

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

11.A).	i) Discuss the switching characteristics of SCR.	5M
	ii) Write short notes on Snubber circuit.	5M

OR

11. B).	Discuss in detail the static and switching characteristic of power IGBT.	10M
12. A).	Explain the operation of three phase, half-controlled converter with RL load. Sketch the associated waveforms also.	10M

OR

12. B).	i) Describe with neat circuit diagram and associated waveforms, operation of a 1- Φ full wave-controlled converter with RL load.	5M
	ii) A 1- φ full bridge converter using four SCRs feeds power to RLE load with R=10 Ω, L = 100Mh, and E = 100V. The ac source voltage is 230 V at 50Hz. Assuming continuous conduction; determine the average value of load current for firing delay angle 45º.	5M
13. A).	Discuss the principle of operation of DC-DC step up chopper with suitable waveform. Derive an expression for its average DC output voltage.	10M

OR

13. B).	Explain the working of Buck–Boost converter with neat sketch and waveforms and drive the expression for average output voltage	10M

14. A). With a neat sketch and output voltage waveforms, explain the working of three phase   10M
bridge inverter in 180⁰ mode of operation.

OR

14. B). Explain the following PWM techniques used in inverter.   10M
i) Sinusoidal PWM
ii) Multiple PWM.

15. A). Explain the operation of 1- φ AC voltage controller with R load. Derive an expression for   10M
output voltage.

OR

15. B). Explain the operation of 1φ-to-1φ step down cyclo converter with power circuit and   10M
waveforms.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Electrical Measurements
(Electrical & Electronics Engineering)

Date: 04.12.2025 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 standardization?	2 M
2.	State the advantages of potentiometers.	2 M
3.	What are the problems associated with the measurement of high resistance.	2 M
4.	List out the advantages of kelvin double bridge.	2 M
5.	What are the drawbacks of desauty's bridge?	2 M
6.	List out the advantages of wien's bridge.	2 M
7.	What are the drawbacks of core loss measurement by potentiometers?	2 M
8.	List out various types of iron losses of bar samples.	2 M
9.	State the limitations of clamp-on meters.	2 M
10.	What are the applications of true RMS meters?	2 M

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

11.A).	Explain how the voltage, current and power can be measured using a D.C Potentiometer.	10M

OR

11. B).	What are the problems associated with ac potentiometer? Also describe the working of any one ac potentiometer with a neat sketch.	10M
12. A).	Describe Carey Foster's bridge and derive the expression for unknown parameters.	10M

OR

12. B).	Explain the measurement of high resistance by using loss of charge method.	10M
13. A).	With the help of phasor diagram, explain Schering bridge for the measurement of capacitance. Derive the expression for dissipation factor.	10M

OR

13. B).	In Hay's bridge the four arms are arranged as under: AB is a resistance of 600Ω in series with an inductor of 0.18 H, BC and DA are noninductive resistances of 1200 Ω each and CD consists of a resistance R in series with a capacitor C. A potential difference of 3V at a frequency of 50Hz is applied between A and C. Determine the values of R and C. Derive the condition for bridge balance.	10M
14. A).	Explain flux meter with suitable diagram.	10M

OR

14. B).	Explain with a schematic diagram for the determination of Hysteresis loop.	10M
15. A).	Explain the digital multimeter with neat sketch.	10M

OR

15. B).	Explain the working of digital storage oscilloscope with neat block diagram.	10M

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

Course Name: Dynamics of Machinery

(Mechanical Engineering)

Date: 25.11.2025 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 meant by gyroscopic couple?	2 M
2.	Define static force analysis.	2 M
3.	Define coefficient of fluctuation of speed.	2 M
4.	Define the term "sensitiveness" in governors.	2 M
5.	What is principle of clutches, list out different types of clutches?	2 M
6.	Define band brake.	2 M
7.	What are the various cases of balancing revolving masses?	2 M
8.	Why is balancing of rotating parts necessary for high speed engines?	2 M
9.	Differentiate forced vibration from free vibration.	2 M
10.	What are the causes and effect of vibration?	2 M

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

11.A). The turbine rotor of a ship has a mass of 3500 kg. It has a radius of gyration of 0.45 m and   10M
a speed of 3000 r.p.m. clockwise when looking from stern. Determine the gyroscopic
couple and its effect upon the ship:

i) When the ship is steering to the left on a curve of 100 m radius at a speed of 36 km/h.

ii) When the ship is pitching in a simple harmonic motion, the bow falling with its
maximum velocity. The period of pitching is 40 seconds and the total angular
displacement between the two extreme positions of pitching is 12 degrees

OR

11. B). Describe the steps involved in dynamic force analysis of a slider-crank mechanism.   10M

12. A). The turning moment diagram for a petrol engine is drawn to the following scales: Turning   10M
moment, 1 mm = 5 N-m; crank angle, 1 mm = 1°. The turning moment diagram repeats
itself at every half revolution of the engine and the areas above and below the mean
turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm². The rotating
parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the
coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.

OR

12. B). Describe Hartnell Governor with help of a neat sketch.   10M

13. A). A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and   10M
200 mm respectively. The maximum intensity of pressure at any point in the contact
surface is not to exceed 0.1 N/mm². If the coefficient of friction is 0.3, determine the
power transmitted by a clutch at a speed 2500 r.p.m.

(P.T.O..)

OR

13. B). What is the difference between absorption and transmission dynamometers? Explain rope 10M
brake dynamometer with neat sketch.

14. A). Four masses m_1, m_2, m_3 and m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The 10M
corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the
angles between successive masses are 45°, 75° and 135°. Find the position and magnitude
of the balance mass required, if its radius of rotation is 0.2 m.

