B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

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SECTION - I

1   A simply Supported beam of length 8m is having two point loads of 50KN and
    40KN acting at distances of 3m and 5m respectively from left support. Find
    (i)   Slopes at left and right supports
    (ii)   Deflections under the loads
    (iii)   Location and magnitude of maximum deflection
    Given $E = 2 \times 10^4$ N/mm^2 and $I = 1.07 \times 10^9$ mm^4

2   By using Moment Area Method, calculate slope and deflection for a simply
    supported beam of length L meters, carrying a uniformly distributed load of
    intensity w/m throughout its length.

SECTION - II

3   Find the forces in all members for the figure below by method of joints
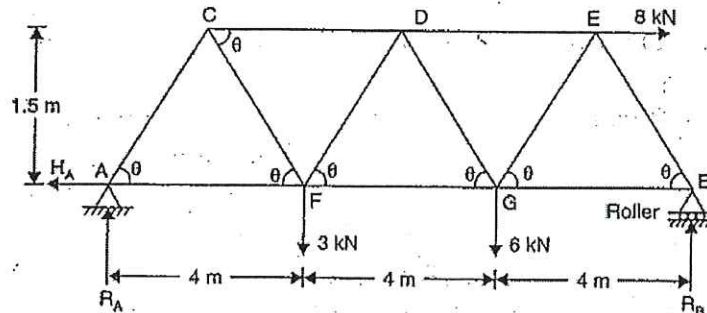
4   Write a short notes on types of frames and list out the assumptions made in
    finding out the forces in a frame.

SECTION – III

5   Draw shear force and bending moment diagrams for a propped cantilever of
    length L, carrying an uniformly distributed load of intensity w/m run on its
    whole span.

6   Write advantages of fixed beams over simply supported beam.

SECTION – IV

7   Draw shear force and Bending Moment diagrams of a continuous beam ABC of
    length 10m which is fixed at A and is supported on B and C. The beam carries a
    uniformly distributed load of 2 kN/m length over the entire span. The spans AB
    and BC are equal to 5m each.

8   How will you apply Clapeyron's theorem of three moments to a
    i)   Continuous beam with simply supported ends
    ii) Continuous beam with fixed end supports.

SECTION – V

9   Find the horizontal displacement at D of the frame shown in figure. Assume the flexural rigidity of the beam is EI to be constant through out the member. Neglect strain energy due to axial deformation.
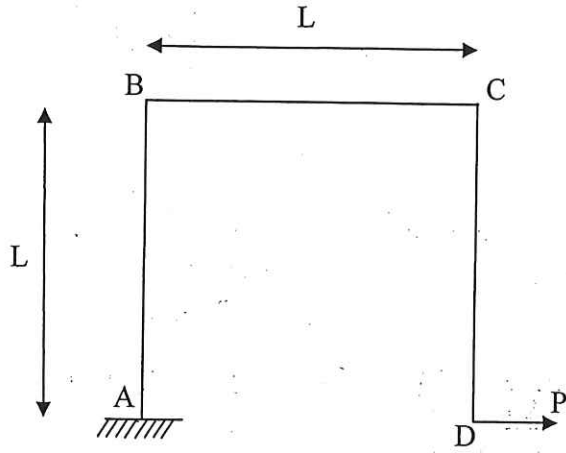
10   Derive Castigliano's First Theorem of Moments.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech I Semester

FOUNDATION ENGINEERING
(Civil Engineering)

Time : 3 hours   Max Marks: 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All questions carry equal marks
* * *

SECTION-I

1   Discuss the friction circle method for the stability of analysis of slopes.

2   (a)   Write short notes on Taylor's stability number and also uses of charts.
    (b)   Write short note on slope failure observed by you and write the reasons for the failure in your opinion .

SECTION-II

3   A 9 m high retaining wall supports a cohesionless backfill whose surface is inclined at an angle of 12^0 with the horizontal. If the unit weight of backfill is $17 kN/m^3$ and the angle of internal friction is 31^0, determine the horizontal component of total active thrust acting on the wall per meter length. Use Rankine's theory.

4   Write the assumptions in the Coulomb's wedge theory. Compare Rankine's and Coulomb's wedge theories.

SECTION-III

5   A trapezoidal masonry retaining wall 1m wide at top and 3m wide at its bottom is 4m high. The vertical face is retaining soil ($\Phi = 30°$) at a surcharge angle of 20^0 with the horizontal. Determine the maximum and minimum intensities of pressure at the base of the retaining wall. Unit weights of soil and masonry are $20 kN/m^3$ and $24 kN/m^3$ respectively. Assuming coefficient of friction at the base of the wall as 0.45, determine factor of safety against sliding and overturning.

6   (a)   Explain the importance of drainage provision for retaining wall.

    (b)   Describe with neat sketches various drainage provisions for retaining wall.

