

II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) What is the degree of indeterminacy of a propped cantilever?
- b) What are the support moments when there is relative displacement at the supports?
- c) How Clapeyron's theorem of three moments can be applied to a overhanging beams?
- d) What are the sign conventions used in slope deflection equations and write the equations.
- e) State the Castigliano's first theorem.
- f) Define the influence line. Draw a I.L.D.
- g) Differentiate between determinate and indeterminate structures.

(2M+2M+3M+4M+3M+4M+4M)

PART-B

2. a) Analyse the propped cantilever beam loaded as shown in the Figure 1. Draw the S.F.D and B.M.D. Assume EI constant throughout.

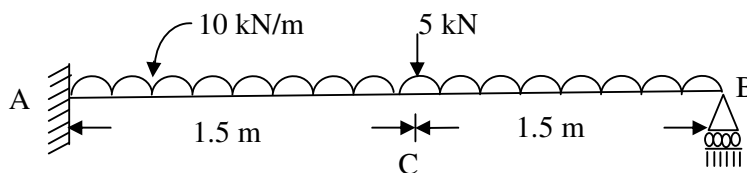


Figure 1

- b) A cantilever of length 4m carries a uniformly distributed load of 1kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$, then (i) find the prop reaction (ii) deflection at the centre of cantilever

(8M+8M)



3. A continuous beam ABC is simply supported at A and C and continuous over support B with $AB = 5\text{m}$ and $BC = 6\text{m}$. A uniformly distributed load of 12kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)
4. A beam ABCD 9.2m long is fixed at A and is supported at B and C at distances 4m and 7m from A with an overhang CD 2.2m long. The span AB carries a point load of 32kN at the mid span. A point load of 16kN acts at the end D. Find the moments and reactions at the supports. (16M)
5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 10kN per metre length, while a concentrated vertical load of 100kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)
6. a) State and prove Castigliano's first theorem.
b) Derive the energy stored due to axial loading. (8M+8M)
7. a) Draw the influence line diagram for a shear force at any section of a simply supported beam.
b) Find the maximum force in the member shown in the Figure 2, when a uniformly distributed load of 10kN/m longer than the span crosses the bridge. (6M+10M)

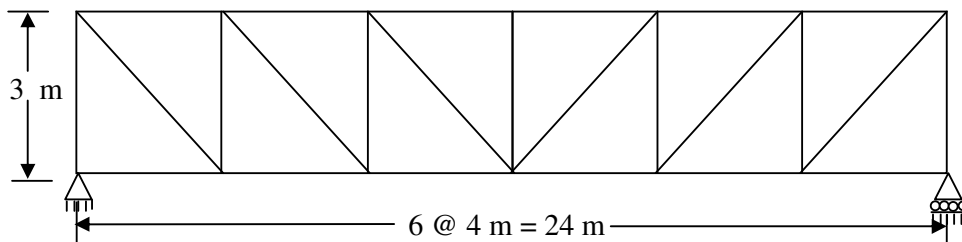


Figure 2



II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

1. a) Draw the bending moment diagram for a propped cantilever of length l with u.d.l. over the whole span.
- b) What is the equation for a fixed beam with ends at different levels?
- c) What is the procedure for analysing the continuous beams using theorem of three moments?
- d) What are the sign conventions used in slope deflection equations and write the equations.
- e) State the Castigliano's first theorem.
- f) Define the influence line. Draw I.L.D for a simply supported beam for finding the reactions at the supports. (3M+3M+4M+4M+3M+5M)

PART-B

2. a) Determine the reactions of the propped cantilever beam and draw SFD and BMD.

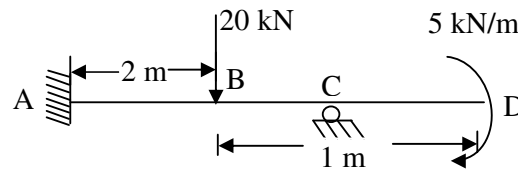


Figure 1

- b) A cantilever of length 6m carries a uniformly distributed load of 2kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$, then (i) find the prop reaction (ii) deflection at the centre of cantilever (8M+8M)
3. A continuous beam ABC is simply supported at A and C and continuous over support B with $AB = 4\text{m}$ and $BC = 6\text{m}$. A uniformly distributed load of 10kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)



4. Analyse the fixed beam shown in the Figure 2.

(16M)

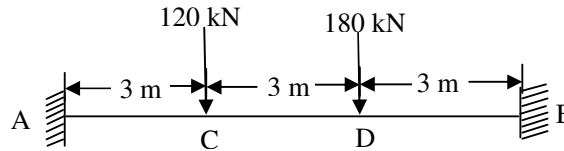


Figure 2

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 12kN per metre length, while a concentrated vertical load of 120kN acts at the mid span AB. Calculate the moments by slope deflection method.

(16M)

6. a) State Castigliano's first theorem.

- b) Compute the vertical deflection of joint E by unit load method Figure 3.

(4M+12M)

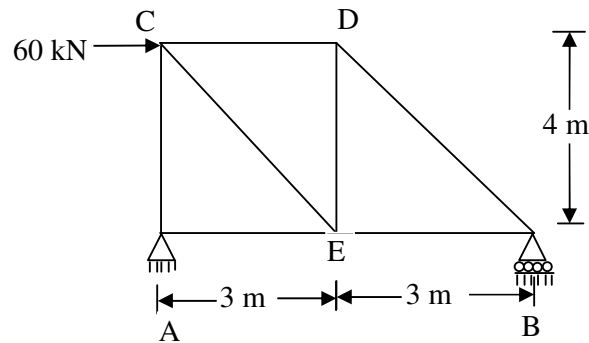


Figure 3

7. a) Draw the influence line diagram for a shear force at any section of a simply supported beam.
 b) A uniformly distributed load of 40kN/m and of length 3m transverse across the span of simply supported length of 18m. Compute the maximum bending moment at 4m from left support and absolute bending moment.

(6M+10M)



II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

-
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

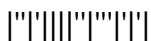
PART-A

1. a) Name a method for deriving the compatibility equation for the propped cantilever.
- b) Draw the shear force and bending moment diagrams for a fixed beam when one of its supports sinks.
- c) What are the merits and limitations of the theorem of three moments?
- d) What are the sign conventions used in slope deflection equations and write the equations.
- e) State and prove Castigliano's first theorem.
- f) Draw a I.L.D for a simply supported beam for finding the reactions at the supports.

(3M+4M+3M+3M+6M+3M)

PART-B

2. a) A propped cantilever beam of length l is subjected to uniformly distributed load of ω/m length over three fourth of its span from the fixed support. Determine the prop reaction and sketch the BMD.
- b) A cantilever of length 5m carries a uniformly distributed load of 1kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$, then (i) find the prop reaction (ii) deflection at the centre of cantilever (iii) Magnitude and position of maximum deflection. (6M+10M)
3. A continuous beam ABC is simply supported at A and C and continuous over support B with $AB = 7\text{m}$ and $BC = 6\text{m}$. A uniformly distributed load of 14kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)



4. Analyse the fixed beam shown in the Figure 1. (16M)

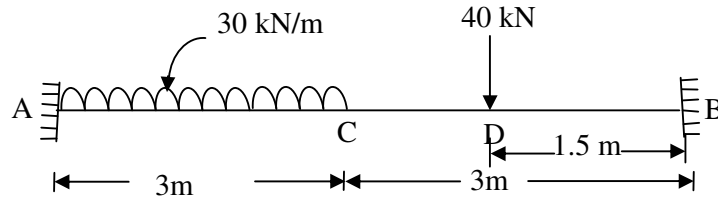


Figure 1

5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 14kN per metre length, while a concentrated vertical load of 140kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)

6. a) State and prove Castigliano's first theorem.

