III B Tech II Sem (VSU) CE

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FOUR YEAR B.TECH DEGREE EXAMINATIONS, APRIL 2013

III B.Tech II Semester

Branch: Civil Engineering

Paper: RCC Structural Design – II

Time: 3 Hours Max. Marks: 60

Answer any **one** question from each Unit.

UNIT – I

1. Design a trapezoidal footing for the two columns A and B transmitting service loads of 800 KN and 1600 KN respectively. The column A is 400 mm X 400 mm and column B is 600 mm X 600 mm in size and they are spaced at 5.0 m centre. The property line is 300 mm beyond the face of column A. The safe bearing capacity of soil at site is 150 KN/m^2. Adopt M-20 grade concrete and Fe-415 grade HYSD bars. **(15M)**

OR

2. Design a reinforced concrete rectangular footing of width not greater than 2.75 m for a column of section 250 mm X 500 mm which is subjected to an axial load of 1500 KN at service state. Consider,

   Density of the soil = 20 KN/m^3

   Angle of repose = 30°

   Allowable bearing capacity of soil = 150 KN/m^2.

   Use M-20 grade concrete and Fe-415 grade steel. **(15M)**

UNIT-II

3. Design a cantilever retaining wall to retain the earth with a backfill sloped of 20° to the horizontal. The top of the wall is 5.5 m above the ground level. Assume the depth of foundation as 1.2 m below the ground level with a safe bearing capacity of 120 KN/m^2. The unit weight of the backfill is 18 KN/m^3 and an angle of shearing resistance of 35°. Also assume the coefficient of friction between soil and concrete as 0.55. Adopt M-20 grade concrete and Fe-415 grade of HYSD bars. **(15M)**

OR

4. Design a counterfort type retaining wall to support an earth fill of 6.0 m above the ground level. The safe bearing capacity of soil at site is 160 KN/m^2. Unit weight of soil may be taken as 16 KN/m^3 and an angle of shearing resistance of 33°. Assume the value of coefficient of friction as 0.55. Spacing of counterforts is 3.0 m centre to centre. Adopt M-20 grade of concrete and Fe-415 grade HYSD bars. Sketch the details of reinforcements in the retaining wall. **(15M)**

UNIT-III

5. A prestressed concrete beam 200 mm wide and 300 mm deep is prestressed with wires of area 320 mm^2 located at a constant eccentricity of 50 mm and carrying an initial stress of 1000 N/mm^2. The span of the beam is 9.0 m. Calculate the percentage loss of stress in the wires if the beam is (a) pretensioned and (b) post tensioned,
   Using the following data:
   $E_s = 210$ KN/mm^2 and $E_c = 35$ KN/mm^2;
   Relaxation of steel stress = 5 percent of the initial stress;
   Shrinkage of concrete = 300 X 10^{-6} for pretensioning and 200 X 10^{-6} for post tensioning;
   Creep coefficient (Φ) = 1.6;
   Slip at anchorage = 1 mm;
   Frictional coefficient for wave effect = 0.00154 per m. **(15M)**

OR

6. A beam of symmetrical I-section spanning 9.0 m has a flange width of 250 mm thick and a flange thickness of 75 mm respectively. The overall depth of the beam is 500 mm. Thickness of the web is 100 mm. The beam is prestressed by a parabolic cable with an eccentricity of 180mm at the center and zero at supports with an effective prestressing force of 120 kN. The live load on the beam is 2000 N/m. Draw the stress diagram at the mid span section for the following conditions:
   (a) Prestress + Self-weight.
   (b) Prestress + Self-weight + Live load.
   Take density of concrete as 25KN/m^3. **(15M)**

UNIT-IV

7. A circular tank has an internal diameter of 10 m and has maximum height of water as 4.0 m. the walls of the tank are restrained at the base. Determine the values of maximum hoop tension and its position, moment at the base and shear at the base using IS Code tables. Assume thickness of wall as 160 mm. **(15M)**

OR

8. Design an intz water tank of 60,000 litres capacity. The height of staging is 12 m upto bottom of the tank. Use membrane analysis. The wind pressure to be 1.5 KN/m^2 and bearing capacity of soil is 120 KN/m^2. Use M-20 grade concrete and Fe-415 grade HYSD bars. **(15M)**

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – CE

HYDROLOGY

Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT – I

1. (a) Describe the Hydrologic cycle. (6)

   (b) Determine the density in kilograms per cubic metre, of (6)

   (i) Dry air at 30°C and a pressure of 900 mb and

   (ii) Moist air with relative humdity of 70 percent at the same temperature and pressure.

Or

2. (a) Explain a procedure for checking a rainfall data for consistency. (6)

   (b) For a drainage basis of 600 km², isohyetals drawn for a storm gate the following data. (6)

Isohyetals (interval) cm	15-12	12-9	9-6	6-3	3-1
Inter isohyetal area (km²)	92	128	120	175	85

   Estimate the average depth of precipitation over the catchment.