SECTION-IV

7   Describe Skempton's analysis for bearing capacity of cohesive soils. Compare with Terzaghi's theory.

8   A square footing located at a depth of 1.5m below the ground surface in cohesionless soil carries a column load of 1280kN. The soil is submerged having an effective unit weight of $11.5 kN/m^3$ and an angle of shearing resistance of 30^0.find the size of footing by Terzaghi theory. Take FOS=3.

SECTION-V

9 (a) Write a short note on negative skin friction on pile. Explain its effect on the pile.

(b) A pile is driven with a single acting steam hammer of weight 15 KN with a free fall of 900 mm. the final set, the average of the last three blows is 27 mm. find the safe load using the Engineering News formula?

10 Describe the various components of a well foundation with neat sketch and also write the uses of each component.

SECTION-VI

11 Discuss various types of soil samplers for obtaining undisturbed samples? Describe any one of them with neat sketch.

12 Discuss various penetration tests . Discuss merits and demerits of each test.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech. I Semester
R.C.C. STRUCTURAL DESIGN - II
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
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SECTION – I

1   Two columns having cross-section of 250 x 250 mm and 300 x 300 mm are loaded with 300 KN and 500 KN respectively. The c/c distance between column IS 4 m and the bearing capacity of soil is 100 KN/M2. Design rectangular combined footing without beam.

2   Two columns having cross-sections of 240 x 249 mm and 300 x 300 mm are loaded with 300 KN and 500 KN respectively. The c/c distance between the columns is 4m. The bearing capacity of soil is 120 KN/M2. The footing is restricted to 120 mm from centre of first column and 150 mm from that of second column. Design a trapezoidal combined footing without beam.

SECTION – II

3   A 7.5m tall counterfort retaining wall is to be constructed from C20/35 concrete and reinforced with 410Mpa high tensile steel bars. It is placed in a granular soil that has a density of 18kN/m3. The water table is below the level of the base to the retaining wall and there is a surcharge of 10 kN/m2 applied on the backfill. The angle of shear resistance φ is 30°, the coefficient of friction between the soil and the concrete is 0.57 and the bearing capacity of the soil is 250kN/m2. Size the retaining wall and determine the quantities of reinforcing steel required in the wall.

4   Design a cantilever retaining wall to retain the horizontal earthen embankment of a height 4m above the ground level. Unit weight of backfill 18 KN/M3 , angle of repose 300 , SBC 180 KN/M2 , coefficient of friction between concrete and soil 0.5. Use M20 concrete and Fe415 steel.

SECTION – III

5   Design a rectangular water tank of size 5m x 4mx 3m deep resting on firm ground. adopt M25 grade concrete and mild steel

6   Design a circular tank having an internal diameter of 10 m and a maximum height of 5 m. The walls of the tank are restrained at base. Assume thickness of wall as 180 mm. Use M25 Grade concrete and Fe 500 steel.

SECTION – IV

7   Inside diameter of circular room is 15m.Design a circular dome to carry a LL of 2.5KN/M^2

8   Explain the design procedure for Intze tanks with neat sketches

SECTION – V

9 (a) Write the assumptions and characteristic features of yield lines for analysis of slabs.
   (b) Write short notes about the upper bound and lower bound theorems.

10   Design a circular slab of diameter 4.8 m which is simply supported at the edges. Live load = 3.8kN/m2. Assume M-30 grade concrete and HYSD bars.

SECTION – VI

11   A prestressed concrete beam 250*350 mm deep is prestressed with wires (area = 380 mm2) located at 55 mm from the bottom carrying an initial stress of 1500 N/mm2. The span of the beam is 9 m. Calculate the percentage loss of pre-stress in wires when the beam is post-tensioned.
   Assume:
   ES = 200 kN/mm2,
   EC = 38 kN/mm2.
   Relaxation of steel stress = 4% initial stress
   Shrinkage of concrete = Creep coefficient = 2.0,
   Slip at anchorage = 1.5 mm,
   Friction coefficient = 0.002 per meter.

12 (a) What is pre tensioning and post tensioning.
   (b) Explain with sketches Freyssinett system and Magnell's system of post tensioning?

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech I Semester

STEEL STRUCTURAL DESIGN
(Civil Engineering)

Time : 3 hours   Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All questions carry equal marks

SECTION-I

1 (a) Enumerate modes of failures of bolted joints with neat sketches.

   (b) Calculate the strength of a 20mm diameter bolt of grade 4.6 for a Lap joint. The main plates to be jointed are 12mm thick.

2 Discuss various types of groove welds and its failures.

SECTION-II

3 An equal angle ISA 90 x 90 x 6 is connected to a 10mm gusset plate at the end with four numbers 16mm diameter bolts. The angle is to be used as a tension member. Find the design tensile strength of the angle if
   (i) 90mm leg is connected to the gusset plate (g = 50mm)
   (ii) 90mm leg is connected to the gusset plate (g = 30mm). Use Fe410.

4 Determine the tensile strength of the plate 130x12mm with holes for 16mm diameter. Use Fe410.

SECTION-III

5 Determine the axial load carrying capacity of a column model of ISHB 300 @ 577N/m, if the length of the column is 3m which is pinned at the both the ends. Use Fe410 Steel.