- b) Compute the vertical deflection of joint E by unit load method Figure 2. (8M+8M)

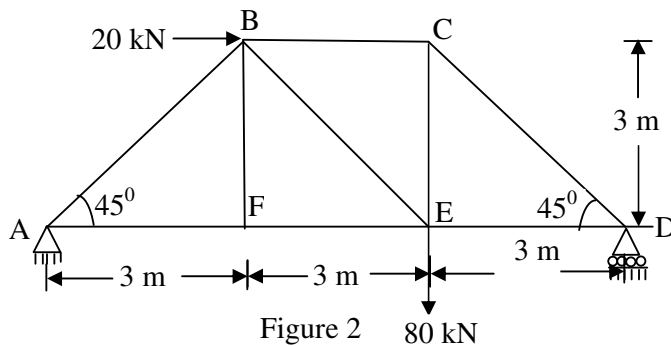


Figure 2

7. a) Draw the influence line diagram for a bending moment at any section of a simply supported beam.
- b) A uniformly distributed load of 50kN/m and of length 4m transverse across the span of simply supported length of 18m. Compute the maximum bending moment at 5m from left support and absolute bending moment. (6M+10M)



II B. Tech II Semester Regular Examinations, May/June - 2015
STRUCTURAL ANALYSIS-I
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

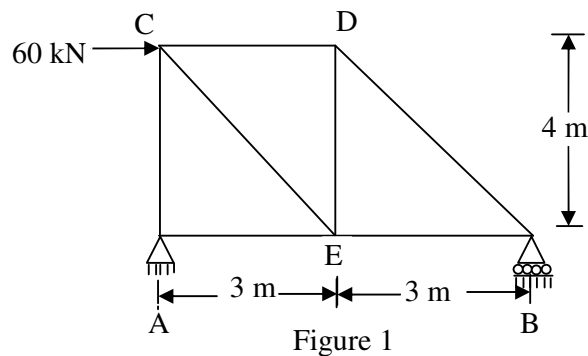
1. a) What is a propped cantilever? What is the degree of indeterminacy?
- b) Draw the shear force and bending moment diagrams for a propped cantilever when the prop sinks.
- c) State and deduce the Clapreyon's three-moment equation.
- d) What are the sign conventions used in slope deflection equations and write the equations.
- e) State and prove Castigliano's first theorem.
- f) Draw Influence line diagrams for a Pratt truss (4M+4M+3M+3M+3M+5M)

PART-B

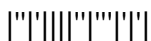
2. a) A propped cantilever beam of length l is subjected to uniformly distributed load of ω/m length over three fourth of its span from the fixed support. Determine the prop reaction and sketch the BMD.
- b) A cantilever of length 7m carries a uniformly distributed load of 3kN/m length over the whole length. The free end of the cantilever is supported on a prop. If $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 10^8 \text{ mm}^4$, then (i) find the prop reaction (ii) Magnitude and position of maximum deflection. (8M+8M)
3. A continuous beam ABC is simply supported at A and C and continuous over support B with $AB = 7\text{m}$ and $BC = 6\text{m}$. A uniformly distributed load of 14kN/m is acting over the beam. The moment of inertia is I throughout the span. Analyse the continuous beam and draw S.F.D and B.M.D. (16M)



4. A fixed beam AB of length 3m carries a point load of 45kN at a distance of 2m from A. If the flexural rigidity is of the beam is $1 \times 10^4 \text{ kNm}^2$, determine (i) the fixed end moments at A and B. (ii) Deflection under the load and (iii) maximum deflection. (16M)
5. ABC is a continuous beam with constant EI throughout its length. The end supports A and C are fixed and beam is continuous over middle support B. Span BC is uniformly loaded with 8kN per metre length, while a concentrated vertical load of 80kN acts at the mid span AB. Calculate the moments by slope deflection method. (16M)
6. a) State and prove Castigliano's first theorem.
b) Compute the vertical deflection of joint E by unit load method Figure 1. (4M+12M)



7. a) Draw the influence line diagram for a shearforce at any section of a simply supported beam.
b) A uniformly distributed load of 60kN/m and of length 4m transverse across the span of simply supported length of 20m. Compute the maximum bending moment at 5m from left support and absolute bending moment. (6M+10M)



II B. Tech II Semester Regular Examinations, May/June - 2015**CONTROL SYSTEMS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

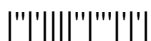
1. a) Define the transfer function in control system.
 b) What is signal flow graph?
 c) What are the time domain specifications?
 d) What is the effect of addition of pole to a transfer function on Root Locus?
 e) What is the effect on polar plot if a non-zero pole is added to the transfer function?
 f) What are the specifications in frequency domain design are specified.
 g) What is meant by state in control system? (3M+3M+3M+4M+3M+3M+3M)

PART-B

2. a) State and explain the Mason's gain formula.
 b) Derive the transfer function and develop the block diagram of Armature controlled DC servo motor
3. a) Discuss the effect of PD and PI on performance of a control system.
 b) A unity feed back system is characterized by an open loop transfer function $G(s) = \frac{K}{s(s+5)}$.
 Determine the gain K so that the system will have a damping factor of 0.7. For this value of K determine the natural frequency of the system. It is subjected to a unity step input. Obtain the closed loop response of the system in time domain.
4. A unity feedback system has an open loop function $G(s) = \frac{k}{s(s^2 + 3s + 10)}$ make a rough sketch of root locus plot by determining the following (i) Centroid, number and angle of asymptotes (ii) angle of departure of root loci from the poles, (iii) Breakaway points if any, (iv) points of intersection with j ω axis and (v) maximum value of k for stability



5. a) Derive the expressions for frequency domain specifications of a second order system.
b) Given the open loop transfer function of a unity feedback system $G(s) = \frac{1}{s(3+s)(1+2s)}$.
Draw the Bode plot and measure from the plot the frequency at which the magnitude is 0 dB.
6. Consider a unity feedback system with open loop transfer function $G(s) = \frac{K}{s(1+s)(2+s)}$,
design a suitable compensator so that the compensated system has
 $K_v = 10 \text{ sec}^{-1}$
Phase margin = 40°
Gain margin $\leq 12 \text{ db}$
7. The state equations of the LTIV system are given by $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$;
 $y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$
a) Determine the STM
b) Find the solution for $y(t)$ and
c) If a unit step is given to the input, what will be the behavior of the output



II B. Tech II Semester Regular Examinations, May/June - 2015**CONTROL SYSTEMS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

-
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

1. a) What are the advantages and disadvantages of closed loop control system?
 b) How do you reverse the direction of rotation in AC servomotor
 c) Draw the time response of second order system and represent the time domain specifications on it
 d) What are the advantages of Root Locus?
 e) State the Nyquist stability theorem.
 f) Write the differences between lead and lag compensator.
 g) What are the properties of state transition matrix (4M+2M+4M+2M+2M+4M+4M)

PART-B

2. a) Derive the transfer function of DC servo motor.
 b) What do you mean by the sensitivity of the control system and discuss the effect of feedback on sensitivity
3. a) Define the steady state error and error constants of different types of inputs
 b) Damping factor and natural frequency of the system are 0.12 and 84.2 rad/sec respectively. Determine the rise time (t_r), peak time (t_p), maximum peak overshoot (m_p) and settling time (t_s).

4. Sketch the root locus plot of unity feedback system with an open loop transfer function

$$G(s) = \frac{K}{s(s+1)(s+5)}. \text{ Find the range of } K \text{ for the system to have damped oscillatory response.}$$

Determine the value of K so that the dominant pair of complex poles of the system has a damping ratio of 0.6. Corresponding to this value of K . Determine the closed loop transfer function in the factored form.



5. Determine the value of the gain constant K for the system with open loop transfer function

$$G(s) = \frac{K}{s(1+0.2s)(1+0.01s)}. \text{ So that it has a phase margin of about } 35^\circ. \text{ For this value of K,}$$

find the new gain margin.

6. Design a phase lag network for a plant with the open loop transfer function $G(s) = \frac{5}{s(1+0.1s)^2}$ to have a phase margin of 45° . Verify the performance of the compensated system with the specification

7. a) Discuss the concept of controllability and observability with an example.

b) Given the state equation $\dot{X} = AX$, where $A = \begin{bmatrix} -3 & 1 & 0 \\ 0 & -3 & 1 \\ 0 & 0 & -2 \end{bmatrix}$. Determine the state

transition matrix.