UNIT – II

3. (a) Discuss briefly the various abstractions from precipitation. (6)

   (b) Explain briefly the evaporation process. (6)

Or

4. (a) Distinguish between

   (i) Infiltration and infiltration rate

   (ii) Field capacity and permanent wilting point. (6)

   (b) Describe

   (i) Reference crop evaporation piration and

   (ii) Actual evaporations piration. (6)

[P.T.O]

UNIT – III

5. (a) Explain
   (i) Water year
   (ii) Natural flow
   (iii) Mass curve. (6)

   (b) Describe briefly the surface water resources of India. (6)

Or

6. (a) What is watershed simulation? and Explain it. (6)

   (b) List the measures that can be adopted to lessen the effects of drought in region. (6)

UNIT – IV

7. (a) Discuss the factors affecting the runoff coefficient 'C' in rational formula. (6)

   (b) Explain the rational method of computing the peak discharge of a small catchment. (6)

Or

8. (a) Write a note on Gumbel's method. (6)

   (b) Explain
   (i) Design flood and
   (ii) Design storm. (6)

UNIT – V

9. (a) Write a note on Isochrome, time of concentration and linear reservoir. (6)

   (b) Explain reservoir routing methods. (6)

Or

10. (a) Explain
    (i) Specific yield
    (ii) Storage coefficient and (6)

    (b) What are Dupit's assumptions and sketch a typical infiltration gallery. (6)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – CE

Paper — ENVIRONMENTAL ENGINEERING – I

Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT – I

1. In a town, it has been decided to provide 200 liters per head per day in the 21st century. Estimate the domestic water requirements of this town in the year AD 2000 by projecting the population of the town by the incremental increase method, from the following data.

Year	Population
1940	2,50,000
1950	4,80,500
1960	5,50,300
1970	6,38,600
1980	6,95,200

Or

2. The following data shows the variation in population of a town from 1922 to 1972. Estimate the population of the city in the year 2002. Use :

   (a) Arithmetical increase method

   (b) Incremental increase method

Year :	1922	1932	1942	1952	1962	1972
Population :	72,000	85,000	1,10,500	1,44,000	1,84,000	2,21,000

UNIT – II

3. (a) Write short notes on the following :

   (i) P^{tt} value and its determination

   (ii) Nitrogen and its compounds

   (iii) E–Coli.

   (b) Describe in brief various important tests conducted for chemical Examination of water.

Or

[P.T.O]

4. (a) What are the common coagulants the drinking water. Write briefly in aluminum sulphate.

(b) Find the dimensions of a rectangular sedimentation basin for the given data as

(i) Volume of water to be treated = 3 million liters per day

(ii) Detention period = 4 Hours

(iii) Velocity of flow = 10 cm/min.

UNIT - III

5. Draw the Rapid sand filter gravity type write briefly.

Or

6. (a) What is ozone treatment? Where we can use, Advantages of ozonation.

(b) What are the test for Free and combined chlorine.

UNIT - IV

7. The Analysis of a water shows the following free CO_2 3 ppm, alkalinity : 65 ppm, non-carbonate hardness : 95 ppm, total magnesium : 10 ppm, Assume that it is possible to remove all but 30 ppm of carbonate hardness with lime and that the finished water is to have total hardness of 80 ppm. Determine the amount of chemicals required per million liters of water.

Or

8. What are the advantages and disadvantages of lime soda and zeolite process?

UNIT - V

9. (a) What are the different types of valves used in water distribution system.

(b) What are the methods of distribution in water supply scheme?

Or

10. A 1 m dia smooth concrete pipe carrier a discharge of 0.9 cumecs at an average temperature of 20°. Compute the hydraulic gradient using

(a) Darcy weilbach formula

(b) Mannings formula

(c) Hazen–William's formula

(d) Slitchers formula for F. Take $\gamma = 1.011 \times 10^{-6} m^2/s$ at 20° C.

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

BRANCH—CE

STRUCTURAL ANALYSIS –II

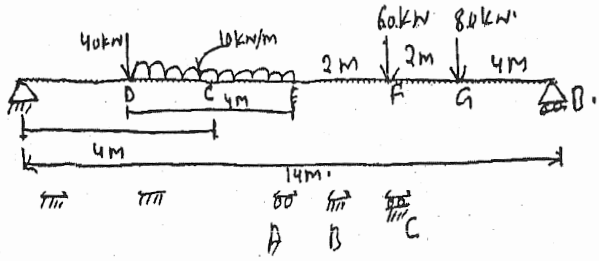
Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT I

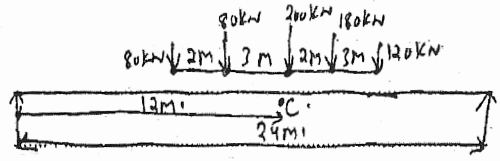
1. (a) For the continuous beam of two equal spans draw Influence line for bending moment and reaction for central support. (6)

   (b) Using I.L.D. find shear force and bending moment at section C in the following beam. (6)



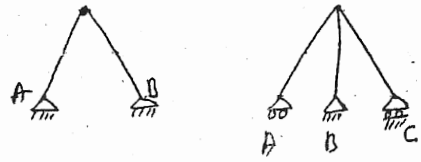
Or

2. A train of 5 wheel loads as shown in figure moving from left to right. Calculate max positive, negative shear force values at centre of span and absolute max B.M. any where is span . (12)



UNIT II

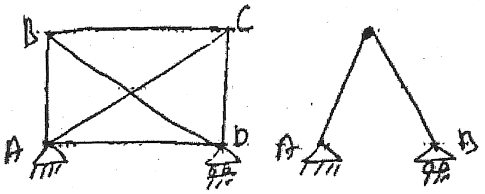
3. (a) Examine the following trusses are statically determinate (or) Indeterminate and find static and kinematic indeterminacies. (6)



   (b) Derive an equation for castigliano's theorem–II.