6 Design a built up column 10m long to carry factored axial load of 1080KN. The column is restrained in position but not in direction at both ends. Provide single lacing system with bolted connections. Use Fe410 steel.

SECTION-IV

7 Design a simply supported beam of effective span 1.5m carrying a factored concentrated load of 360kN at mid span.

8 A Simply supported beam of span 5m has its compression flange laterally supported, it has to support the following loads, DL excluding self weight-80KN, point load-65KN and live load-120KN.

SECTION-V

9   Design a gantry girder to be used in an industrial carrying manually operated overhead travelling crane, for the following data.

    a)   Crane capacity – 200kN
    b)   Self weight of the crane girder excluding trolley – 200kN
    c)   Self weight of the trolley, electric motor, hook.etc – 40kN
    d)   Approximate minimum approach of the crane hook to the gantry girder – 1.2m
    e)   Wheel base – 3.5m
    f)   Centre to centre distance between gantry rails – 16m
    g)   Centre to centre distance between columns (span of the gantry girder) – 8m
    h)   Self weight of the rail section -300N/m
    i)   Diameter of crane wheels – 150mm
    j)   Steel of grade Fe410
    k)   Design also the field welded connection, if required.
    l)   The support bracket connection need not be designed.

10   A steel beam of span 6m with end bearings of 150m at each end. The loading consists of dead load 3kn/m^2 including weight of beams and live load of 12KN/m^2. The compression flanges of the beam are laterally supported. Design the beam of depth not exceeding 400mm.

SECTION-VI

11   A column ISHB350 @ 661.2N/m carries an axial compressive factored load of 1700kN.Design a suitable bolted gusset plate base. The base rests on M15 grade concrete pedestal. Use 24mm diameter bolts of grade 4.6 for making the connections.

12   Design a slab base for a column ISHB350@710.2N/m subjected to a factored axial compressive load of 1500KN, when load is transferred to base plate by welded connections.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

DIGITAL SIGNAL PROCESSING
(Common to EEE & ECE)

Time : 3 hours   Max. Marks :60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1 (a) Determine the inverse Z – transform of $\dfrac{z}{(z+3)^2(z-2)}$

   (b) Explain the properties of Region of Convergence of X(Z)

2   Explain in detail about Fourier representation of finite duration sequences with an example

SECTION - II

3   Compute 8 point DFT of the sequence x(n)={1/2,1/2,1/2,1/2,0,0,0,0} using DIF-FFT algorithm

4 (a) Identify the DFT of the four point-sequence: x(n) = (0 ,1,2,3)
   (b) Prove the following DFT properties
        i.   Circular Symmetries of a Sequence
        ii. Linearity
        iii. Convolution

SECTION - III

5   Design the direct form I, direct form II and cascade form realization for the following system.
        y(n) = -0.52y(n-1)+0.23y(n-2)+5x(n)+3.9x(n-1)+0.6x(n-2)

6 (a) Bring out the salient features of IIR Structures Direct form–I, Direct form- II
   (b) Determine the transposed direct form-II for the given system

        y(n) = ½ y(n-1) – ¼ y(n-2) + x(n) + x(n-1)

SECTION - IV

7   Obtain the analog Chebyshev filter transfer function that satisfies the constraints
        $1/\sqrt{2} \le |H(j\Omega)| \le 1$; $0\le\Omega\le2$ $|H(j\Omega)| < 0.1$; $\Omega\ge4$

8 (a) Determine the poles of low pass Butterworth filter for N=4. Sketch the location of poles on s-plane and hence determine the normalized transfer function of LPF

   (b) Compare Chebyshev and Butterworth filters.

SECTION - V

9   Explain the Design of FIR digital filters using window techniques.

10   (a)   Explain briefly the method of designing FIR filter using Frequency sampling method

      (b)   Compute 20 log|w(e^{iw})| at w=0 for the following windows:
          i.   Bartlett window for add N
         ii.   Rectangular window
        iii.   Hamming window

SECTION - VI

11   (a)   Explain Input quantization Error.
      (b)   List why rounding is preferred for truncation in realizing digital filter?

12   (a)   Discuss the limit cycle behavior of the following system y(n) = 0.7y (n-1) + x(n).
      (b)   Explain product quantization Error.

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

POWER SYSTEMS - II
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Derive the expressions for the ABCD constants for the nominal pi circuit of a medium transmission line.

(b) Obtain the equivalent circuit of a long transmission line with necessary equations.

2 (a) Using nominal -T method find A, B, C, D constants of a 3-phase 80 km long 50 Hz transmission line with series impedance of (0.15+j0.78) ohms per km and a shunt admittance of 5×10^{-6} mho per km.

(b) Explain the physical significance of the generalized A, B, C, D constants of a transmission line. State the units of these constants.