II B. Tech II Semester Regular Examinations, May/June - 2015
CONTROL SYSTEMS
 (Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

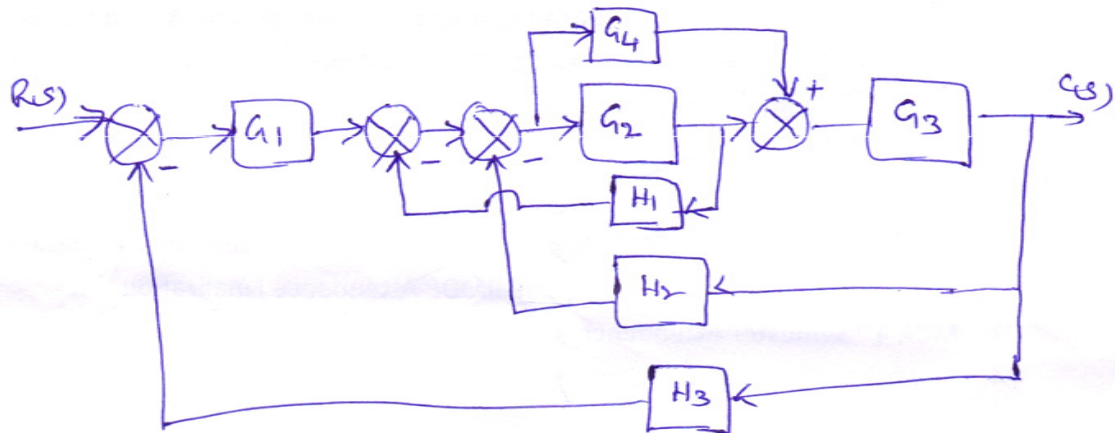
PART-A

- Define the closed loop control system. Give its properties.
 - What is a synchro? Write its transfer function.
 - What are the standard test signals used in time domain analysis?
 - What are the disadvantages of Routh Criterion?
 - Define phase margin and gain margin.
 - What is the need of lag-lead compensator?
 - What is controllability?

(4M+3M+3M+4M+4M+2M+2M)

PART-B

- Simplify the block diagram shown in below figure and obtain the closed loop transfer function



- Obtain the time response of a first order system for a unit step input and plot its response.
 - A unity feedback system is characterized by the open loop transfer function

$$G(s) = \frac{1}{s(1+0.3s)(1+0.4s)}$$

Determine the steady state error for unity step, unity ramp and unity acceleration inputs. Also determine the damping factor and natural frequency of dominant roots.



4. a) Explain the procedure to draw root locus of a given transfer function.
 b) A feedback system has the open loop transfer function of $G(s) = \frac{Ke^{-s}}{s(s^2 + 2s + 3)}$. Find the limiting values of K for maintaining stability.
5. a) Explain the frequency domain specifications of a second order system.
 b) Given the open loop transfer function $G(s) = \frac{5}{(1 + 2s + s^2)(1 + 3s)}$. Sketch the Nyquist plot and investigate the open loop and closed loop systems stability.
6. For the given open loop transfer function, $G(s) = \frac{K}{s(s + 4)(s + 6)}$.
 Design suitable lead compensation so that phase margin is $\geq 30^\circ$ and velocity error constant, $K_v \geq 15$
7. The state equation of a system is given by

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad t > 0$$

- a) Is the system controllable?
 b) Compute the state transition matrix
 c) Compute $x_1(t)$ under zero initial condition and a unit step input



II B. Tech II Semester Regular Examinations, May/June - 2015**CONTROL SYSTEMS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

1. a) What are the advantages and disadvantages of open loop control system
- b) What is the difference between AC servo motor and DC servo motor?
- c) Define the transient response, and draw the time domain response of first order system.
- d) What is the necessary and sufficient condition for stability?
- e) What are the frequency domain specifications?
- f) Draw the electrical equivalent circuits of lead, lag and lag-lead compensators.
- g) What is observability? (3M+3M+3M+3M+3M+4M+3M)

PART-B

2. a) Explain the construction and principle of operation synchro transmitter.
- b) Derive the transfer function and develop the block diagram of Armature controlled DC servo motor
3. a) Derive the time domain specifications of second order system with unit step input
- b) Given the open loop transfer function of a servo system with unity feed back is

$$G(s) = \frac{6}{s(1+0.2s)}. \text{ Obtain the steady state error of the system when subjected to an input}$$

$$\text{signal given by } r(t) = a_0 + a_1t + \frac{a^2t^2}{2}$$



4. a) Explain the Routh's criteria with an example. What are its limitations.
b) Determine the stability of the closed loop system whose open loop transfer is

$$\frac{5(2s+1)}{s(s+1)(1+3s)(1+0.5s)}, \text{ using Routh-Hurwitz criterion.}$$

5. Given the open loop transfer function with unity feedback as $G(s) = \frac{Ke^{-10s}}{s(2+s)(1+5s)}$. Draw the bode plot and determine the gain K for the gain cross over frequency to be 4 rad/sec.

6. A unit feedback system has an open loop transfer function $G(s) = \frac{K}{s(s+2)(0.3s+1)}$. Design a

phase lag compensator to meet the following specifications:

Velocity error constant = 10

Phase margin $\geq 40^\circ$

7. Determine the state transition matrix for the system $\dot{X} = AX$, where $A = \begin{bmatrix} -2 & 0 & 1 \\ 0 & -1 & 1 \\ 2 & 0 & -1 \end{bmatrix}$



II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
 (Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

1. a) Find the capacitance of a parallel-plate capacitor containing two dielectrics, $\epsilon_{r1} = 2$ and $\epsilon_{r2} = 3.3$, each comprising one-half of the volume. Here, $A=4m^2$ and $d=10^{-3}m$.
- b) Compare the boundary conditions of magnetic field with those of electric field.
- c) Explain about the characteristics of uniform plane waves.
- d) Write the difference between Conduction Current density and displacement current density.
- e) Define characteristic impedance and propagation constants of transmission lines.
- f) Explain about single stub matching. (4M+4M+3M+4M+3M+4M)

PART-B

2. a) Derive an expression for the electric field intensity due to a finite length line charge along the Z- axis at an arbitrary point Q(x,y,z)
- b) A line charge $\rho_L= 200pC/m$ lies along the X- axis. The surface of zero potential passes through the point P(0,5,4). Find the potential at point (1,3,-2) (8M+8M)
3. a) State all Maxwell's equations in differential and integral form for time varying fields.
- b) Define and explain the terms: i) skin depth ii) intrinsic impedance of free space iii) phase constant. (8M+8M)
4. a) Derive the expression for attenuation and phase constants of uniform plane wave.
- b) If $\epsilon_r = 9$, $\mu=\mu_0$ for the medium in which a wave with frequency $f= 0.3GHz$ is propagating determine propagation constant and intrinsic impedance of the medium when i) $\sigma =0$ and ii) $\sigma= 10 mho/m$ (8M+8M)
5. a) State and prove Poynting theorem.
- b) A plane wave travelling in air is normally incident on a material with $\mu_r = 1$ and $\epsilon_r = 4$. Find the reflection and transmission coefficients. (8M+8M)
6. a) Define and explain both lossless and distortion less transmission lines in terms of transmission line parameters.
- b) State the impedance relations, reflection coefficient and SWR for i) shorted line ii) open circuited transmission line (8M+8M)
7. a) Define Reflection coefficient and VSWR. Explain the relation between the two quantities in terms of their definition.
- b) Discuss the applications of Smith chart. (8M+8M)



II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
 (Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) Give the limitations of Gauss Law.
- b) Define vector magnetic potential and magnetic scalar potential.
- c) Write about the wave propagation in a Lossless Media.
- d) What is meant by total internal reflection explain?
- e) Write in brief about the different types of transmission lines.
- f) Discuss in brief reflection coefficient of a transmission line. (3M+4M+4M+3M+4M+4M)