OR

14. B). What do you mean by primary and secondary unbalanced forces of reciprocating masses? 10M
Explain.

15. A). A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free 10M
end. The Young's modulus for the shaft material is 200 GN/m². Determine the frequency
of longitudinal and transverse vibrations of the shaft.

OR

15. B). Explain the method of finding the natural frequency of a torsional vibration of three rotor 10M
system.

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

Course Name: Manufacturing Technology
(Mechanical Engineering)

Date: 27.11.2025 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. Compare turret and capstan lathe.   2 M
2. A shaft 180 mm long is to be turned in a lathe whose larger diameter is 100 mm and smaller   2 M
    diameter is 85 mm. calculate the angle at which he compound rest should be set up.
3. What are the different ways to mount the drilling tool?   2 M
4. Specify the importance of jig boring machine.   2 M
5. List the common specifications of shaping, planning and slotting machines. 2 M
6. List the various work holding devices used in planer.   2 M
7. Compare up and down milling with reference to metal removal.   2 M
8. Write down the rule for gear ratio in differential indexing.   2 M
9. Recall the reason for dressing and truing of grinding wheel.   2 M
10. How do the open and dense structures of a grinding wheel influence its cutting performance   2 M
    and material removal efficiency?

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

11.A). Using the compound rest method, demonstrate how you would set up a lathe to perform a   10M
        taper turning operation on a cylindrical workpiece.

OR

11. B). Demonstrate how you would select and arrange the tools on a turret lathe for the   10M
         production of a hexagonal nut. Justify your choice of tools and their sequence of
         operation.

12. A). State the types of broaching machines? Explain the continuous broaching machine with   10M
         neat sketch.

OR

12. B). Describe the kinematic arrangement of boring machines.   10M

13. A). Compare shaper, planer and slotter in terms of the operation, work- tool motion,   10M
         construction features, type of work pieces and other relevant parameters

OR

13. B). Describe the automatic feed of the shaper table with a suitable sketch.   10M

14. A). Explain any four operations performed by a milling machine.   10M

OR

14. B). Describe the working principles of vertical milling machine.   10M

15. A). Discuss about the different types abrasives used in a grinding wheel and list the various 10M
         types bonds used in a grinding wheel.

OR

15. B). Discuss the honing and lapping processes with suitable sketches.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: **Refrigeration & Air Conditioning**
(Mechanical Engineering)
Date: 04.12.2025 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 tonne of refrigeration.	2 M
2.	What is an actual air refrigeration system?	2 M
3.	What is meant by superheating in refrigeration?	2 M
4.	What are the coordinates used in a P–h chart?	2 M
5.	What is the purpose of a condenser in a refrigeration system?	2 M
6.	List out few common refrigerants.	2 M
7.	Write the main difference between vapour absorption and vapour compression systems.	2 M
8.	What is the function of an ejector in a steam jet refrigeration system?	2 M
9.	Define Grand Sensible Heat Factor.	2 M
10.	What is the working principle of a heat pump?	2 M

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

11.A). Explain the ideal reversed Carnot cycle used for refrigeration. Derive the expression for its COP.   10M

OR

11. B). Explain the working of a bootstrap air refrigeration system with a neat diagram.   10M

12. A). Discuss the effect of sub cooling and superheating on the performance of vapor compression refrigeration systems.   10M

OR

12. B). The temperature limits of an ammonia refrigeration system are 25°C and -10°C. If the gas is dry at the end of compression. Calculate the coefficient of performance of the cycle assuming no undercooling of the liquid ammonia. Use the following table for properties of ammonia: 10M

Temperature (°C)	Liquid heat (kJ/kg)	Latent heat (kJ/kg)	Liquid entropy (kJ/kg K)
25	298.9	1166.94	1.1242
-10	135.37	1297.68	0.5443

13. A). Explain shell-and-tube and shell-and-coil condensers with neat diagrams.   10M

OR

13. B). What are the desirable properties of a refrigerant? Explain all of them.   10M

(P.T.O..)

14. A). Draw a neat diagram of lithium bromide water absorption system and explain its working. List the major field of applications of this system. 10M

OR

14. B). Explain the principle and working of a Thermoelectric Refrigerator with a neat diagram. 10M

15. A). Define the `` human comfort `` and explain the factors which affect human comfort. 10M

OR

15. B). A hall is to be maintained at 24°C dry bulb temperature and 60% relative humidity under the following conditions: Outdoor conditions = 38°C DBT and 28°C WBT, Sensible heat load in the room = 46.4 kW, Latent heat load in the room = 11.6 kW, Total infiltration air = 1200 m³/h, Apparatus dew point temperature = 10°C, Quantity of recirculated air from the hall = 60% If the quantity of recirculated air is mixed with the conditioned air after the cooling coil, find the following: 10M

(i) The condition of air leaving the conditioner coil and before mixing with the recirculated, air;

(ii) The condition of air before entering the hall

(iii) The mass of air entering the cooler

(iv) The mass of total air passing through the hall

(v) The by-pass factor of the cooling coil

(vi) The refrigeration load on the cooling coil in tonnes of refrigeration.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Electronic Measurements & Instrumentation
(Electronics & Communication Engineering)

Date: 25.11.2025 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.	Explain any two dynamic characteristics of an instrument.	2 M
2.	Define the terms Accuracy and Resolution.	2 M
3.	What is the function of spectrum analyzer?	2 M
4.	List the applications of wave analyzers.	2 M
5.	Define deflection sensitivity of a CRT?	2 M
6.	What are the advantages of dual beam for multiple trace oscilloscopes?	2 M
7.	List out difference between active and passive transducer in detail.	2 M
8.	Define Gauge factor for transducer and explain its significance.	2 M
9.	Interpret the applications of Wheatstone bridge?	2 M
10.	Explain any one of the method for the measurement of humidity?	2 M