SECTION - II

3 (a) A 3-phase overhead line has per phase resistance and reactance of 6 ohm and 20 ohms respectively. The sending end voltage is 66 kV while the receiving end voltage is maintained at 66 kV by a synchronous phase modifier. Determine the KVAR of the modifier when the load at the receiving end is 75 MW at p.f. 0.8 lagging; also determine the maximum load that can be transmitted.

(b) Explain the effect of shunt compensation on the performance of transmission lines.

4 (a) Explain the various types of voltage control methods in detail.

(b) Define attenuation and distortion coefficients.

SECTION - III

5 (a) Discuss the phenomenon of wave reflection and refraction. Derive expression for reflection and refraction coefficients.

(b) A 200 kV, 3 μs, rectangular surge travels on a line of surge impedance of 400 ohms. The line is terminated in a capacitance of 3000 pF. Find an expression for voltage across the capacitance.

6 (a) Give a mathematical analysis to show the velocity of propagation of wave depends on the inductance and capacitance of the line.

(b) Derive the transmission and reflection coefficients for voltage and currents of a line of impedance 'Z' is terminated by a resistor of value 'R'.

SECTION - IV

7 (a) Explain the procedure of earthing and define the various types of earthing.

(b) What is Tower Footing Resistance and explain its reduction methods?

8   (a)   What is the design of a grounding transformer?

      (b)   Explain arcing grounds and the methods of protection against them.

SECTION - V

9   (a)   Draw the key diagram for 66/11kv substation.

      (b)   What are the environmental impacts of transmission lines?

10   (a)   What is the need of EHV transmission system in India?

      (b)   Explain the advantages of DC transmission.

SECTION - VI

11   (a)   What is meant by per unit quantity? Why per unit method is considered superior to percent method for short circuit calculations.

      (b)   The single-line diagram of a three-phase system is shown in Fig. 1. Using the common base Sb = 50 MVA, draw the impedance diagram in per unit including the load impedance. The manufacturer's nominal ratings are given as follows:
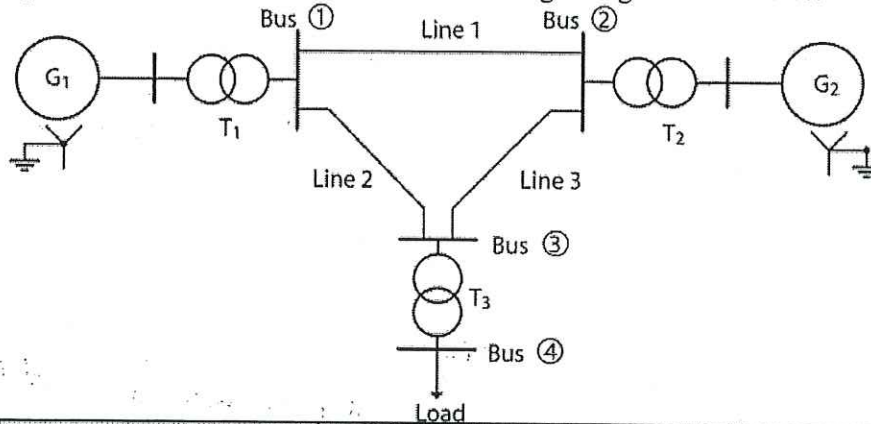
Device	S_n	$U_{(L\text{-}L)n}$	X_n
Generator G_1:	48 MVA	20 kV	20%
Generator G_2:	25 MVA	13.8 kV	15%
Transformer T1:	50 MVA	20/110 kV	8%
Transformer T2:	30 MVA	13.8/110 kV	6%
Transformer T3:	50 MVA	11/110 kV	10%

      The three-phase load at bus 4 absorbs 60 MVA at 0.75 power factor (lagging), and lines 1, 2, and 3 have the reactance of 40Ω, 32 Ω, and 30Ω, respectively.

12   (a)   Explain the difference between the two- winding three-winding transformer.

      (b)   Draw Single line diagram representation of impedance diagram by taking example.

R-17   **Code : 17EC3104**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

ANALOG IC APPLICATIONS
(Common to EEE & ECE)

Time : 3 hours   Max. Marks :60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1   Discuss the DC characteristics of an Op Amp.

2   Design the Inverting & Non inverting Op-Amps and Derive the gain equations.

SECTION - II

3   (a)   What is differential Amplifier? Draw its transfer characteristics.

       (b)   Explain the operation of Precision Half-wave Rectifier.

4   Explain the operation of V-I and I-V Converters using Op-Amp.

SECTION - III

5   Illustrate the operation of Regenerative Comparator with relevant diagrams.

6   Design the sine wave generator using Op-Amp.

SECTION - IV

7   With the help of functional block diagram explain the operation of IC 555 and list out its applications.

8   Discuss the operation of VCO IC 566 with neat block diagram.

SECTION - V

9   Explain different types of Active filters. Discuss their merits and demerits.

10   Discuss the design of IC 723 Voltage regulator.

SECTION - VI

11   What are the specifications that we need to consider in ADC/DAC design? Explain in detail.

12   Discuss the design of Successive approximation ADC and list its specifications.

R-17   **Code : 17ME3105**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech. I Semester
MECHANICAL MEASUREMENTS
(Mechanical Engineering)

Time : 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a) Define readability and sensitivity of an instrument.