PART-B

2. a) State the applications of Gauss Law with respect to a) point charge b) infinite line charge
 b) Point charges 4 mC and -3 mC are located at (2, 1, -3) and (-1, -2, 4) respectively. Calculate the electric force on a 12 nC charge located at (0, 3, 1) and the electric field intensity at that point. (8M+8M)
3. a) Discuss the boundary conditions at the interface separating one dielectric and another.
 b) Region $y \leq 0$ consists of a perfect conductor while region $y \geq 0$ is a dielectric medium ($\epsilon_{ir} = 2$). If there is a surface charge of 4 nC/m^2 on the conductor, determine E and D at (1, -3, 2) (9M+7M)
4. a) Derive the relation between E and H in uniform plane wave propagation.
 b) For a uniform plane wave in space $\lambda = 12\text{cm}$. In a loss less material of unknown characteristics, $\lambda = 8\text{cm}$. In this material $E = 50\text{V/m}$, $H = 0.1\text{A/M}$ find f , μ_r , ϵ_r (8M+8M)
5. a) State and prove Poynting theorem.
 b) For good dielectrics derive the expression for α , β , v and η (8M+8M)
6. a) What are the major losses that occur in transmission lines? How is a lossless line characterized?
 b) What are the types of loading? A lossless transmission line having $Z_0 = 120\Omega$ is operating at 500M rad/s . If the velocity on the line is $2.4 \times 10^8 \text{ m/s}$, find the distributed parameters L and C. (8M+8M)
7. a) Discuss the configuration of the Smith chart considering the two families of constant circles.
 b) What are the advantages and disadvantages of stub matching? (9M+7M)



II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
 (Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

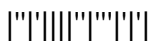
PART-A

1. a) Define the terms electric field, electric displacement and electric flux density
- b) Write Maxwell's equations for electrostatic fields.
- c) Explain briefly about Biot-Savart's Law.
- d) What is meant by total internal reflection? Explain.
- e) Explain about the primary and secondary constants of transmission lines.
- f) Discuss in brief about the types of loading of a transmission line.

(3M+4M+4M+4M+4M+3M)

PART-B

2. a) Derive expression for electric field due to an infinitesimal electric dipole.
- b) On a flat conducting surface, if a surface charge density $\rho_s = 1$ coulomb per square meter is placed on it, what would be the value of the electric field strength E at its surface? (8M+8M)
3. a) State Ampere's circuit law. What are its applications?
- b) What is displacement current? A parallel plate capacitor with plate area of 6 cm^2 and plate separation of 4 mm has a voltage $50\sin 10^3 t$ V applied to its plates. Calculate the displacement current assuming $\epsilon = 2\epsilon_0$ (8M+8M)
4. a) Derive the relation between E and H in uniform plane wave propagation.
- b) A uniform plane wave in air with $\mathbf{H} = 4 \sin(\omega t - 5x) \mathbf{a}_y$ A/m is normally incident on a plastic region with parameters $\epsilon = 4\epsilon_0$, $\mu = \mu_0$, $\sigma = 0$. Obtain the total electric field in air, and calculate the average power density in the plastic region. (8M+8M)
5. Prove that under the condition of no reflection at an interface, the sum of the Brewster angle and the angle of refraction is 90 degrees for parallel polarization for the case of reflection by a perfect conductor under oblique incidence, with neat sketches. (16M)
6. a) Show that a transmission line will be distortion free if $CR = LG$
- b) A high frequency line has the following primary constants $L = 1.2 \text{ mH/Km}$, $C = 0.05 \mu\text{F/Km}$. $R = G = \text{negligible}$. Determine the characteristics impedance and propagation constant of the line. (8M+8M)
7. a) Define the reflection coefficient and derive the expression for the input impedance in terms of reflection coefficient.
- b) Explain with sketches how the input impedance varies with the frequency (8M+8M)



II B. Tech II Semester Regular Examinations, May/June - 2015
EM WAVES AND TRANSMISSION LINES
 (Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

PART-A

1. a) Derive the expression for capacitance of the spherical conductors.
 b) Write short notes on Lorentz force equation
 c) Explain briefly about Faraday's law for time varying fields.
 d) What is meant by depth of penetration?
 e) Describe the characteristics of UHF lines.
 f) Draw the directions of electric and magnetic fields in parallel plate and coaxial lines
 (4M+4M+4M+3M+4M+3M)

PART-B

2. a) Derive expression for magnetic field at any point on the axis at a distance 'h' from the centre of a circular loop of radius 'a' and carrying current 'I'.
 b) Find the magnetic field strength, H on the Z- axis at a point P(0,0,4) due to a current carrying conductor loop, $x^2+y^2=a^2$ in Z=0 plane (8M+8M)
3. a) State and explain Biot Savart's law. Give expressions of Biot Savart's law for line, surface and volume currents.
 b) Find an expression for the magnetic field produced by a straight current carrying conductor at a distance x from it. (8M+8M)
4. A plane wave with $E=2.0$ V/m and has a frequency of 300MHz is moving in free space impinging on thick copper sheet located perpendicular to the direction of the propagation . Find
 i) E and H at the plane surface, ii) Depth of penetration and iii) The surface impedance. (16M)
5. a) State and prove the critical angle theorem.
 b) Derive an expression for reflection when a wave is incident on a dielectric obliquely with parallel polarization. (8M+8M)
6. a) Derive the relationship between secondary constant and primary constants of a transmission line.
 b) What is meant by inductive loading? What are its advantages and disadvantages? (8M+8M)
7. a) Explain the significance and utility of $\lambda/8, \lambda/4$ and $\lambda/2$ lines
 b) A low transmission line of 100Ω characteristics impedance is connected to a load of 400Ω . Calculate the reflection coefficient and standing wave ratio. (8M+8M)



II B. Tech II Semester Regular Examinations, May/June - 2015
FORMAL LANGUAGE AND AUTOMATA THEORY
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

~~~~~

**PART-A**

- 1 a) What is Finite State Machine? What are the elements of FSM? (3)
- b) What is the difference between CFG and CSG? (3)
- c) Consider a DFA  $M = (Q, \Sigma, \delta, q_0, F)$ , What is the minimum and maximum number of initial states in it? (2)
- d) Give the formal definition of Moore machine (2)
- e) What are the applications of CFG? (3)
- f) List out the components of turing machine (3)
- g) What is dead state? Give an example. (3)
- h) Give the formal definition of TM? Give the block diagram of TM (3)

**PART-B**

- 2 a) What is Computation? What are the different models of Computation? Explain (5)
- b) What are the different classes of automata? How they are classified? Explain in detail. (5)
- c) Give the formal definition of FSM? What are the examples of FSM? (6)
- 3 a) What are the different operations on strings? Explain with examples? (3)
- b) What are the different types of languages in automata theory? Clearly give the rules for each of these languages and the relationship among these languages (6)
- c) Consider a language  $L^*$ , where  $L = \{ab, cd\}$  with  $\Sigma = \{a, b, c, d\}$ . (7)
  - (i) write all words in  $L^*$  that have six or less letters/symbols
  - (ii) What is the shortest string in  $\Sigma^*$  that is not in the language  $L^*$ ?



- 4 a) Construct a DFA accepting the language  $L = \{w \mid |w| \bmod 8 \neq 0\}$  on  $\Sigma = \{a, b\}$  (8)  
 b) Obtain a DFA to accept strings of  $a$ 's and  $b$ 's such that, each block of 5 consecutive symbols has at least two  $a$ 's. (8)

- 5 a) What is Arden's Theorem. Explain (4)  
 b) Convert the following DFA to RE. (6)

|   |   |   |
|---|---|---|
|   | 0 | 1 |
| p | p | q |
| q | q | r |
| r | r | r |

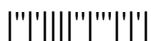
- c) Check whether the following two DFA's are equal or not (6)

|    |    |    |
|----|----|----|
|    | 0  | 1  |
| q1 | q1 | q2 |
| q2 | q3 | q1 |
| q3 | q2 | q3 |

|    |    |    |
|----|----|----|
|    | 0  | 1  |
| q4 | q4 | q5 |
| q5 | q6 | q4 |
| q6 | q7 | q6 |
| q7 | q6 | q4 |

- 6 a) What is Chomsky's hierarchy? Explain (5)  
 b) What is Unit production? What is the procedure to remove the unit productions in CFG. (4)  
 c) Convert the following grammar to CNF. (7)  
 $S \rightarrow bA \mid aB$   
 $A \rightarrow bAA \mid aS \mid a$   
 $B \rightarrow aBB \mid bSbb$

- 7 a) Design a total Turing machine to accept the language:  $L2 = \{w \in \{a, b, c\}^* \mid \#a(w) \leq \#b(w) \leq \#c(w)\}$  (Note: '#' means number) (12)  
 b) Explain about P and NP classes of languages. (4)



**II B. Tech II Semester Regular Examinations, May/June - 2015**  
**FORMAL LANGUAGE AND AUTOMATA THEORY**  
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**