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

11.A).	Explain the following terms in detail (i) Accuracy (ii) Resolution (iii) Precision (iv) Expected value	10M
	OR	
11. B).	Explain the operation of True RMS Responding Voltmeter with neat diagram.	10M
12. A).	Explain the operation of Harmonic Distortion Analyzer.	10M
	OR	
12. B).	Illustrate the working of a function generator with a neat block diagram.	10M
13. A).	Explain the principle and working of a storage oscilloscope.	10M
	OR	
13. B).	Explain the Measurement of frequency and phase using Lissajous patterns with one example.	10M
14. A).	Derive the expression for Gauge factor of a strain Gauge.	10M
	OR	
14. B).	With a neat diagram explain the operation of a LVDT	10M
15. A).	Explain the operation of Maxwell's Bridge and derive the condition for balance of the Bridge.	10M
	OR	
15. B).	With the help of a neat sketch explain the principle and working of Electromagnetic Flow meter. What are the advantages and Limitations of this Method?	10M

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

Course Name: Antenna & Wave Propagation

(Electronics & Communication Engineering)

Date: 27.11.2025 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 relation between gain and directivity for an efficient antenna?	2 M
2.	State the formula for radiated power from a short dipole.	2 M
3.	What is a parasitic element in antenna arrays?	2 M
4.	What is the pitch angle in a helical antenna?	2 M
5.	What is the impact of substrate thickness on antenna bandwidth?	2 M
6.	What is the primary function of a reflector in antenna design?	2 M
7.	State the condition for maximum directivity in an end fire array?	2 M
8.	Name two sources of error in antenna measurements.	2 M
9.	What is wave tilt in ground wave propagation?	2 M
10.	State the significance of critical frequency in sky wave propagation.	2 M

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

11.A). Define and derive the expression for retarded potentials. How does the Helmholtz   10M
theorem support the analysis of antenna radiation?

OR

11. B). Derive expressions for radiation resistance and radiated power of a small electric dipole.   10M

12. A). With a neat sketch, explain the structure and working principle of a Yagi-Uda antenna.   10M
Include a discussion on the role of the reflector, driven, and director elements, and their
effect on radiation pattern and gain?

OR

12. B). Describe the geometry of a monofilar helical antenna. Compare the axial and normal   10M
modes of operation in terms of polarization, directivity, and radiation pattern?

13. A). With a neat diagram, explain the geometry and parameters of a rectangular microstrip   10M
patch antenna.

OR

13. B). With the help of diagrams, explain the geometry of a paraboloidal reflector. What are the   10M
typical feed methods used, and how do they affect overall performance?

(P.T.O..)

14. A). Explain the working and design of a broadside array with non-uniform amplitude distribution using binomial coefficients.   10M

OR

14. B). Distinguish between near-field and far-field measurement zones. What precautions are taken while setting up pattern measurement arrangements?   10M

15. A). With a neat sketch, explain the structure of the ionosphere. Describe how refraction and reflection occur in different layers and their effect on sky wave propagation?   10M

OR

15. B). A radio wave is transmitted with a frequency of 12 MHz. Given a virtual height of 300 km, calculate the skip distance and maximum usable frequency. Include ray path illustrations.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Linear & Digital IC Applications
(Electronics & Communication Engineering)

Date: 29.11.2025 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.	Sketch the Symbol of Op-Amp & Mention the terminals.	2 M
2.	Define Virtual Ground Property.	2 M
3.	List the types of Filters.	2 M
4.	Discuss about the Discharge and control voltage pin role in the 555 timer.	2 M
5.	What is the principle of a Successive Approximation ADC?	2 M
6.	What is the resolution of a 4-bit R-2R Ladder DAC?	2 M
7.	Compare TTL and CMOS in terms of noise immunity.	2 M
8.	How many selection lines are required for a 16:1 multiplexer?	2 M
9.	Name two commonly used sequential logic ICs.	2 M
10.	Distinguish between RAM and ROM.	2 M

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

11.A).	With neat sketch explain the operation of an Instrumentation amplifier.	10M
	OR	
11. B).	The two input terminals of an op-amp are connected to voltage signals of strength 745 V and 740 V respectively. The gain of the op-amp in differential mode is 5×10^5 and CMRR is 80 dB. Calculate the output voltage and % error due to common mode.	10M
12. A).	Draw the circuit of a 1st order low pass Butterworth filter and discuss its transfer functions.	10M
	OR	
12. B).	Explain the functional block diagram of 555 timers.	10M
13. A).	Draw and explain about R-2R ladder DAC with an example.	10M
	OR	
13. B).	Explain the operation of a successive-approximation ADC.	10M
14. A).	Describe the basic operation of a CMOS transmission circuit.	10M
	OR	
14. B).	Build BCD-to-decimal decoder using 74HC42.	10M
15. A).	Describe the operation of a synchronous decade counter.	10M
	OR	
15. B).	Design and explain ROM internal architecture.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Digital Signal Processing
(Electronics & Communication Engineering)

Date: 02.12.2025 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 Linear Shift Invariant Systems.	2 M
2.	Define causal and static system.	2 M
3.	Explain any two properties of Discrete Fourier Series.	2 M
4.	Illustrate Overlap Add for DFT computation.	2 M
5.	Define IIR filter with one Example.	2 M
6.	Explain any one main difference between Butterworth and Chebyshev filter approximations.	2 M
7.	What is Window Technique in filters?	2 M
8.	Explain any one main difference between FIR and IIR filters.	2 M
9.	Define interpolation.	2 M
10.	Describe any two main Finite Word Length Effects.	2 M