Or

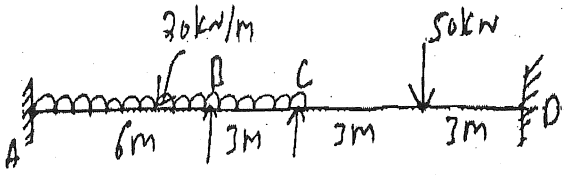
4. (a) Examine the following trusses whether it is statically determinate determinate (or) Indeterminate, find out static and kinematic indeterminacies.



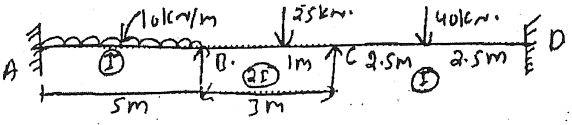
(b) A continuous beam of two equal spans L is uniformly loaded over its entire length. Find the magnitude R of the middle reaction by using castiglianos theorem. Middle reaction is located at distance "L" From A.

UNIT III

5. (a) Analyse the following beam using slope –deflection B sinks by 10mm, EI is uniform, 20kN/M.

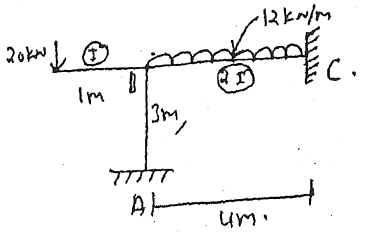


(b) Analyse following beam using moment –distribution.

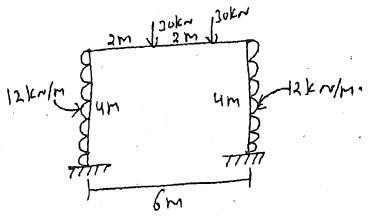


Or

6. (a) Analyse following Frame using slope deflection method.



(b) Analyse following frame using moment distribution method.



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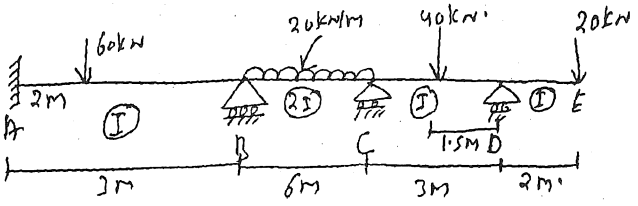
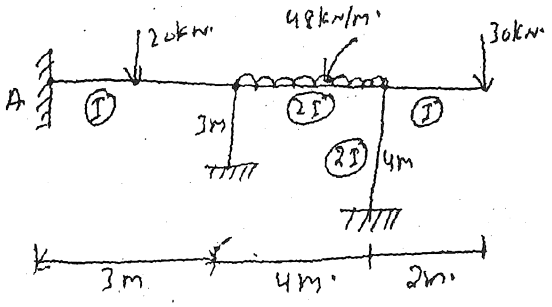
UNIT IV

7. Analyse following beam using kanj's method and draw S.F.D. and B.M.D.



Or

8. Analyse the following frame using Kannis method draw B.M.D.



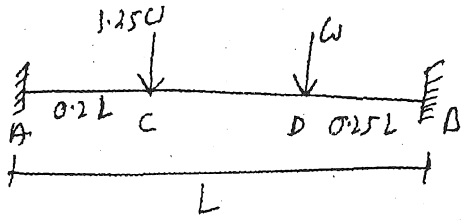
UNIT V

9. (a) What are the assumptions made in plastic theory?

   (b) Obtain the shape factor for rectangular section with width "b" and depth "d".

Or

10. (a) Determine collapse load in fixed beam as shown.



(b) Explain beam, Scay, combined mechanisms.

(10 CE 26)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – CE

FOUNDATION ENGINEERING

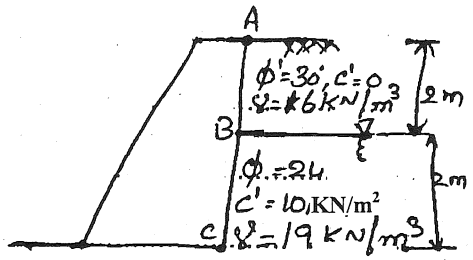
Time : 3 Hours *Max. Marks : 60*

Answer ONE questions from each Unit.