~~~~~

PART-A

- 1 a) What is Finite State Machine? What are the advantages of FSM (4)
- b) Define regular expression (2)
- c) Consider a NFA $M=(Q, \Sigma, \delta, q_0, F)$, What is the minimum and maximum number of states in it? (3)
- d) Give the formal definition of Mealy machine. Give an example (3)
- e) What is ambiguous grammar? Give an example (3)
- f) What is trap state? Give an example (3)
- g) Differentiate between PDA and TM with respect to tape and head (4)

PART-B

- 2 a) What is state diagram and state transition table. Explain with an example. (5)
- b) What are the different classes of automata? How they are classified? Explain in detail. (5)
- c) What are the components of FSM? Explain. (6)
- 3 a) What is push down Automata? Show how context free language is accepted by push down automata. (8)
- b) Consider a language L^* , where $L=\{ab, cd\}$ with $\Sigma=\{a,b,c,d\}$. (8)
 - (i) Write all words in L^* that have six or less letters/symbols
 - (ii) What is the shortest string in Σ^* that is not in the language L^* ?



- 4 a) Construct a DFA accepting the language: $\{w \in \{a,b\}^* : w \text{ has both } ab \text{ and } ba \text{ as substrings}\}$ (8)
 b) Design a ϵ -NFA for the regular expression $a^*bc/ab^*/c^*$ (6)
 c) Define ϵ -closure of a state? Give an example (2)

- 5 a) What are the properties of Regular sets? Explain (4)
 b) Convert the following DFA to RE. (6)

	0	1
p	p	q
q	q	r
r	p	r

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	q2	q3

	0	1
q4	q4	q4
q5	q6	q4
q6	q4	q6
q7	q6	q4

- 6 a) What is use of simplification of CFG? What is the procedure to simplify the CFG? Explain (8)
 b) Simplify the following grammar. (8)
 $S \rightarrow aAa$
 $A \rightarrow bBB / D$
 $B \rightarrow ab / \epsilon$
 $C \rightarrow aB$

- 7 a) Give the formal definition of TM? What are the components of TM? What is *id* of TM? (6)
 b) Design a Turing Machine for the $\{L = ww^R / w \in (0+1)^*\}$ (10)



II B. Tech II Semester Regular Examinations, May/June - 2015
FORMAL LANGUAGE AND AUTOMATA THEORY
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

- 1 a) What is Finite State Machine? What are the disadvantages of FSM (3)
 b) $\Phi^* = \text{-----}$ and $\epsilon^* = \text{-----}$ (2)
 c) Consider a ϵ -NFA $M = (Q, \Sigma, \delta, q_0, F)$, What is the minimum and maximum (2)
 number of states in it?
 d) What is Unit Production? If you eliminate the unit productions from the given (3)
 CFG, what will be the effect on the language by the resultant grammar
 e) When you convert ϵ -NFA to NFA, how do you decide the final states of (4)
 resultant NFA. Give an example
 f) What is left recursion? How to eliminate the left recursion (4)
 e) Differentiate between PDA and TM with respect to: halt state and final state (4)

PART-B

- 2 a) Give the formal definition of FSM? What are the examples of FSM? (5)
 b) Write short note on classification of Automata (5)
 c) What is state diagram and state transition table? Explain with an example. (6)
- 3 a) Differentiate NFA with DFA (3)
 b) Describe on detail about recursive enumerable language (6)
 c) Write regular expression for the language over $\{0,1\}$: the set of all strings that (7)
 contain 1011.
- 4 a) What are the advantages of NFA (4)
 b) Design a ϵ -NFA for the regular expression $a^*/b^*/c^*$ (6)
 c) Construct a DFA accepting the language: $\{W \in \{a,b\}^* : W \text{ has neither } aa \text{ nor } bb \text{ as a substring}\}$ (6)



- 5 a) Write short note on i) optimum DFA ii) Two way DFA. (4)
 b) Convert the following DFA to RE. (6)

	0	1
p	p	r
q	q	r
r	q	r

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	Q3	q3

	0	1
q4	q6	q5
q5	q6	q4
q6	q7	q5
q7	q6	q4

- 6 a) Define Chomsky Normal form and Greibach Normal form? What is the difference between these two normal forms. (8)

- b) Convert the following CFG into GNF. (8)

$$A_1 \rightarrow A_2 A_3$$

$$A_2 \rightarrow A_3 A_1 / b$$

$$A_3 \rightarrow A_1 A_2 / a$$

- 7 a) Give the formal definition of TM? What are the different types of TMs? Explain. (6)

- b) Design a Turing Machine for $L = \{wcw^R/w \in (0+1)^*\}$ (10)



II B. Tech II Semester Regular Examinations, May/June - 2015
FORMAL LANGUAGE AND AUTOMATA THEORY
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
- ~~~~~

PART-A

- 1 a) What is Finite State Machine? What are the applications of FSM (3)
- b) If $L = \{ \epsilon, 00, 01, 10, 11, 000, \dots, 111, \dots \}$, find \bar{L} over the alphabet $\{0,1\}$ (3)
- c) Consider a DFA $M = (Q, \Sigma, \delta, q_0, F)$, What is the minimum and maximum number of final states in it? (2)
- d) What is useless symbol in a CFG? If you eliminate the useless symbols and productions from the given CFG, what will be the effect on the language by the resultant grammar (3)
- e) What is left recursion? How to eliminate the left recursion (3)
- f) Give the formal definition of Moore machine? (2)
- g) What is an infinite loop in TM? Explain with an example. (3)
- h) Give the differences between DFA and 2DFA with examples. (3)

PART-B

- 2 a) Give the general procedure for drawing a state diagram from transition table. (5)
- b) Construct a finite automata with transition for the regular expression $r = 01^* + 10$ (5)
- c) Define cellular and geographic automata. (2)
- d) What are the components of FSM? Explain (4)
- 3 a) Write a short note on i) Symbols ii) Alphabets and ii) Strings. (3)
- b) Write a short note on PDA with an example. (6)
- c) Write regular expression for the language over $\{0,1\}$: the set of all strings that contain 100. (7)
- 4 a) Define ϵ -closure of a state? Give an example (3)
- b) Design a DFA to accept odd number of a 's and even number of b 's, where $\Sigma = \{a,b\}$. Show the acceptance of a string with an example (7)
- c) Design a ϵ -NFA for the regular expression $a^*b/cb^*/ac^*b$ (6)



- 5 a) List out the properties of Regular sets and Regular languages (4)
 b) Minimize the following DFA, where state '0' is the start state and 3,5,6&7 are the final states. (6)

	a	b
0	1	2
1	4	5
2	3	-
3	-	-
4	4	2
5	6	-
6	7	-
7	7	-

- c) Check the following two DFA are equal or not (6)

	0	1
q1	q1	q2
q2	q3	q1
q3	q2	q3

	0	1
q4	q4	q5
q5	q5	q4
q6	q7	q6
q7	q6	q4

- 6 a) What is normalization of CFG? What is the use of Normalization? What are the different normal forms? Explain (8)
 b) Convert the following CFG into GNF. $S \rightarrow AA|0$, $A \rightarrow SS|1$ (8)
- 7 a) Design Turing machine to compute the function $n!$ (Factorial of a number) (12)
 b) Explain about undecidable problem (4)



II B. Tech II Semester Supplementary Examinations, May - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

1. a) What is the importance of geology in civil engineering?
b) What is weathering? What are the factors of weathering?
2. a) Define mineral? What are the physical properties of minerals?
b) Write the physical properties of the following minerals.
i) Bauxite ii) Quartz iii) Calcite.
3. a) Define rock? Give brief classification about igneous rocks?
b) Write a short notes on
i) Limestone ii) Schist iii) Galena
4. Answer the following
i) What is fold? What are the parts of folds?
ii) Angular unconformity.
iii) Synclinalorium and anticlinalorium.
iv) Dykes and sills.
v) Strike and dip
5. Answer the following
i. Water table
ii) Cone of depression
iii) Shield areas and seismic belts of earthquakes.
6. What is the importance of geophysical studies in civil engineering? Explain- Electrical resistivity method.
7. What is Dam? What are the types of dams explain with neat sketches.
8. Explain about over break and lining in tunneling?



II B. Tech II Semester Supplementary Examinations, May - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~

1. a) What is meant by weathering? Briefly explain Granite weathering?  
b) Explain i) Exogenous weathering?  
ii) Endogenous weathering?
2. a) Give brief notes on Texture and structures of sedimentary rocks.  
b) Write the physical properties of the following minerals.  
i) Galena. ii) Quartz iii) Hematite.
3. Answer the following  
i) Dykes and sills.  
ii) Parts of faults?  
iii) Slip faults  
iv) Heave and throw.  
v) Recognition of unconformities.
4. Explain the Electrical resistivity method in detail .
5. Write short notes on following.  
a) Terminology of earthquake.  
b) What are the precautionary measures in the construction of buildings in earthquakes zones?
6. Write notes on the following:  
a) Principles of gravity methods  
b) Principles of magnetic methods
7. What are the causes of silting in reservoirs? Indicate the impact of silting on functioning of a reservoir.
8. Explain about  
a) Tunnels in faulted strata.  
b) Effects of tunneling on the ground.



**II B. Tech II Semester Supplementary Examinations, May - 2015**  
**ENGINEERING GEOLOGY**  
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