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

11.A). Determine whether the following systems are linear, time-invariant, causal, and stable. 10M
Justify your answers with proper reasoning and examples where applicable.
i) $y[n]=x[4n+1]$
ii) $y[n]=x[n] \cdot u[n]$
iii) $y[n]=n \cdot x[n-1]+3x[n]$
iv) $y[n]=x^2[n]+x[n]$
v) $y[n]=e^{x[n]}$

OR

11. B). Obtain the i) Direct form-I ii) Direct form-II realizations for the following systems. 10M
$y(n) = -0.1y(n-1) + 0.2 y(n-2) + 3x(n) +3.6 x(n-1) + 0.6 x(n-2)$

12. A). Evaluate circular convolution of the sequences using concentric circle method 10M
$x1=\{2,1,2,1\}$ and $x2=\{1,2,3,4\}$

OR

12. B). Evaluate the DFT of a sequence $x(n)=\{1,2,3,4,4,3,2,1\}$, using decimation in time(DIT) 10M
algorithm.

13. A). Demonstrate the use of Impulse Invariant and Bilinear Transformation techniques in the 10M
design of IIR filters.

OR

13. B). Demonstrate the use of Spectral Transformations in digital filter design with one example. 10M

(P.T.O..)

14. A). Design an FIR filter using the Fourier Series Method for a given specification. 10M

OR

14. B). Analyze the Frequency Sampling technique for FIR filter design. 10M

15. A). Explain some applications of multi rate signal processing 10M

OR

15. B). Discuss the causes and effects of overflow and round-off noise in digital filters. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Digital Design Through Verilog HDL
(Electronics & Communication Engineering)

Date: 04.12.2025 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 difference between simulation and synthesis?	2 M
2.	List out the basic data types available in Verilog.	2 M
3.	What are the types of delays in gate-level modeling of Verilog?	2 M
4.	Differentiate dataflow modeling from gate-level modeling.	2 M
5.	Write the syntax for initial Construct.	2 M
6.	How is repeat different from for and while loops?	2 M
7.	What are signal strengths in Verilog and their importance for switch-level modeling?	2 M
8.	List out some "tasks" used in switch-Level Modeling	2 M
9.	How many types of models are available in sequential circuit description?	2 M
10.	What is meant by design verification?	2 M

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

11.A).	i) Describe with an example how module is created in Verilog.	5M
	ii) How functional verification is carried out in Verilog.	5M
	OR	
11. B).	i) Explain about various signal strength levels with their syntaxes in Verilog.	5M
	ii) Write the difference between scalar and vector types with example.	5M
12. A).	Create a Verilog module using gate-level primitives to model a 4-to-1 multiplexer.	10M
	OR	
12. B).	Define a 4-bit full adder with carry lookahead adder using dataflow operators.	10M
13. A).	Write a Verilog code to ripple adder using behavioral modelling.	10M
	OR	
13. B).	Illustrate with an example the usage of blocking and non-blocking assignments.	10M
14. A).	Generate a switch-level Verilog code for CMOS flip-flop.	10M
	OR	
14. B).	Write about the compiler directives along with syntax, in detail.	10M
15. A).	Explain about the implicit model and capacitive model in sequential systems	10M
	OR	
15. B).	Describe the process involved in testing of sequential circuit in Verilog.	10M

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

Course Name: Computer Organization

(Electronics & Communication Engineering)

Date: 04.12.2025 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.	Name the four main functional blocks of a computer system.	2 M
2.	What is Register Transfer Language (RTL)?	2 M
3.	What is the 2's complement representation of -18 in 8-bit format?	2 M
4.	Name any two types of adders used in computer arithmetic.	2 M
5.	What is the difference between privileged and non-privileged instructions?	2 M
6.	Define Interrupt.	2 M
7.	What is a pipeline hazard? Name any one type?	2 M
8.	What do you mean by throughput in pipelining?	2 M
9.	Define cache memory.	2 M
10.	What is the difference between write-through and write-back policies?	2 M

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

11.A). i) Describe the roles of the CPU, memory, and I/O subsystems in computer operation with neat diagram.   5M

ii) What is the function of the control unit in a computer? Differentiate between hardwired and micro programmed control units.   5M

OR

11. B). i) What are addressing modes? Explain any four types with examples.   5M

ii) Compare the instruction set architectures and design philosophy of a CPU.   5M

12. A). i) Describe fixed-point and floating-point number representations with examples.   5M

ii) Illustrate the steps involved in shift-and-add multiplication with an example.   5M

OR

12. B). Explain the steps involved in Booth's multiplication algorithm with suitable example.   10M

13. A). i) Give a brief overview of the x86 architecture with neat diagram.   5M

ii) Explain software interrupts and exceptions with suitable examples.   5M

OR

13. B). Compare the different I/O transfer methods: program-controlled, interrupt-driven, and DMA.   10M

14. A). i) How parallel processing is achieved in pipelining? Explain.   5M

ii) Discuss about auxiliary memory.   5M

OR

14. B). What is pipelining? Discuss instruction pipelining using an example.   10M

(P.T.O..)