     (b) What do you understand by threshold? What are the causes for threshold?

2   (a) Explain the different dynamic characteristics of a measuring system.

     (b) Define and explain sensitivity and accuracy.

SECTION - II

3   Clearly explain the constructional features and working of inductive transducer and photoelectric transducer

4   Describe ay two transducers for measurement and discuss their limitations and applications.

SECTION – III

5   Suggest and explain a method for measuring dynamic pressure variations in t he exhaust manifold of an I.C. engine.

6   (a) Explain with the help of suitable sketches, the difference between a bellows gauge and a diaphragm gauge for pressure measurement.

     (b) Write short notes on high-pressure measurement.

SECTION - IV

7   (a) With neat sketch explain the working of Rotameter.

     (b) Explain ultrasonic flow meter with a neat sketch and give limitations.

8   Describe the working of (i) turbine flow meter and (ii) Magnetic flow meter with neat diagrams.

SECTION - V

9 Briefly explain the theory of pyrometry? Explain the construction and working of an optical pyrometer with the help of a schematic diagram.

10 Explain the principle of resistance thermometer with a neat sketch. Also state the advantages of resistance thermometer over thermocouples.

SECTION - VI

11 (a) What are the requirements of materials for strain gauges

  (b) Explain the working of electrical strain gauge.

12 Name the flow seismic instruments and working of any one instrument to measure the vibration

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

DYNAMICS OF MACHINERY
(Mechanical Engineering)

Time : 3 hours   Max. Marks :60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1 (a) What do you mean by friction axis and friction circle? Explain.

   (b) The mean diameter of a square threaded screw jack is 50 mm. The pitch of the thread is 10 mm. The coefficient of friction is 0.15. What force must be applied at the end of a 0.7 m long lever, which is perpendicular to the longitudinal axis of the screw to raise a load of 20 kN and to lower it?

2   Explain working principle of Centrifugal clutch with neat diagram.

SECTION - II

3   Discuss the various types of brakes with neat sketches.

4   Classify two different types of dynamometers and explain about their working with the aid of neat sketches.

SECTION - III

5   A porter governor has equal arms each 250 mm long and pivoted on the axis of rotation. Each ball has a mass of 5 kg and the mass of central load on the sleeve is 25 kg. The radius of rotation of the ball is 150 mm. The governor begins to lift and rises to 200 mm when the governor is at maximum speed. Find the range of speed when the friction at the sleeve is equivalent to 10 N.

6   Explain the following terms relating to governors:
          (i) Effort and power   (ii)Isochronism and Hunting

SECTION - IV

7 (a) The turning moment requirement of a machine is represented by the equation $T = (1000+500 \sin 2\theta-300\cos 2\theta)$ N-m. Where θ is the angle turned by the crankshaft of the machine. If the supply torque is constant, determine: i) The moment of inertia by the flywheel. The total fluctuation of speed is not to exceed one percent of the mean speed of 300 rpm. ii) Angular acceleration of the flywheel when the crankshaft has turned through 45^0 from the beginning of the cycle. iii) The power required to drive the machine

   (b) Write short notes on i) Turning moment diagram ii) coefficient of fluctuation of speed

8   A Punching press is driven by a constant torque electric motor. The press is provided with a flywheel that rotates at maximum speed of 225 rpm. The radius of gyration of the flywheel is 0.5 m. The press punches 720 holes per hour, each punching operation takes 2 seconds and requires 15 kN-m of energy. Find the power of the motor and minimum mass of the flywheel if speed of the same is not to fall below 200 rpm?

SECTION - V

9   (a) What do you understand by gyroscopic couple ?

       (b) The moment of inertia of a rotating disc in aeroplane is 15 kg-m^2 and the direction of rotation is clockwise when looking from front side of the aeroplane. The speed of the disc is 1600 rpm. The speed of flight is 240 km/hr. If the aeroplane makes a right turn on a curved path of 170 m radius, find the gyroscopic couple on the aeroplane.

10   The rotor of a turbine installed in a boat with its axis along the longitudinal axis of the boat makes 1500 rpm clockwise when viewed from the stern. The rotor has a mass of 750 kg and a radius of gyration of 300 mm. If at an instant, the boat pitches in the longitudinal vertical plane so that bow rises from the horizontal plane with an angular velocity of 1 rad/s, determine the torque acting in the boat and the direction in which it tends to turn the boat at the instant.

SECTION - VI

11   (a) What is a cam? What type of motion can be transmitted with a cam and follower combination? What are its elements?

       (b) A cam is to give the following motion to a knife-edged follower : 1. Outstroke during 60° of cam rotation ; 2. Dwell for the next 30° of cam rotation ; 3. Return stroke during next 60° of cam rotation, and 4. Dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when the axis of the follower passes through the axis of the cam shaft.