UNIT – I

1. (a) Explain with neat sketch Rehbann's Construction for active earth pressure. (6)

   (b) Determine the Rankine's passive force per unit length of the wall. The water table is at the level of 'B' Take $\gamma_w = 10KN/m^3$. (6)



Or

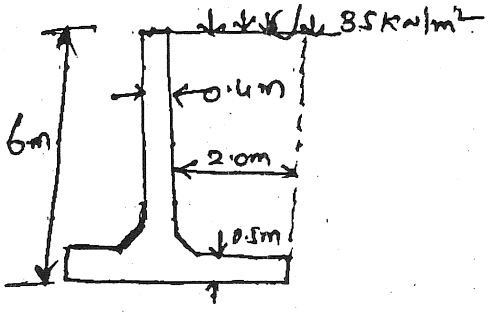
2. (a) Explain the Rankine's passive earth pressure in Cohesive Soils. (8)

   (b) Explain the earth pressure at rest Condition. (4)

UNIT – II

3. (a) Classify the types of Drinages in retaining walls. (4)

   (b) Check the stability of the cantilever retaining wall $C' = 0, \phi' = 41^\circ$, $\gamma = 16KN/m^3$, water table is at Considerable depth below ground surface. Angle of friction δ' between the base f the wall and soil can be taken as $2\phi/3$. Backfill carries surcharge load $35KN/m^2, \gamma_c = 24KN/m^3$, safe bearing capacity = 200 KN/m² of soil below the base. (8)



Or

4. (a) Explain design consideration for Retaining walls. (8)

(b) What are the factors affecting the selection of Backfill and placement condition. (4)

UNIT – III

5. (a) Explain any one of Geophysical methods with reference to sub soil investigation. (6)

(b) Explain in detail cone penetration test. (6)

Or

6. (a) Explain in detail standard penetration test. (6)

(b) Explain the types of borings with neat diagram. (6)

UNIT – IV

7. (a) Explain assumptions in Terzaghi's theory of Bearing Capacity. (6)

(b) Determine ultimate bearing capacity of strip footing 1.2 m wide and having a depth of foundation of 1.0 m. Use Terzaghi's theory and assume General shear failore Take $\phi' = 35^\circ$, $\gamma = 18 KN/m^3$ $C^1 = 15 KN/m^2$. (6)

Or

8. (a) Explain the types of shear failures. (6)

(b) Write about Meyerhof's Bearing Capacity theory. (6)

UNIT – V

9. (a) Explain how can go determine safe capacity of pile from piletest data. (6)

(b) Describe various types of pile foundation. (6)

Or

10. (a) What is negative skin friction? What is its effect on pile? (6)

(b) Sketch a typical double under-reamed pile foundation. (6)

(10 CE 29)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – CE

RAILWAY, AIRPORT AND HARBOUR ENGINEERING

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Comparison of railways and highways. Write briefly.
   (b) What are the requirements of rails?

Or

2. (a) Write briefly the permanent way of track with neat sketch.
   (b) What are the difference between flat footed rails and double headed rails?

UNIT – II

3. (a) What are the classification at sleepers? Write briefly.
   (b) What are the functions of ballast in a railway track?

Or

4. (a) What are the requirements of good ballast?
   (b) Comparison of wooden sleepers and concrete sleepers.

UNIT – III

5. (a) Differentiate between the following :
      (i) Station and yard
      (ii) Junction and terminal stations.
   (b) Explain briefly the different types of station yards.

Or

6. (a) What is marshalling yards? Write briefly.
   (b) What are the classification of railway stations?

UNIT – IV

7. (a) What are the points required for airport site selection?
   (b) What are the requirements of a suitable site for terminal building development?

Or

8. (a) What are the characteristics of an ideal airport layout?

(b) Explain the various surveys to be conducted and the data to be controlled for airport selection.

UNIT – V

9. (a) What are the factors governing the height of a break water?

(b) Write the differentiate between the following :

(i) Dry dock and floating blocks

(ii) Keel and bilge blocks.

Or

10. (a) Explain clearly the difference between capital dredging and maintenance dredging.

(b) What are the requirements of a good port?

(10 EC 23)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – ECE & EEE

MICROPROCESSORS AND APPLICATIONS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Write an assembly language program for getting a delay of 1 sec, assuming the clock frequency of 3.3 MHz using 8085 microprocessor instructions. (5)

   (b) With the help of a neat diagram describe the internal architecture of 8086 microprocessor. (7)

Or

2. (a) Why are buffers and latches often required in an 8086 based system? Explain how address, data and control buses of 8086 microprocessor are demultiplexed. (6)

   (b) What are the minimum requirements for 8086 to work in minimum mode. (6)

UNIT –II

3. (a) Write a program to add the contents of the memory location 2000H:0500H to contents of 3000H:0600H and store the result in 5000H : 0700H. (6)

   (b) Write an 8086 subroutine to test a system in address 00200H–07FFFH. (6)

Or

4. (a) With a neat block diagram explain how the memory is interfaced to 8086 as odd and even page. (6)

   (b) Write an assembly language program for 8086 microprocessor to add two vectors containing 10 numbers of data. (6)

UNIT – III

5. (a) Discuss about various programmed data transfer schemes. (6)

   (b) Explain mode 0 and mode 1 operations of 8253. (6)

Or

6. (a) With a neat block diagram explain the working of a OMA controller. (9)

   (b) What are the control words of 8251 and what are its functions? (3)

[P.T.O]

UNIT IV

7. (a) With a neat sketch explain the functions of 8255 PPI. (6)

   (b) Illustrate the different modes of operations of 8255. (6)