15. A). Three types of mapping procedures are of practical interest when considering the organization of cache memory. Explain them with suitable examples. 10M

OR

15. B). i) Illustrate the concept of hierarchical memory organization. 5M

ii) Describe the importance of "replacement algorithms" in cache memory. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Computer Networks
(Common for CSE, IT, CSM, CSD & AID)

Date: 25.11.2025 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 three criteria necessary for an effective and efficient network?	2 M
2.	Define LAN? Give an Example.	2 M
3.	Define the sliding window protocol.	2 M
4.	Illustrate the difference between a hub and a switch in data link layer switching.	2 M
5.	What is flooding? What is the problem with flooding?	2 M
6.	What is the optimality principle?	2 M
7.	Why User datagram protocol is called connectionless?	2 M
8.	What are the primary services provided by the transport layer?	2 M
9.	What is HTTP, and what is its purpose in the internet?	2 M
10.	Name two protocols commonly used for streaming media over the Internet.	2 M

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

11.A).	Explain the ISO/OSI network model with a suitable diagram.	10M

OR

11. B).	Describe the key types of guided transmission media used in the physical layer? Discuss the advantages and disadvantages of each.	10M
12. A).	Describe the sliding window protocol, specifically the one-bit sliding window protocol, and explain how it functions in data transmission.	10M

OR

12. B).	A bit stream 10011101 is transmitted using the standard CRC method described in the text. The generators polynomial is $x3+1$. Show the actual bit string transmitted suppose the thread bit from the left is inverted during transmission. Show that this error is detected at receivers end.	10M
13. A).	Describe the distance vector routing algorithm, highlighting its operation, convergence properties, and limitations. How does it differ from link-state routing.	10M

OR

13. B).	Define flooding in the context of network routing. Discuss its advantages, disadvantages, and applications in various types of networks.	10M
14. A).	Discuss the features of both TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). Compare them in terms of connection establishment, reliability, and use cases.	10M

(P.T.O..)

OR

14. B). Describe the steps involved in the TCP three-way handshake, including the SYN,   10M
SYN-ACK, and ACK segments. How does this process ensure a reliable connection?

15. A). Write short notes on: 10M
(i) DNS
(ii) SMTP
(iii) Socket programming with TCP and UDP.

OR

15. B). Discuss the issues related to Multimedia transmission via Internet.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Formal Languages & Automata Theory
(Computer Science & Engineering)

Date: 27.11.2025 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.	Differentiate Moore machine and Melay machine.	2 M
2.	What is the importance of epsilon transition?	2 M
3.	Find the simplified regular expression for the following regular expression r (r*r + r*) + r*.	2 M
4.	Whether this language is regular or not $\{a^m, b^n \mid (m/n)=10\}$ and why?	2 M
5.	Construct a CFG for set of strings that contain equal no of a's and b's over {a,b}.	2 M
6.	When do you say that a string is accepted by PDA?	2 M
7.	What is reachable variable? Give an example.	2 M
8.	List the closure properties of CFL's.	2 M
9.	State the modified post correspondence problem.	2 M
10.	Compare recursive and recursive enumerable languages.	2 M

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

11.A). Design an NFA the set of all strings over {a,b} with three consecutive b's.   10M

OR
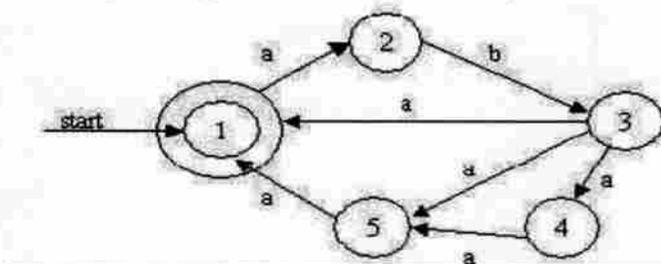
11. B). Convert the following NFA into DFA   10M
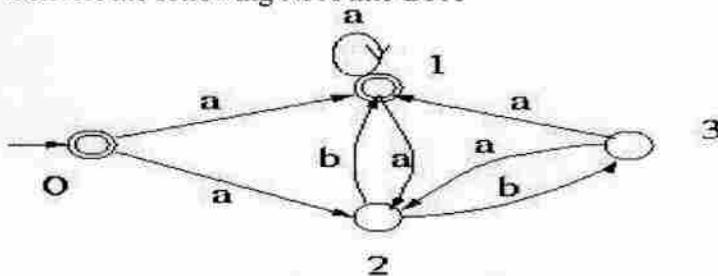
12. A). Give the RE for (i) All strings over {a,b} which contains even number of a's (ii) All strings over {a,b} which contains at least two a's (iii) All strings over {a,b} which contains at most two a's (iv) All strings over {a,b} which contains exactly two a's.   10M

OR

12. B). Find Regular Expression for the following NFA   10M

(P.T.O..)

13. A). Convert the following grammar into PDA.   10M

  S → aABC
  A → aB | a
  B → bA | b
  C → a

  Check whether the string "aabbaa" is accepted by PDA or not. Convert the following grammar into PDA.

<center>OR</center>

13. B). Consider the following productions.   10M

  S → aB | bA
  A → a | aS | bAA
  B → b | bS | aBB

  For the string "aaabbabb" find i) left most derivation ii) right most derivation iii) parse tree iv) Is it ambiguous?

14. A). Eliminate useless symbols, useless productions, unit productions and null productions   10M
       from the following grammar.
  S→ aa/A/B/C
  A→ aB/E
  B→ Aa
  C→ aCD
  D→ ddd

<center>OR</center>

14. B). Covert the following grammar in to GNF   10M
  S → AB1 | 0
  A → 00A |B
  B →1A1

15. A). What is post correspondence problem? Verify whether the following PCP has solution or   10M
       not? A={ba,ab,a,baa,b}, B={ bab,baa,ba,a,aba }

<center>OR</center>

15. B). Discuss briefly bout the following: 10M
       (i) Recursively Enumerable (REL) & Recursive Languages (RL)
       (ii) Halting Problem:
       (iii) Decidability of PCP.