~~~~~

1. Write a short notes on
 - i) Valley development.
 - ii) Geological work of Rivers.

2. a) Discuss in detail.
 - i) Moh's hardness table.
 - ii) Cleavage and fracture.
 - iii) Mineral and rock.b) Write the physical properties of following minerals.
 - i) Bauxite ii) Calcite.

3. Briefly explain the following.
 - i) Polymorphism
 - ii) Isomorphism
 - iii) Stlag mites and statutes
 - iv) Ptophyritic textures.

4. Discribe the deferent types of unconformities encountered in the structural geology? Draw neat sketches.

5. What is meant by fold? Give classification of folds? Explain with neat sketches.

6. Explain the following.
 - i) Types of aquifers. ii) Cone of depression.

7. What is the importance of geophysical methods in civil engineering aspect? Briefly explain the Seismic refraction method.

8. a) What are the causes and effects of landslides?
b) Describe the geological consideration for successful tunneling?



II B. Tech II Semester Supplementary Examinations, May - 2015
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

~~~~~

1. What is geology? Explain the main and allied branches of geology?
2. a) Define rock? How the rocks are classified?  
b) Give short notes on Marble and Limestone.
3. Define mineral? Write the Physical properties of the following minerals?  
i) Talc      ii) Magnetite      iii) Muscovite
4. What is fault? Give brief classification of fault? Explain with neat sketches.
5. Answer the following.  
i) Richter scale  
ii) What are the precautions to be taken for building construction in earthquake zones?  
iii) Describe the causes and effects of landslides
6. What is the importance of Geophysical studies? Explain Electrical Resistivity method?
7. What is Dam? Briefly Explain the Geological causes for the failures of ST' Francies dam, Hales bar dam and Hafayetha dam?
8. a) What are the requirements for a successful reservoir?  
b) Write the purposes of tunneling? What are the effects of tunneling on the ground?





**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**SWITCHING THEORY AND LOGIC DESIGN**  
 (Com. to EEE, ECE, ECC, BME, EIE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

- ~~~~~
- 1 a) Explain how decimal numbers are represented in binary, octal and hexadecimal [6]
  - b) Find the X from the following? (i)  $(B0.D)_{16} = (X)_8$  (ii)  $(3.33)_3 = (X)_2$  [6]
  - c) Consider an arbitrary number system with the independent digits as 0, 1 and X. What is the radix of this number system? List the first 10 numbers in this number system. [3]
  
  - 2 a) Express the compliment of following functions in sum of min terms [8]
    - i)  $F(A,B,C,D) = \sum (1,3,5,6,12,14)$  ii)  $F(x,y,z) = \pi (0,2,6,5)$
  - b) Find the compliment of  $F = x+yz$  then show that  $F.F' = 0$  and  $F + F' = 1$  ? [3]
  - c) Show that the dual of an exclusive OR is equivalent to its complement [4]
  
  - 3 a) Simplify the Boolean function F together with the don't care conditions d in [12]
    - (i) sum of products and (ii) product of sums using K-maps
$$f(w,x,y,z) = \sum (0,2,3,8,10,12)$$

$$d(w,x,y,z) = \sum (1,5,6,11,14)$$
  - b) Simplify the following function  $f = x'y' + yz + x'yz'$  [3]
  
  - 4 a) Draw the circuit diagram of a 4-bit adder-subtractor and briefly describe its functionality? [8]
  - b) Draw the logic diagram of a three digit BCD adder and briefly describe its functional principle. [7]
  
  - 5 a) Realize the switching function  $f(w,x,y,z) = \sum (1,5,6,8,9,11,14)$  by an  $(8 \times 1)$  multiplexer. [7]
  - b) Realize NOT,AND,NOR,NAND,NOR and XOR gates using 2X1 Multiplexer [8]
  
  - 6 a) Write short notes on PLA. [3]
  - b) Implement 4 bit binary to gray code conversion logic functions in PLA. [7]
  - c) Give the comparison between PROM, PLA and PAL. [5]
  
  - 7 a) Develop a synchronous 3-bit UP/DOWN counter with a gray code sequence. The counter should count UP when an UP/DOWN control i/p is 1. And count DOWN when i/p is 0. [8]
  
  - 8 a) What are the capabilities and limitations of Final State Machines? [8]
  - b) Explain in detail the Mealy state diagram and ASM chart for it with an example. [7]