Or

8. Interface a 16K RAM and 32K ROM to 8086 microprocessor using memory chips of size ukRAM and ukROM. Assume suitable starting address for RAM and ROM use decoders for interfacing. (12)

UNIT V

9. (a) With a neat block diagram explain the architecture of 8051 microcontroller. (8)

   (b) Write an assembly language program for 8051 to find the sum of the values 76H, F2H and E4H, put the sum in registers Ro (low byte) & Rs (high byte). (4)

Or

10. (a) Discuss the various timer modes supported by 8051 and write a program to initialize timer 1 m auto reload mode, so that it overflows 10,000 times in a sec. (7)

    (b) Explain the various operating modes for serial port in 8051 microcontroller. (5)

(10 EC 24)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

II B.Tech.–II SEMESTER EXAMINATION

Branch – ECE

Paper — MICROWAVE TECHNIQUES

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What are klystrons? Sketch a neat diagram of two cavity klystron giving all its important parts.

   (b) What are the salient features of TWT? How it is able to give larger bandwidth.

Or

2. In a two identical cavity klystron amplifier, $V_0 = 1$ kv, $I_0 = 20mA$ cavity gap $d = 1$ mm, $f = 8$ GHz, drift region length $L = 4cm$, equivalent shunt resistance Rsh of 40 kΩ. Find

   (a) Electron velocity

   (b) Cavity gap transit time

   (c) Input voltage for maximum output voltage

   (d) The voltage gain in decibels and

   (e) Efficiency.

UNIT – II

3. (a) What are tunner diodes? How they are able to exhibit dynamic negative resistance?

   (b) What are parametric amplifiers? What is their significance in the high frequency receivers?

Or

4. (a) Explain the function of varactor diode.

   (b) Write note on microwave transistors and FET's.

UNIT – III

5. (a) Derive the expressions for field components in a rectangular cavity resonator.

   (b) Define attenuation of a device. Describe the functioning of various types of attenuators.

Or

6. (a) What is magic tee? Describe its structure and list various properties of an ideal magic tee.

   (b) Write a notes on directional couplers.

[P.T.O]

UNIT – IV

7. (a) Describe
   (i) Low VSWR and
   (ii) Double minimum method.
   (b) Write notes on microwave bench setup.

Or

8. (a) Measure the frequency of rectangular wave guide in TE_{10} mode.
   (b) Write notes on VSWR.

UNIT – V

9. Explain
   (a) Helical antenna
   (b) Parabolic reflector antenna.

Or

10. (a) Write notes on hybrid MIC's.
    (b) Write the advantages of MIC's.

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch — Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSING

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Find the z-transform and the R.O.C. of the signal $x(n)=\left(\frac{-1}{3}\right)^n u(n)-\left(\frac{1}{2}\right)^n u(-n-1)$. (6)

   (b) Determine the zero state response of the system $y(n)=\frac{1}{2}y(n-1)+4x(n)+3x(n-1)$; to the input $x(n)=e^{jw_0 n}\cdot u(n)$. (6)

Or

2. (a) Determine the impulse response of the system described by the difference equation $y(n)=\frac{3}{4}y(n-1)+\frac{1}{8}y(n-2)=x(n)-x(n-1)$ and also sketch the pole zero pattern for the system. (8)

   (b) Find the convolution of the following using z transform $x(n)=\{1, 2, 1\}$, $h(n)=\{1, 1, 1\}$. (4)

UNIT – II

3. (a) Determine the inverse DFT of sequence $X(k)=\{3, (2+j), 1, (2-j)\}$. (6)

   (b) Compare the number of multiplications required to compute the DFT of a 64-point sequence using direct computation and that using FFT. (6)

Or

4. (a) An 8 point sequence is given by $x(n)=\{1, 2, 3, 4, 4, 3, 2, 1\}$ then compute 8 point DFT of sequence $x(n)$ by radix-2 DIF FFT algorithm. (8)

   (b) State and prove any two properties of DFT. (4)

UNIT – III

5. (a) Realize the system with difference equation $y(n)=\frac{3}{4}y(n-1)-\frac{1}{8}y(n-2)+\frac{1}{3}x(n-1)$ in parallel form. (6)

   (b) Obtain FIR linear phase and cascade form realizations of the system function $H(z)=\left(1-\frac{1}{4}z^{-1}+\frac{3}{8}z^{-2}\right)\left(1-\frac{1}{8}z^{-1}-\frac{1}{2}z^{-2}\right)$. (6)

Or

6. (a) Obtain the Direct form-I and Direct form-II realizations for the system described by the following difference equation $y(n) = 2y(n-1) + 3y(n-2) + x(n) + 2x(n-1) + 3x(n-2)$. (8)

(b) Explain about canonic form realizations. (4)

UNIT – IV

7. (a) Convert the analog filter with system function $H(s) = \frac{s+0.1}{(s+0.1)^2+9}$ into digital IIR filter using bilinear transformation. Assume resonant frequency $W_r = \pi/4$. (8)

(b) Explain about Frequency Warping effect. (4)

Or

8. (a) Design a Chebyshev for the following specifications using impulse invariant method :(8)

$$0.8 \le \left|H(e^{jw})\right| \le 1 \qquad 0 \le w \le 0.2\pi$$

$$\left|H(e^{jw})\right| \le 0.2 \qquad 0.6\pi \le w \le \pi.$$

(b) Explain about frequency prewarping. (4)

UNIT – V

9. (a) Explain the procedure for designing FIR filter using windows. (6)

(b) What is Gibbs phenomenon? (6)

Or

10. (a) Design a low pass filter using Hamming window with a cutoff frequency 1.2 rad/sec and $N = 9$. (8)

(b) What are the different window functions? Explain with neat diagrams. (4)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch — EEE

Paper — POWER SYSTEMS — II

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. Show how regulation and transmission efficiency are determined for medium lines using
   (a) Nominal T-method
   (b) Nominal π -method.
   Illustrate your answer with suitable vector diagrams.