<center>*****</center>

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Software Testing Methodologies
(Common for CSE & IT)

Date: 29.11.2025 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 meant by testing? Why we need it?	2 M
2.	Write the applications of path testing.	2 M
3.	Distinguish between Control Flow and Transaction flow.	2 M
4.	What is Data flow anomaly?	2 M
5.	List the uses of Domain Testing.	2 M
6.	Define Regular Expressions with example.	2 M
7.	What is state transition?	2 M
8.	Discuss the principles of state testing.	2 M
9.	Define good state and bad state graphs.	2 M
10.	Show the state-transition table with example.	2 M

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

11.A).	State and explain various dichotomies in software testing.	10M
	OR	
11. B).	Explain heuristics procedures for sensitizing paths.	10M
12. A).	Demonstrate the complication in transaction-flow testing.	10M
	OR	
12. B).	Define Data Flow Testing? Examine the Data-Flow Testing Strategies.	10M
13. A).	Discuss in detail the nice domains and ugly domains with suitable examples and explain domain testing.	10M
	OR	
13. B).	Analyze the Regular Expressions and Flow Anomaly detection.	10M
14. A).	Define path product, path expression and path sum. Explain with examples.	10M
	OR	
14. B).	Build the software implementation issues in state testing.	10M
15. A).	With neat Diagram and examples, Reproduce the node reduction algorithm.	10M
	OR	
15. B).	Discuss about matrix representation software and its building tools.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech V Semester Supplementary Examinations Nov/Dec-2025

Course Name: Operating Systems

(Common for CSE & IT)

Date: 02.12.2025 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 advantages of multiprogramming systems.	2 M
2.	What are the characteristics of an operating system?	2 M
3.	What is the difference between a process and a thread?	2 M
4.	What is Inter process communication?	2 M
5.	What is the importance of process synchronization?	2 M
6.	Define wait ( ) and signal ( ) operations.	2 M
7.	What is segmentation?	2 M
8.	Define logical and physical address.	2 M
9.	Give syntax and semantics of write() system call.	2 M
10.	List any two file access methods.	2 M

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

11.A). Classify different types of system calls with suitable examples.   10M

OR

11. B). What is a parallel system? How does it differ from distributed system?   10M

12. A). Consider the following set of processes, with the length of the CPU burst time given in   10M
milliseconds:

Process	Burst Time
P1	27
P2	12
P3	37
P4	19
P5	10

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.
Draw the Gantt chart that illustrate the execution of these processes using the following
scheduling algorithms: FCFS, SJF. Also determine the average waiting time and average
turnaround time for each of the algorithms.

OR

12. B). Explain various states of process with neat diagram.   10M

13. A). Explain about Peterson's Solution to the Critical Section Problem.   10M

OR

13. B). Illustrate how dining philosopher's problem is solved using semaphores.   10M

(P.T.O..)

14. A). What is demand paging and how it is implemented? Explain. 10M

OR

14. B). Consider the following page reference string: 10M
7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1 How many page faults would occur for the following replacement algorithm, assuming three frames using FIFO, Optimal? Remember that all frames are initially empty, so your first unique pages will cost one fault each.

15. A). Discuss various approaches for free space management in memory. 10M

OR

15. B). Explain the following with relevant diagrams: 10M
i) Single level directory structure, ii) Two-level directory structure, iii) Tree level directory structure and iv) Acyclic grape directory.

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

Course Name: Artificial Intelligence

(Common for CSE & IT)

Date: 04.12.2025 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 out the basic kinds of agents that represent the intelligent systems.	2 M
2.	Classify various search mechanisms.	2 M
3.	List different types of local consistency mechanisms.	2 M
4.	What is the purpose of a knowledge base (KB) in knowledge-based agent?	2 M
5.	List various Symbols and interpretations used in Syntax and Semantics of First-Order Logic.	2 M
6.	What is the main idea behind backward chaining?	2 M
7.	What is a planning graph?	2 M
8.	What are the different levels of Online replanning in Nondeterministic Domains.	2 M
9.	Write the Bayes' Rule.	2 M
10.	What is a CPT in Bayesian networks?	2 M

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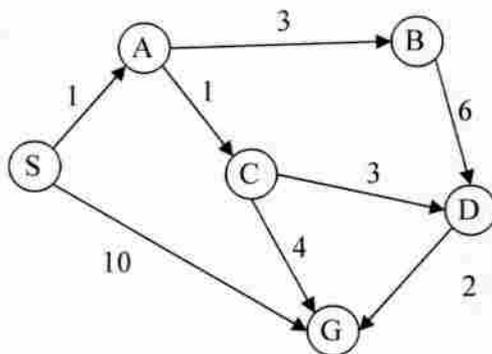**Answer the following. Each question carries TEN Marks.**   5x10=50M

11.A). Describe different types of agents.   10M

OR

11. B). (i) Apply A* algorithm to search for node G in the following tree/graph structure by considering node S as initial state.   5M

State	h(n)
S	5
A	3
B	4
C	2
D	6
G	0

(ii) Write algorithm to implement Iterative deepening Depth First Search.   5M

12. A). (i) Explain the components of a Constraint Satisfaction Problem with an example.   5M
(ii) Describe simple resolution algorithm for propositional logic.   5M

OR

12. B). (i) What are Horn clauses and definite clauses? Explain how they are used in logic inference.   5M

(ii) Describe algorithm to implement Adding Alpha-Beta Cutoffs.   5M

(P.T.O..)