**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**SWITCHING THEORY AND LOGIC DESIGN**

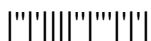
(Com. to EEE, ECE, ECC, BME, EIE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

- ~~~~~
- 1 a) Represent the number 6027 in BCD & EXCESS-3 code? [3]
  - b) If  $A = -57$  and  $B = +38$  Represent A and B in 8-bit 2's complement.  
Find i)  $A+B$  ii)  $A-B$  using 2's complement method [7]
  - c) convert the binary number to hexadecimal 10110001101011.11110010 [2]
  - d) Using 8-bits represent the integers -48 and 52 in  
(i) Signed magnitude form [3]  
(ii) Twos complement form
  - 2 a) Express the following functions in sum of minterms and product of maxterms [7]  
i)  $f(A,B,C,D) = B'D + A'D + BD$   
ii)  $f(x,y,z) = (xy+z)(xz+y)$
  - b) Explain how hamming code is constructed for single bit error detection and correction with example [8]
  - 3 a) Realize a network whose input are first 10 non-negative integers  $x$  in the Gray code, and whose output has the value 1 when  $5 \leq x \leq 7$ . [8]
  - b) Minimize the following function using K-map [7]  
 $F = \sum(0,2,4,5,6,7,8,10,14,17,18,21,29,31) + \sum d(11,20,22)$
  - 4 a) Implement a parallel adder to perform addition between two 8 bit numbers 100111002 and 101111012 ? Explore the result when the input carry at lowest bit is 0 and 1. [8]
  - b) Explain on look ahead carry adder operation with diagram? [7]
  - 5 a) Design 3 to 8 line decoder circuit using NOR gates only. [12]
  - b) Explain different hazards in combinational circuit [8]
  - 6 a) Give the comparison between PROM, PLA and PAL. [8]
  - b) Write the programming table to implement BCD to using a PLA? [7]



- 7 a) Derive the state tables for the 4 bit ring counter [8]  
 b) Explain the working of 3-bit bi-directional shift register with the help of diagram? [7]
- 8 a) For the state table of the machine given below. Find the equivalent partition and a corresponding reduced machine in standard form. [15]

| Present State | Next State Z |       |
|---------------|--------------|-------|
|               | $x=0$        | $x=1$ |
| A             | D,0          | H,1   |
| B             | F,1          | C,1   |
| C             | D,0          | F,1   |
| D             | C,0          | E,1   |
| E             | C,1          | D,1   |
| F             | D,1          | D,1   |

- b) Design the above using JK flip-flops [10+5]



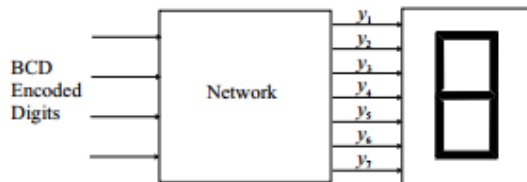
**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**SWITCHING THEORY AND LOGIC DESIGN**  
 (Com. to EEE, ECE, ECC, BME, EIE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

- 1 a) Perform the subtraction with the following unsigned decimal numbers by taking the 2's complement of subtrahend [7]  
 i) 11010-10000 ii) 11010 -1101 iii) 100 – 110000 iv) 1010100-1010100  
 b) Convert the decimal number 416.75 to base 7, 8 and 12 [8]
- 2 Explain the following codes [15]  
 a) Gray code  
 b) Weighted Codes  
 c) Hamming code [5+5+5]
- 3 Simplify the following using K-map method and tabulation method [15]  
 $F(A, B, C, D, E) = \sum(0, 1, 2, 5, 8, 11, 13, 16, 17, 21, 23, 25, 29, 31)$
- 4 a) Realize a network that activates the seven-segment display of first 10 non-negative integers as shown [8]



- b) Draw the logic diagram of a three-digit Excess-3 adder and briefly describe its functional principle? [7]

- 5 a) An 8X1 multiplexer has inputs A, B, and C connected to  $S_2, S_1,$  and  $S_0,$  respectively. The data inputs,  $I_0$  through  $I_7,$  are as follows:  $I_1 = I_2 = I_7 = 0;$   $I_3 = I_5 = 1;$   $I_0 = I_4 = D$  and  $I_6 = D'.$  Determine the Boolean function that the multiplexer implements. [12]
- b) Construct 5X32 decoder with four 3X8 decoders with enable and one 2X4 decoder. Use block diagrams. [3]
- 6 a) Obtain the programmable table for three digit binary to excess-3 code conversion using PLA and implement it using PLA [9]
- b) Implement Full adder circuit using ROM [6]
- 7 a) The content of a 4 bit shift register is initially 1101. The register is shifted six times to the right, with the serial input being 101101 what is the content of the register after each shift? [7]
- b) Design a mod-11 counter using the +ve edge triggered JK Flip-Flop [8]
- 8 a) Convert the following mealy machine into a corresponding Moore machine? [8]

| PS | NS,Z |     |
|----|------|-----|
|    | X=0  | X=1 |
| A  | C,0  | B,0 |
| B  | A,1  | D,0 |
| C  | B,1  | A,1 |
| D  | D,1  | C,0 |

- b) Design the circuit for the above table [7]



**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**SWITCHING THEORY AND LOGIC DESIGN**

(Com. to EEE, ECE, ECC, BME, EIE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

- 1 a) Explain weighted and non-weighted codes with example [7]  
 b) Represent the decimal number 6456 in [8]  
     i) BCD code ii) excess-3 code iii) 2421 code iv) 6311 code
- 2 a) A 12 bit hamming code word containing 8 bits of data and 4 parity bits is read from Memory. What was the original 8 bit word that was written in to the memory if the 12 Bit word read out is as follows? [15]  
     i) 000011101010  
     ii) 101110000110  
     iii) 101111110100

- 3 a) Realize the code converter which converts the binary (BCD) code into the Hamming code as specified in table [10]

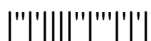
|   | BCD  | Hamming |
|---|------|---------|
| 0 | 0000 | 0000000 |
| 1 | 0001 | 0000111 |
| 2 | 0010 | 0011001 |
| 3 | 0011 | 0011110 |
| 4 | 0100 | 0101010 |
| 5 | 0101 | 0101101 |
| 6 | 0110 | 0110011 |
| 7 | 0111 | 0110100 |
| 8 | 1000 | 1001011 |
| 9 | 1001 | 1001100 |

- b) Design a combinational circuit with three inputs and one output. Output is 1 when the binary Value of inputs has two high inputs otherwise 0 [5]
- 4 a) Explain the working of carry look ahead adder and express how it is advantageous over 4 bit Ripple adder. [8]  
 b) Construct the 4 bit parallel adder with look ahead carry generation? [7]



- 5 a) A cross-bar switch is a two-input  $x_0, x_1$  two-output  $y_0, y_1$  device with a control input  $w$  that realizes the mapping  $y_0 = \bar{w}x_0 + wx_1$  and  $y_1 = \bar{w}x_1 + wx_0$ . Realize the cross-bar switch by  $(2 \times 1)$  multiplexers. [7]
- b) Explain with the help of logic diagram the operation of 3-to-8 line decoder? How such decoders are used in the realization of 1:64 de-multiplexers? [8]
- 6 a) Explain [8]
- Write and Read operation
  - ROM and RAM
  - Programmable Devices with Examples
  - FPGA and CPLD
- b) Implement the following Boolean functions with a PLA [7]
- $F(x,y,z) = \sum (0,1,2,5,6)$
  - $F(x,y,z) = \sum (1,3,6,7)$
- 7 a) Distinguish between combinational and sequential logic circuits. [7]
- b) Draw and explain the all operations of Universal shift register [8]
- 8 a) Obtain a minimal state table using partition technique for the state table given below. Find the minimum length sequence that distinguishes state from A from state B. [15]

| PS | NS, Z |     |
|----|-------|-----|
|    | X=0   | X=1 |
| A  | B,0   | H,1 |
| B  | F,0   | D,1 |
| C  | D,1   | E,0 |
| D  | C,1   | F,0 |
| E  | D,0   | E,1 |
| F  | C,0   | E,1 |
| G  | C,0   | D,1 |
| H  | C,1   | A,0 |



**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**PRINCIPLES OF PROGRAMMING LANGUAGE**  
(Com. to CSE, IT)

Time: 3 hours

Max. Marks: 75

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks  
~~~~~

1. a) Draw the syntax tree and symbol table for the GCD program
b) Describe the classification of programming languages

2. a) Describe about the principle of storage allocation mechanisms
b) What are Macros. What are the advantages and disadvantages of Macros

3. a) Explain the Attribute Grammar and also explain about the features of the same
b) Explain about the role of semantic analyzer

4. a) Describe the different categories of control flow mechanisms
b) What is Iterator? Explain the Iterator objects in C++

5. a) Explain about the enumerated data types in pascal
b) Explain about the type checking in detail

6. a) Explain about the concurrency in Ada 95
b) Explain about the coroutines with an example

7. a) Explain about the dynamic binding with an example
b) Distinguish between private, public and protected base classes in C++

8. a) Explain the applications of logic programming
b) Explain about the higher order function with an example



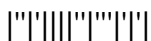
II B. Tech II Semester Supplementary Examinations, May/June - 2015
PRINCIPLES OF PROGRAMMING LANGUAGE
(Com. to CSE, IT)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~

1. a) Differentiate between static and dynamic semantic  
b) Programming languages can be compiled or interpreted. Give relative advantages and disadvantages of compilation and interpretation.
  
2. a) What is garbage collection  
b) Distinguish between static and dynamic scoping  
c) Distinguish between Overloading Vs coercion
  
3. a) Explain about the space management for attributes  
b) Explain the attribute grammar and also write the attribute grammar for simple assignment statements.
  