Or

2. (a) Using rigorous method, derive expression for sending end voltage and current for a long transmission line.
   (b) Explain the Ferranti effect.

UNIT – II

3. (a) Discuss the phenomenon of wave reflection and refraction. Derive expression for reflection and refraction coefficients.
   (b) Discuss the following cases of line terminations.
      (i) Open circuited line
      (ii) Short circuited line.

Or

4. (a) How can Bewley Lattice be drawn? Discuss its use.
   (b) A cable has an inner conductor of radius 0.5×10^{-2} mt inside a sheath of inner radius 1.5×10^{-2} mt. Find Inductance and capacitance per mt. length surge impedance and velocity of propagation of the permitivity of the insulator is 4.

UNIT – III

5. (a) Explain the terms : Earth electrode, resistance of earthing electrode, step potential and touch potential.
   (b) What are the objectives of earthing?

Or

6. (a) Discuss the following methods of natural grounding
   (i) Resistance grounding
   (ii) Reactance grounding

   (b) What is arcing grounds? How it is minimized?

UNIT – IV

7. (a) Explain the different bus bar arrangements with neat figures.

   (b) Write the symbols of the different equipment in sub-station.

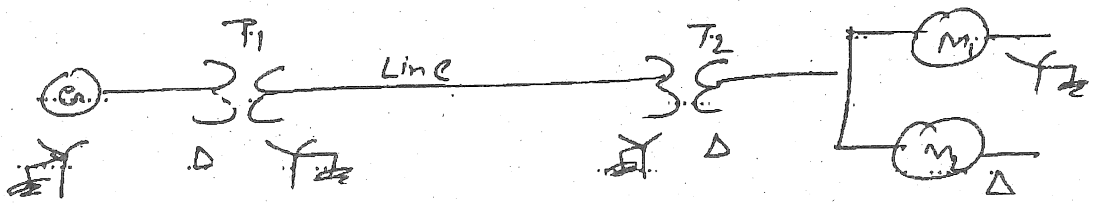
Or

8. (a) Explain different types of DC links.

   (b) Explain the advantages of HVDC transmission.

UNIT – V

9. (a) A 90 MVA 11 KV 3-Phase generator has a reactance of 25%. The generator supplies two motor through a transmission line as shown in Fig. The transformer T_1 is a 3-phase transformer, 100 MVA, 10/132 KV, 6% reactance. The transformer T_2 composed of 3 single phase units each rated at 30 MVA, 66/10 KV with 5% Reactance. The motors are rated at 50 MVA and 40 MVA both 10 KV and 20% reactance. Taking generator ratings as base, dawn the reactance diagram and indicate the reactance in per unit. The reactances of the line is 100 Ω,



   (b) Discuss the advantages of per unit system.

Or

10. (a) Draw the circuit representation of synchronous machine, two winding and three winding transformer.

   (b) A 3-phase 3-winding Y-Y-Δ transformer is rated as under :

   Primary : 132 KV, 30 MVA

   Secondary : 11 KV, 20 MVA

   Tertiary : 6.6 KV, 10 MVA.

   The results of S.C. test as under secondary short circuited, tertiary open circuited, primary encited X = 7% on 132 KV, 30 MVA base secondary open circuited, tertiary short circuited, Primary encited, X = 9% on 132 KV, 30 MVA base Tertiary short circuited, Primary open circuited, secondary encited, X = 4% on 11 KV, 20 MVA base. Find X_1 , X_2 and X_3 neglecting resistance.

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – ECE

Paper — DIGITAL IC APPLICATIONS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) List out different types of A/D converters and compare their merits and demerits.
   (b) Give the schematic circuit diagram of the fastest A/D converter and explain it operation.

Or

2. (a) Explain in detail about data converters.
   (b) Distinguish between A/D converters and D/A converters.

UNIT – II

3. (a) Write the VHDL code for full adder.
   (b) Write notes on package and library.

Or

4. What are the moduling styles in VHDL? Explain with suitable examples.

UNIT – III

5. (a) Write the VHDL code for 16 × 4 encoder.
   (b) Define :
      (i) Signal
      (ii) Variable
      (iii) Constants.

Or

6. (a) Write the VHDL code for 3 × 8 decoder.
   (b) What is the difference between encoder and multiplexer.

UNIT – IV

7. (a) Write the differences between latch and flip flip and how do you convert one type of flip flop to another.
   (b) Explain the concept of ring and Johnson counter.

Or

[P.T.O.]