12   Draw the cam profile for following conditions: Follower type = roller follower, in-line; lift = 25mm; base circle radius = 20mm; roller radius = 5mm; out stroke with Uniform acceleration and retardation for 120^0 cam rotation; dwell for 60^0 cam rotation; return stroke with UARM, for 90^0 cam rotation; dwell for the remaining period. Determine max. velocity and acceleration during out stroke and return stroke if the cam rotates at 1200 rpm in clockwise direction

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech. I Semester

VLSI DESIGN
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   Summarize the Fabrication of NMOS transistor with neat Sketches.

2   Explain about the following
     i). Oxidation   ii). Ion Implantation   iii). Encapsulation

SECTION - II

3   Analyze the working of CMOS Inverter with its Characteristics in detail.

4   (a)   Outline about NMOS Inverter with neat sketches.

     (b)   Summarize the working of Bi-CMOS inverter with neat sketches.

SECTION - III

5   (a)   Outline about Area Capacitance calculation with an example.

     (b)   Determine the Inverter Delays with relevant expressions.

6   Design the Layout of 2-input NOR gate using Lambda based design rules.

SECTION - IV

7   Analyze the working of C^2MOS logic and CMOS Domino logic circuits.

8   Explain about Placement, routing and Power delay estimation.

SECTION - V

9   Explain the working of 4x4 Barrel Shifter with neat sketches.

10   Analyze the functionality of CPLDs with neat sketches.

SECTION - VI

11   Summarize about the Design Capture Tools used in Testing of VLSI circuits.

12   Outline about the concepts of Design and Testability.

R-17   **Code : 17EC3103**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech. I Semester
ELECTROMAGNETIC RADIATING SYSTEMS
(Electronics & Communication Engineering)

Time : 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Obtain the relation between primary and secondary constants in transmission lines.

   (b) List the advantages and application of the transmission lines.

2 Discuss the purpose of transmission line in communication systems and derive the transmission line equations.

SECTION - II

3 Illustrate the properties of Smith chart and explain the importance of smith chart.

4 (a) Exhibit Standing Waves and explain Reflection Coefficient.

   (b) Summarize the concept of Input Impedance of Open and Short Circuited Lines.

SECTION - III

5 (a) Define antenna and recall the concept of retarded potential.

   (b) Express the relation between Directivity and Maximum Effective Aperture with suitable equations.

6 (a) Compare Half Wave Dipole and Monopole Antennas.

   (b) Write a short note on Radiation Pattern, Radiation Intensity.

SECTION - IV

7 With a neat diagram explain the construction and operation of the Yagi-Uda Antenna

8 (a) Discuss the need of Antenna arrays and explain Broadside arrays.

   (b) Elucidate the Principle of Pattern Multiplication.

SECTION - V

9 Explain Ground wave Propagation and calculate the Ground Wave Field Strength

10 (a) Demonstrate the effect of wave propagation with antennas located over Flat Earth.
   (b) Write a short note on Surface and space wave propagation.

SECTION - VI

11 Define sky wave propagation and Explain the wave propagation mechanism in sky wave propagation.

12 (a) Summarize MUF, critical frequency and skip distance.

   (b) Elaborate significance of Virtual Height in wave propagation.

R-13   **Code :13EC3101**

III B.Tech. I Semester

ELECTRONIC MEASUREMENTS & INSTRUMENTATION
(Electronics & Communication Engineering)

Time : 3 hours   Max. Marks :60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1   Explain the types of errors in measurements.

2   (a)   Describe the principle of operation of a multimeter.

     (b)   A 1mA meter movement with an internal resistance of 100Ω is to be converted to $0 - 100mA$. Calculate the value of shunt resistance required

SECTION - II

3   (a)   Draw and explain the block diagram of Function Generators.

     (b)   Describe a modern laboratory-type standard signal generator. What technique is used to improve its stability?

4   (a)   With a neat sketch explain the working of spectrum analyzer.

     (b)   What is the difference between a wave analyzer and a harmonic distortion analyzer?

SECTION - III

5   Draw the basic block diagram of an Oscilloscope and explain its principle of operation.

6   (a)   Explain in detail about Dual trace oscilloscope.
     (b)   Explain Lissajous method of frequency measurement in CRO.

SECTION - IV

7   With neat circuit diagram explain how R_x is measured using a Wheatstone's bridge.

8   (a)   Derive the value of capacitance C_x by using Schering bridge.

     (b)   Describe the circuit and working of a Q-meter. Give its applications.

SECTION - V

9   (a)   Define Transducer? Briefly explain its types.

     (b)   what is strain gauge? Derive the expression for gauge factor

10   (a)   Draw and explain about Strain Gauges.

     (b)   Explain how displacement can be measured using LVDT with neat sketch.