4. a) Explain about the switch statement in Algol with an example  
b) What is lazy evaluation? Explain the reasons why lazy evaluation may be desirable
  
5. a) Describe the classification of data types  
b) Explain about the dangling reference
  
6. a) Explain about the models of parameter passing  
b) Distinguish between implicit and explicit constraints
  
7. a) Explain about the pure virtual method in C++ with an example  
b) Explain the use of this parameter in object oriented languages with an example
  
8. a) Explain the applications of functional programming languages  
b) Explain about the Resolution and Unification with an example



**II B. Tech II Semester Supplementary Examinations, May/June - 2015**  
**PRINCIPLES OF PROGRAMMING LANGUAGE**  
(Com. to CSE, IT)

Time: 3 hours

Max. Marks: 75

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

~~~~~

1. a) Differentiate between syntax and semantics
b) Explain the parse tree for the sum and average program by using the grammar

2. a) Explain the dangling reference in detail
b) Explain the overloading concept in Ada with an example

3. a) Explain about the attribute flow
b) Explain about the syntax tree for simple calculating program
c) Describe the similarities and differences between context-free grammars and tree grammars.

4. a) Explain about the logically controlled loops in Algol
b) Explain about the assignment operators in C

5. a) Differentiate between type equivalence and type compatibility
b) Describe about the pointers in FORTRAN 90, Ada, pascal with an example

6. a) Explain about the subroutines as a parameters in Pascal with an example
b) What is exception? How to handle exceptions in Ada

7. a) Explain about the virtual and non virtual methods. Also explain the virtual methods in C++ and C#
b) What are the benefits of data abstraction

8. a) Explain the basic elements of prolog
b) Explain the characteristics of functional programming languages



II B. Tech II Semester Supplementary Examinations, May/June - 2015
PRINCIPLES OF PROGRAMMING LANGUAGE
(Com. to CSE, IT)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

~~~~~

1. a) Draw and explain the parse tree for GCD program  
b) Explain the syntax graph and EBNF descriptions of the Ada if statement.
  
2. a) What is binding time  
b) What are the rules of Scope
  
3. a) Explain the Attribute Grammar and also explain about the features of the same  
b) Distinguish between Synthesized and inherited attributes
  
4. a) Explain about the tail recursive function with an example  
b) Describe the different categories of control flow mechanisms
  
5. a) Explain the differences between type conversion, type coercion and non converting type casts  
b) Explain the different types of data types used in C
  
6. a) Explain about the generic sub routines with an example  
b) What is exception. How to handle the exceptions in Java with an example
  
7. a) Describe the issues of object oriented programming languages  
b) Explain the use of :: operator in C++ with an example
  
8. a) Describe about the search strategies in prolog  
b) Explain the features of functional programming languages



**II B. Tech II Semester Supplementary Examinations, May/June - 2015****OBJECT ORIENTED PROGRAMMING**  
(Electronics and Communications Engineering)

Time: 3 hours

Max. Marks: 80

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

- 1 a) Compare object oriented programming with structured programming. [8M]  
b) Explain different types of control statements available in Java with examples. [8M]
- 2 a) Where and how can you use a private constructor? [5M]  
b) What is the difference between a static and a non-static inner class? [6M]  
c) Write a program in Java which reads two real numbers, finds the sum of these two numbers and prints the real and imaginary part of this sum separately [5M]
- 3 What is an inheritance? Briefly describe various forms of inheritance with suitable examples. [16M]
- 4 a) What is an interface? What is meant by extension of interfaces? Explain with an example. [8M]  
b) What is meant by access protection? Explain different access specifiers supported by Java with an example. [8M]
- 5 a) Write short notes on Checked exceptions and Unchecked exceptions. [7M]  
b) Explain the process of synchronization provided for multithread programming using Java. [9M]
- 6 a) Explain the delegation event models? Explain the role of source and listeners with an example. [8M]  
b) Write java program to handle keyboard events. [8M]
- 7 a) Discuss card layout manager with an example. [10M]  
b) Explain the process for creating own exception subclasses. [6M]
- 8 a) Discuss any three classes in util package with examples. [12M]  
b) Write short notes on TCP/IP . [4M]



**II B. Tech II Semester Supplementary Examinations, May/JUNE - 2015****OBJECT ORIENTED PROGRAMMING**  
(Electronics and Communications Engineering)

Time: 3 hours

Max. Marks: 80

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

- 1 a) What are the advantages of 'platform independent languages'? Also explain how Java is platform independent. [8M]  
b) Explain creating and accessing class members using object with an example. [8M]
- 2 a) What is method overloading? What are the important points which should be taken care of while overloading methods? [6M]  
b) With an example program explain the overloading constructors. [6M]  
c) What is the difference between final, finally and finalize? [4M]
- 3 a) Write about substitutability with an example. [7M]  
b) What is meant by multilevel hierarchy? Explain with an example program in Java. [9M]
- 4 a) What is the use of super keyword in Java? Explain in detail. [8M]  
b) Compare & contrast interfaces, abstract classes and actual classes? [8M]
- 5 a) Describe the complete life cycle of thread with a neat block diagram at each stage. [7M]  
b) Explain usage of following words in exception handling: throw, throws, finally. [9M]
- 6 a) Explain with an example program how to handle keyboard events. [10M]  
b) Describe the delegation event model and the roles of event sources and event listeners. [6M]
- 7 a) Write Short notes on the following: [16M]
  - i) MVC architecture
  - ii) JApplet
  - iii) Combo boxes
- 8 a) Explain different string handling functions with example. [10M]  
b) Write short notes on datagrams. [6M]



**II B. Tech II Semester Supplementary Examinations, May/JUNE - 2015****OBJECT ORIENTED PROGRAMMING**  
(Electronics and Communications Engineering)

Time: 3 hours

Max. Marks: 80

---

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

- 1 a) State various OOP concepts and explain any four of them with suitable examples. [8M]  
b) State and explain the atomic elements of Java program. [8M]
- 2 a) Explain the usage of constructor and types of constructors in Java. [7M]  
b) Discuss how final keyword is used to prevent overriding and inheritance with examples. [9M]
- 3 a) What is the difference between interface and abstract class? [7M]  
b) What is the use of super keyword in Java? Explain in detail. [9M]
- 4 Explain in detail the process of defining, creating, importing and accessing a package with suitable example. [16]
- 5 a) Explain different ways defined by Java to create threads. [8M]  
b) Write a java program to implement the following exception class [8M]  
i) Arithmetic Exception ii) Number Format Exception
- 6 a) Explain about various interfaces defined by the java.awt.event to implement event listeners. [8M]  
b) What is Border Layout? Write a Java program which creates Border Layout and adds two Checkboxes to it. [8M]
- 7 a) Write and explain the fundamentals of an applet with a simple applet program [8M]  
b) Explain the following Swings components [8M]  
i) JList ii) JScrollPane.
- 8 a) Write short notes on the following: [16M]  
i) URL  
ii) Byte oriented streams  
iii) Sockets



**II B. Tech II Semester Supplementary Examinations, May/JUNE - 2015****OBJECT ORIENTED PROGRAMMING**  
(Electronics and Communications Engineering)

Time: 3 hours

Max. Marks: 80

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

- 1 a) Explain the primitive data types supported by Java language. [8M]  
b) Write a program that illustrates the dynamic initialization, the scope and lifetime of variables in Java. [8M]
- 2 a) How to overload methods in Java? Explain the concept of 'Using objects as parameters to methods'. [7M]  
b) Illustrate the usage of arrays in Java with the help of two dimensional arrays multiplication. [9M]
- 3 a) Explore the concept of string classes with an example program. [8M]  
b) In detail explain about Dynamic method dispatching. [8M]
- 4 a) What is CLASSPATH? Explain its role in finding packages. [7M]  
b) What cautions need to be taken while importing Explain with an example program for importing packages? [9M]
- 5 a) What is an exception? Write about the fundamentals of exception handling used in Java. [7M]  
b) What is multithreading? Explain two advantages of multithreaded programs. Write a program in Java to explain how different priorities can be assigned to different threads. [9M]
- 6 a) Explain how to generate menu bar with scroll bars using Java. [10M]  
b) Discuss the following in detail :  
i) Adapter classes ii) Color class [6M]
- 7 a) What is a layout manager? List different layouts managers and any Two layouts managers [12M]  
b) What is the difference between Swing and AWT components? [4M]
- 8 a) Explain in detail about TCP/IP  
b) Briefly explain java.io package [8M+8M]