8. (a) Write note on CAD tools.

(b) Write the VDHL code for up down counter.

UNIT – V

9. (a) Define PCB. How we can text the PCBs

(b) Write a notes on BIST.

Or

10. Explain

(a) Placement

(b) Routing

(c) Static timing analysis in physical design.

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – EEE

Paper – POWER ELECTRONICS

Time : 3 Hours *Max. Marks : 60*

UNIT – I

1. (a) What do you mean by commutation of SCR? (2)

   (b) What are the different classes of a forced commutation? Explain the class 'C' and class 'D' methods. (10)

Or

2. Explain in detail the voltage and current Ratings of an SCR? (12)

UNIT – II

3. Describe the working of a single phase fully controlled bridge converter in the Following two modes

   (a) Rectifier mode

   (b) Inverter mode (12)

   Also, Sketch the following wave forms for $\alpha = 45°$ and $\alpha = 20°$

   (i) Load voltage wave form

   (ii) Load current wave form

   (iii) Thyristor voltage and current wave forms

   (iv) Supply voltage and current wave forms

Or

4. (a) Explain the operation of Three phase half wave controlled converter with RL load. Sketch the associated waveforms. (9)

   (b) A 230V, 50HZ, one pulse SCR controlled converter is triggered at a firing angle of 40° and the load current extinguishes at an angle of 210°. Find the circuit turn off time. average output voltage and the average load current for R = 5 Ω and L=2mH. (3)

UNIT – III

5. (a) Discuss the working of load commutated chopper with relevant voltage & current waveforms (8)

   (b) Derive the expression form which the value of Commutating Capacitor of this chopper. (4)

Or

6. (a) Describe a Jones chopper with associated voltage and current waveforms. (8)

(b) Discuss the design considerations of the Jones chopper (4)

UNIT – IV

7. Draw the wave forms and discuss the performance of following methods of PWM control used in Inverters

(a) Multiple pulse Modulation

(b) Sinusoidal pulse Modulation. (12)

Or

8. Draw and explain the operation of MC Murry-Bed ford half bridge Inverter. (12)

UNIT – V

9. (a) Derive the expression for output voltage equation for a cyclo converter (8)

(b) What is load commutated cyclo converter (4)

Or

10. (a) Explain the operation of 3-phase to 1-phase cyclo converters, (9)

(b) A Three phase —six-pulse, 50KVA, 415V, Cyclo converter is operating at a firing angle of 45° and supplying load of 0.8 power factor, Determine input current to the converters. (3)

(10 EC 25)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – ECE

PRINCIPLES OF COMPUTER NETWORK

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Discuss briefly the functions of different layers of the OSI reference model with a neat diagram.

   (b) Discuss about various network topologies with diagrams.

Or

2. (a) Write short notes on ARPANET and Novell networks.

   (b) Discuss in detail about Internet.

UNIT – II

3. (a) What is transmission media? Explain about guided transmission media.

   (b) Explain about various design issues of datalink layer.

Or

4. (a) Discuss in detail about HDLC protocol.

   (b) What are sliding protocols? Explain about outbit sliding window protocol.

UNIT – III

5. (a) What is a LAN? Discuss in detail about wireless LAN's.

   (b) Explain about carrier sense multiple access protocols.

Or

6. (a) What is routing? Which layer is impossible for writing? Explain about shortest path routing.

   (b) What are different categories of routing algorithm? Discuss about distance vectors routing.

[P.T.O]

UNIT – IV

7. (a) Write short notes on the following elements of transport protocol.
   (i) Connection establishment
   (ii) Connection release.
   (b) Explain in detail about UDP transport layer protocol.

Or

8. (a) What is a ATM network? What is this size of an ATM cell? Discuss briefly about ATM reference model with a neat diagram.
   (b) Explain TCP connection management.

UNIT – V

9. (a) Discuss in detail about DNS.
   (b) Discuss in brief about cryptography, substitution ciphers and transposition ciphers with examples.

Or

10. (a) Explain about flutioning rail and World Wide Web architectures.
    (b) What are symmetric key algorithms? Discuss in brief about DES.

(10 EE 18)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – EEE

UTILIZATION OF ELECTRICAL POWER

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each unit.

UNIT – I

1. (a) Define the following terms
   (i) Mean spherical candle power
   (ii) Luminous flux
   (iii) Solid angle
   (iv) Illumination
   (v) Luminance.
   (b) Describe with a circuit diagram the working of a florescent lamp. Enumerate its advantages and disadvantages. (6+6)

Or

2. (a) Discuss inverse square law and cosine law of illumination.
   (b) What are the various types of lighting schemes. Explain with relevant diagrams. (6+6)

UNIT – II

3. (a) Explain the principle of Induction heating. What are the principles of Induction heating.
   (b) What are the factors which decide frequency and voltage of the di-electric heating? Derive the expression for heat produced in a di-electric material. (6+6)

Or

4. (a) Describe briefly various types of arc welding processes.
   (b) Describe with neat sketches various methods of electric resistance welding. (6+6)

UNIT – III

5. (a) What are the reasons for using load equalization in electric drives.
   (b) Derive expression for the temperature rise of an electric machine. (6+6)

Or

6. (a) Discuss advantages and disadvantages of Electric drives.
   (b) Discuss various factors that govern the choice of a motor for a given service. (6+6)

[P.T.O]

UNIT – IV

7. (a) Compare A.C. and D.C supply systems for Track electrification.