R-20   **Code : 20CE3105**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

BASICS OF TRANSPORTATION ENGINEERING

(Common to CSE, IT & AI&DS)

Time : 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. (a) Define and differentiate between the various modes of transportation, including road, rail, water, and air.

   (b) What factors influence the selection of road alignment, and how do topography and land use affect alignment decisions?

2. (a) Explain the different methods used to classify roads, including functional classification and traffic classification.

   (b) Explain why a direct alignment is preferable in road design.

SECTION - II

3. (a) A highway has a design speed of 70 mph. Calculate the minimum horizontal curve radius required for a super elevation rate of 6%.

   (b) Calculate the SSD required for a vehicle traveling at 55 mph on a level road. Assume a driver reaction time of 2 seconds and a deceleration rate of 11.2 ft/s².

4. (a) Explain the concept of extra widening on horizontal curves and its purpose.

   (b) Derive the formula for calculating super elevation (e) in terms of design speed (V), radius (R), and acceleration due to gravity (g).

SECTION - III

5. (a) Why international standardization of traffic is signs necessary, and how does it benefit global transportation?

   (b) Discuss the primary function of road markings in traffic control.

6. (a) Discuss the role of mandatory signs in regulating traffic.

   (b) Describe the typical materials used for road markings and their durability.

SECTION - IV

7. (a) Describe the function of sleepers in the railway track system.

   (b) List and briefly explain the different types of railway stations.

8. (a) Name and describe the types of railway yards.

   (b) Name and describe three common types of sleepers used in railway tracks. Calculate the number of wooden sleepers required for a 2-kilometer railway track if the sleeper spacing is 0.8 meters.

SECTION - V

9 (a) Define "air transportation" and its significance in modern travel. Explain the functions of the terminal area in an airport.

   (b) List and discuss the key factors that influence the site selection for an airport. Describe the types of flights that operate from airports.

10 (a) Define "apron" in the context of airport design. Explain the concept of parking patterns in airports and why they are crucial.

   (b) Explain the different categories of airports based on the International Civil Aviation Organization (ICAO) classification.

SECTION – VI

11 (a) Why is water transportation important in the field of civil engineering and transportation?

   (b) Describe the causes of tides and their influence on harbors and navigation.

12 (a) Differentiate between a public and a private port.

   (b) List the factors that affect the site selection for a harbor or port.

R-17

Code : 17CS3104

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech I Semester

COMPILER DESIGN
(Computer Science & Engineering)

Time : 3 hours

Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All questions carry equal marks
* * *

SECTION-I

1 (a) Explain the process of recognition of tokens from the source program.

   (b) Explain input buffering scheme used in lexical analysis phase.

2   Explain in detail the process of compilation. Illustrate the output of each phases of compilation for any input string.

SECTION-II

3 (a) Explain the role of parser. Discuss different kinds of errors and error recovery strategies.

   (b) What is the role of parser generator?

4   Compute FIRST and FOLLOW for the grammar:
        E → T E',
        E' → + T E' | ε,
        T → F T',
        T' → * F T' | ε,
        F → (E) | id

SECTION-III

5 (a) What is syntax directed translation? How it is different from translation schemes? Explain with an example.

   (b) Explain the Construction of syntax tree with example.

6   For the grammar below:
        E → E + T | T
        T → num . num | num
        Give an SDD to determine the type of each term T and expression E.

SECTION-IV

7 (a) Explain the sequence of stack allocation process for a function call.

   (b) Discuss the process of accessing non local variables information from symbol table in case of nested procedures.

8   Construct a Quadruple, Triple and Indirect Triple for the statement
        a+a*(b-c) +(b-c)*d

SECTION-V

9 (a) Discuss the design issues of Code Generator.

   (b) Explain in detail about global common sub expression elimination technique.

10   Explain the Code generation algorithm to generate code for the following expression? x=(a-b) + (a+c).

SECTION-VI

11   (a)   Distinguish local and global optimization?

(b)   Explain the global data-flow analysis.

12   Explain about loop optimization with suitable example.

R-13　　　　　　　　　　　　　　　　　　**Code : 13CS3105**

III B.Tech. I Semester

THEORY OF COMPUTATION
(Computer Science & Engineering)

Time : 3 hours　　　　　　　　　　　　　　　　　　Max. Marks :60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
*All Questions carry equal marks*
* * *

SECTION - I

1　(a)　What are the difference between NFA and DFA?

　(b)　Construct DFA equivalent to the following NFA. Show the acceptance of the string 00011 on both the Fas. Assume that q0 is the start state and q3 is final state.

	0	1
q0	{q0,q1}	{q0}
q1	-	{q2}
q2	-	{q3}
q3	-	-

2　(a)　Compare and contrast Moore Machine with Melay Machine.

　(b)　Construct the Moore machine for the Melay machine given below.
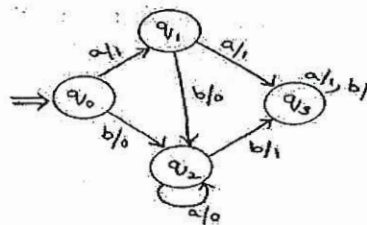
SECTION – II

3　(a)　Define Regular Expression and Regular Set.