13. A). (i) Illustrate Models required for first-order logic. 5M
(ii) Examine reduction to propositional inference with an example. 5M

OR

13. B). (i) What is default reasoning? How is it used to represent incomplete knowledge? 5M
(ii) Discuss usage of first-order definite clauses in forward chaining. 5M

14. A). (i) Discuss the blocks world problem of Classical Planning. 5M
(ii) With an example explain how multiple agents simultaneous involves in Planning. 5M

OR

14. B). (i) Write the Graph plan algorithm. 5M
(ii) Examine the process of Searching for primitive solutions in Hierarchical Planning. 5M

15. A). (i) Describe how agents act under uncertainty and rational decisions with suitable examples. 5M
(ii) Explain dempster Shafer theory with an example. 5M

OR

15. B). (i) What are the specifications of Bayesian network? With an example explain how knowledge can be represented in an uncertain domain. 5M
(ii) Describe explanation-based learning and illustrate an example for proof trees for the simplification problem. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Data Warehousing & Data Mining
(Common for CSE, CSC & CSM)

Date: 08.12.2025 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 a data warehouse.	2 M
2.	Expand ROLAP, MOLAP, HOLAP.	2 M
3.	Define data mining.	2 M
4.	What is similarity and dissimilarity measure in data mining?	2 M
5.	Define association rule mining.	2 M
6.	Write any one advantage of FP-Growth over Apriori.	2 M
7.	Define Naive Bayes classifier.	2 M
8.	State any one measure for selecting the best split in decision tree induction.	2 M
9.	List any four types of data used in cluster analysis.	2 M
10.	Mention two key issues in hierarchical clustering.	2 M

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

11.A). Compare operational database systems vs data warehouses in terms of data, users, processing, and time-variance.   10M

OR

11. B). With neat sketches, differentiate Star, Snowflake, and Galaxy (Fact Constellation) schemas. Mention situations where each is preferred.   10M

12. A). Explain the steps of the KDD process and show how data mining fits into it.   10M

OR

12. B). Explain data transformation and discretization techniques used in preprocessing.   10M

13. A). A database has five transactions. Let min_sup=60% and min_ conf = 80%.   10M

TID items bought
T100 {M, O, N, K, E, Y}
T200 {D, O, N, K, E, Y}
T300 {M, A, K, E}
T400 {M, U, C, K, Y}
T500 {C, O, O, K, I, E}
Find all frequent itemsets using Apriori algorithm.

OR

13. B). Explain the working principle of the FP-Growth algorithm with a suitable example.   10M

(P.T.O..)

14. A). Describe the decision tree induction algorithm. Explain how attributes are selected using   10M
    Information Gain / Gain Ratio / Gini Index.

OR

14. B). Explain K-Nearest neighbor classification algorithm with a suitable example.   10M

15. A). Describe the categorization of major clustering methods with examples.   10M

OR

15. B). Suppose that the data mining task is to cluster points (with x, y) representing location)   10M
    into three clusters, where the points are
    $A_1(2,10), A_2(2,5), A_3(8,4), B_1(5,8), B_2(7,5), B_3(6,4), C_1(1,2), C_2(4,9)$.
    The distance function is Euclidean distance. Suppose initially we assign A_1, B_1, and C_1 as
    the center of each cluster, respectively. Use the *k-means* algorithm to show *only*
    (i) The three cluster centers after the first round of execution.
    (ii) The final three clusters.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: Automata & Compiler Design
(Common for IT & CSC)

Date: 27.11.2025 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 functions of a lexical analyzer?	2 M
2.	What is left recursion? Eliminate left recursion from the given expression $A \rightarrow Aa \mid Ab \mid c \mid d$	2 M
3.	Differentiate Top-Down parsing and Bottom-up Parsing?	2 M
4.	Write the three-address code for $x = -a + b * -a + b$	2 M
5.	Define Chomsky hierarchy of languages?	2 M
6.	How type equivalence is carried during compilation?	2 M
7.	Summarize the importance of flow graph in code optimization.	2 M
8.	How to access non local names in stack storage allocation?	2 M
9.	What is the need of registry pair for some operations in code generation?	2 M
10.	List out the forms of the target program generated by code generation phase of a compiler.	2 M

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

11.A). Construct the LL(1) parser table for the following grammar: 10M

    $E \rightarrow TE'$
    $E' \rightarrow +TE' \mid \varepsilon$
    $T \rightarrow FT'$
    $T' \rightarrow * FT' \mid \varepsilon$
    $F \rightarrow (E) \mid id$

    Parse the string $(id * id) + id$

OR

11. B). Convert the following NFA to DFA.   10M
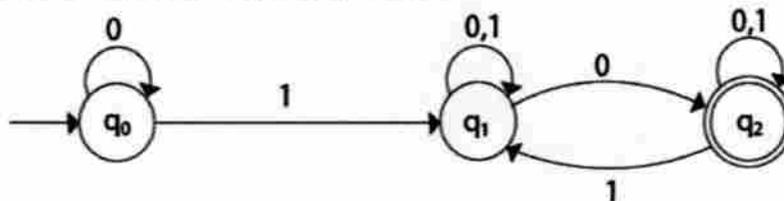
12. A). i) Derive Abstract Syntax Tree? Explain the procedure for construction the abstract syntax tree for the expression $x = -(b + c) * d$ 6M

    ii) Explain how conditional statements are translate into semantic actions.   4M

(P.T.O..)