　(b)　Construct a Finite Automata for the regular expression.
　　　　$(0+1)(1+10)^*$

4　(a)　What is pumping lemma? Write the applications of Pumping Lemma?

　(b)　Prove that $L = \{ a^n b^n /n > 0\}$ is not regular using pumping lemma.

SECTION - III

5　(a)　How do you simplify Context Free Grammars? Explain with examples?

　(b)　Give the Context Free Grammar (CFG) generating the set of palindromes over an alphabet, $\Sigma = \{a, b\}$.

6 (a) List the closure properties of Context Free Languages.

   (b) For the string 'aaabbabababb', Give the Leftmost derivation, Rightmost derivation and Parse tree for the given grammar. Verify the given grammar is ambiguous or not?

   $$S \to bA/ aB$$
   $$A \to bAA/aS/a$$
   $$B \to aBB/bS/b$$

SECTION - IV

7 (a) Define mathematical model of Pushdown Automata. What are the different ways of string acceptance in PDA?

   (b) Construct PDA for the Language $L = \{ a^n b^m \mid n > m \}$.

8 (a) Explain the process of constructing PDA from the given grammar.

   (b) Construct PDA that accepts the CFG G={{S,A,B,C},{a,b,c},P,S} p is defined as,

   $$S \to aA$$
   $$A \to aABC \mid bB \mid a$$
   $$B \to b$$
   $$C \to c$$

SECTION - V

9 (a) Define Turing Machine formally. explain how Turing Machine can be used to compute integer functions?

   (b) Explain about PCP and modified PCP.

10 (a) Explain about Chomsky hierarchy of languages.

   (b) Write a short note on Universal Turing Machine.

R-17

Code : 17CS3105

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023
III B.Tech I Semester

WEB APPLICATION DEVELOPMENT USING PYTHON
(Common to CSE & IT)

Time : 3 hours

Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All questions carry equal marks
* * *

SECTION-I

1 (a) How does mastering Python translate into mastering Django, and why are these skills interconnected for developers?

   (b) Write about the built-in types in Python.

2 (a) How do Python regex functions optimize text processing tasks effectively?

   (b) What are the fundamental standard types in Python, and how are they utilized in programming?

SECTION-II

3 (a) How can one create a project using Django, and what are the essential steps involved?

   (b) What are Python's basics for creating dynamic websites effectively?

4 (a) How is the architecture of a Django web application structured?

   (b) What are Django's fundamental philosophies guiding web development practices effectively?

SECTION-III

5 (a) How does Django support rich field types, and what are their applications?

   (b) How to create and updating the database using manage functions?

6 (a) Write the features of Object Oriented Model in Django.

   (b) Describe the various query sets in accessing database.

SECTION-IV

7 (a) Describe the Modeling HTTP mechanisms in web application.

   (b) How does Django handle validation and cleaning of form data?

8 (a) How to configure URLs in Django web application?

   (b) How is form display managed in Django?

SECTION-V

9 (a) How Advanced JavaScript is usefull in Django Application development? Briefly Explain it with an example.

(b) What are the essential elements and best practices for creating a photo gallery?

10 (a) Write about an Application of "Don't Repeat Yourself"(DRY).

(b) What is the role and functionality of the AJAX Toolkit in Django web development?

SECTION-VI

11 (a) How can the Django admin interface be customized for projects?

(b) Write about inclusion tags and custom filters in template system

12 (a) How does Django generate and serve downloadable files effectively?

(b) Explain in what way can the Django template system be extended for customization?

R-17   **Code : 17CS31E1**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

III B.Tech. I Semester

ADVANCED DATABASE MANAGEMENT SYSTEMS
(Common to CSE & IT)

Time : 3 hours   Max. Marks :60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Describe the Server system architectures.

   (b) Write the differences between Centralized and client-server architectures.

2   Describe the Network types in detail.

SECTION - II

3 (a) Describe about distributed data storages.

   (b) Explain about commit protocols.

4   Describe the Interoperation Parallelism and Query Optimization.

SECTION - III

5 (a) Describe about the Homogeneous and Heterogeneous databases.

   (b) Describe about the Distributed Query Processing.

6   Explain about the Cloud-Based Databases and Directory Systems.

SECTION - IV

7 (a) Explain about the Complex Data Types.

   (b) Describe about the Inheritance in SQL.

8 (a) Write short notes on persistent programming languages.

   (b) Describe about the Object-Relational Mapping.

SECTION - V

9 (a) Describe about extended E-R features.

   (b) Explain the different aspects of database design.

10 (a) Explain briefly about various notations for data modeling.

   (b) Describe the Performance tuning.

SECTION - VI

11 (a) Explain briefly about the Spatial and Geographic data.

   (b) Describe the Real-Time Transaction Systems.

12 (a) Write short notes on transactional workflows

   (b) Describe the Main Memory Databases.