12. B). Construct LALR parser for the below grammar and show the parsing steps for the input string $(a, (a, a))$ 10M

$S \rightarrow (L) \mid a$

$L \rightarrow L, S \mid S$

13. A). i) Define type conversion? Describe various kinds of type conversions and their impact on program behavior. 5M

ii) Write the explain the SDD for checking the type equivalence in compiler. 5M

13. B). Explain about Context Sensitive Grammar and their importance in compiler. 10M

14. A). Summarize runtime storage allocation strategies followed in program execution. 10M

14. B). i) What is peephole optimization? Explain how it is implemented during code optimization. 5M

ii) Discuss about Activation record and its importance in implementing storage allocations. 5M

15. A). Discuss about object form and code generation algorithms. 10M

15. B). Construct a DAG for the expression $x = -(b + c) * d - (b + c)$ and demonstrate how code optimization and register assignment are done for it. 10M

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

Course Name: Data Science with R

(CSD)

Date: 29.11.2025 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 definition of Data Science?	2 M
2.	What are probability distributions.	2 M
3.	What is the median?	2 M
4.	What is a binary attribute?	2 M
5.	What is a vector in R? How can you create and name a vector?	2 M
6.	What is matrix sub setting?	2 M
7.	What are relational operators in R?	2 M
8.	List some commonly used mathematical functions in R.	2 M
9.	What are the main strategies used for data reduction?	2 M
10.	What is attribute subset selection?	2 M

PART-B

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

11.A).	i) Describe the current landscape of perspectives in Data Science.	5M
	ii) Explain the purpose of statistical modeling in data science.	5M
	OR	
11. B).	i) Explain the basic data types in R.	5M
	ii) Describe the difference between populations and samples in statistics.	5M
12. A).	i) What is the difference between ordinal attributes and nominal attributes?	5M
	ii) Describe the different ways to measure the dispersion of data	5M
	OR	
12. B).	i) Differentiate between discrete and continuous attributes with examples.	5M
	ii) What is the interquartile range (IQR) and how is it useful?	5M
13. A).	i) Explain vector arithmetic with examples.	5M
	ii) What methods can be used to sort a data frame?	5M
	OR	
13. B).	i) Explain the process of subsetting a data frame.	5M
	ii) Write a program to merge two or more lists?	5M
14. A).	i) Explain how logical operators interact with vectors.	5M
	ii) How does a while loop work in R? Provide a sample use case.	5M

(P.T.O..)

OR

14. B). i) What are conditional statements in R? Write examples using if, else and ifelse. 5M
ii) Explain function scoping in R with an example. 5M

15. A). i) Explain Principal Component Analysis (PCA) and its use in dimensionality reduction. 5M
ii) What is data cube aggregation and how is it applied? 5M

OR

15. B). i) How can histograms assist in the process of data reduction? 5M
ii) Explain geometric projection visualization techniques with use cases. 5M

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

Course Name: Theory of Computation

(CSM)

Date: 18.12.2025 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 alphabets, strings, and languages?   2 M
2. Write the difference between Moore and Mealy machines.   2 M
3. State the closure properties of regular languages.   2 M
4. Write the process of minimizing a DFA.   2 M
5. What is ambiguity in grammar? Give an example.   2 M
6. Write the equivalence of PDA and CFG.   2 M
7. Write the steps to eliminate ε-productions from a CFG.   2 M
8. Define a Turing machine and its components.   2 M
9. What is a recursively enumerable language?   2 M
10. Mention any two undecidable problems about Turing machines.   2 M

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

11.A). Describe the formal definition of NFA with ε-transitions and explain with an example.   10M

OR

11. B). Explain the conversion of NFA with ε-transitions to DFA with suitable example.   10M

12. A). Explain the algebraic laws of regular expressions with examples.   10M

OR

12. B). Determine whether the language $L = \{a^n b^m \mid n \neq m\}$ is regular using the pumping lemma.   10M

13. A). Construct a PDA for the language $L = \{ww^r \mid w \in (0+1)^*\}$ and explain the working.   10M

OR

13. B). Explain ambiguity in context-free grammars with suitable example.   10M

14. A). Explain the procedure for converting CFG into Chomsky Normal Form and Greibach Normal Form.   10M

OR

14. B). Prove that the intersection of two context-free languages need not be context-free.   10M

15. A). Discuss recursively enumerable and recursive languages with examples.   10M

OR

15. B). Explain the Modified Post Correspondence Problem and its undecidability.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations Nov/Dec-2025
Course Name: **Business Management & Financial Analysis**
(Common for CE & CSD)

Date: 27.11.2025 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 short note on scientific management.	2 M
2.	What is motivation? Name any two motivation theories.	2 M
3.	List any two objectives of Human Resource Management.	2 M
4.	What is PPC?	2 M
5.	Distinguish between micro and macroeconomics.	2 M
6.	What is inflation?	2 M
7.	List the types of costs.	2 M
8.	Define market equilibrium.	2 M
9.	Write any two objectives of financial statement analysis.	2 M
10.	Mention two types of financial ratios.	2 M

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

11.A).	Compare and contrast the classical and human relations approaches to management.	10M
	OR	
11. B).	Examine the role of leadership in effective management with examples.	10M
12. A).	Illustrate the importance and functions of HR Management in an organization.	10M
	OR	
12. B).	Analyze how the financial and marketing departments work together for business success.	10M
13. A).	Analyze the concept and types of elasticity of demand.	10M
	OR	
13. B).	Examine how economic environment impacts managerial decisions.	10M
14. A).	Discuss different market structures and their characteristics.	10M
	OR	
14. B).	Analyze the relationship between price, cost, and output decisions in competitive markets.	10M
15. A).	Evaluate the importance of liquidity and leverage ratios in financial analysis.	10M
	OR	
15. B).	Prepare a comparative financial statement and interpret the results.	10M

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