   (b) Describe how plugging, rheostatic braking and regenerative braking employed with series motor. (4+8)

Or

8. (a) Discuss the special features of traction motor.

   (b) Compare the different methods of electric braking. (6+6)

UNIT – V

9. (a) Derive an expression for the tractive effort developed by a train.

   (b) Define specific energy output and specific energy consumption. (6+6)

Or

10. (a) Draw the speed-time curve of a main line service and explain how it woks.

    (b) A train is required to run between two stations $2km$ apart at a scheduled speed of 36 $kmph$, the duration of stops being 20 seconds. The braking retardation is 2.7 $kmphps$. Assuming a trapezoidal speed-time curve, calculate the acceleration at the ratio of maximum speed to average speed is 1.2. (5+7)

ME

(10 ME 15)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – ME

Paper — DYNAMICS OF MACHINERY

Time : 3 Hours *Max. Marks : 60*

Answer ONE questions from each Unit.

UNIT – I

1. Derive the condition for friction of a body lying on a rough inclined plane by considering the motion of the body
   (a) Up the plane
   (b) Down the plane. (12)

Or

2. A single plate clutch effective on both sides, is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner radii of frictional surface if the coefficient of friction is 0.255, the ratio of raddi is 1.25 and the maximum pressure is not to exceed 0.1 N/mm^2. Also determine the axial thrust to be provided by springs. Assume the theory of uniform wear. (12)

UNIT – II

3. Define brake. Explain simple band brake with neat sketches. (12)

Or

4. Briefly explain the various following absorption dynamometers
   (a) Proney brake dynamometer
   (b) Rope brake dynamometer. (12)

UNIT – III

5. What is Hartnell governor? Derive the relation for stiffness of the spring. (12)

Or

6. Explain the following terms of a governor
   (a) Sensitiveness
   (b) Stability
   (c) Isochronous
   (d) Hunting. (12)

[P.T.O]

UNIT – IV

7. Briefly explain flywheel in punching press. Derive the maximum fluctuation of energy equation. (12)

Or

8. The equation of the turning moment diagram for the three crank engine is given by $T(N\text{-}m) = 25000 - 7500 \sin 3\theta$.

   Where θ radians is the Crank angle from inner dead centre. The moment of the inertia of flywheel is 400 kg-m^2 and the mean engine speed is 300 rpm. Calculate the power of the engine and the total percentage fluctuation of speed of the flywheel if

   (a) The testing torque is constant and

   (b) The testing torque is $(25000+3600 \sin\theta)$ N-m. (12)

UNIT – V

9. What is the effect of the gyroscopic couple on an Aeroplane and explain the various cases with neat sketches. (12)

Or

10. A four wheeled trolley car of total mass 2000 kg running on rails of 1.6 gauge, rounds a curve of 30 m radius at 54 km/n. The track is blanked at 8°. The wheels have an external diameter of 0.7m and each pair with axle has a mass of 200 kg. The radius of gyration for each pair is 0.3m. The height of centre of gravity of the car above the wheel base is 1m. Determine allowing for centrifugal force and gyroscopic couple actions, the pressure on each rail. (12)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – ME

Paper — ENGINEERING METROLOGY

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Explain about line and end standards. (6)

   (b) Explain various types of fits with neat sketch. (6)

Or

2. (a) State the Taylor's principle for design of limit gauge. (6)

   (b) Define the general type Go and Not-Go gauges for component having 25 H/f 8 fit. Being given with usual notations : (i) i (microns) = $0.45\sqrt[3]{D} + 0.001D$ (D in mm) (ii) upper deviation for f shaft = $-5.5\ D^{0.41}$ (iii) 25 mm falls in diameter of step of 18 and 30 take wear allowance as 10% of gauge tolerance. Also determine (1) type of fit (2) allowance for the above fit. (6)

UNIT – II

3. (a) Explain about tool maker's microscope. (6)

   (b) Explain about applications of slip gauges. (6)

Or

4. (a) Explain with neat sketch about angle dekkor. (6)

   (b) Explain how a pneumatic comparator works with neat sketch. (6)

UNIT – III

5. (a) Explain with neat sketch Tomilson surface meter. (6)

   (b) At what angle to optical flat, the fringe pattern should be observed and why? (6)

Or

6. (a) What is fundamental difference between length and flatness interferometers? (6)

   (b) Discuss what you understand by following terms in connection with surface finish measurement (i) waviness (ii) lay (iii) primary texture (iv) flaws. (6)

[P.T.O]

UNIT – IV

7. (a) What are the two corrections applied in measurement of effective diameter by the method of wires? (6)

   (b) Explain with neat sketch nomenclature of gear tooth. (6)

Or

8. (a) Explain with neat sketch alignment tests on lathe. (6)

   (b) Explain with neat sketch the base tangent method. (6)

UNIT – V

9. (a) Write about the various types of sampling plans. (6)

   (b) Write about the characteristics of OC curve. (6)

Or

10. (a) What is control chart and how it is made? (6)

    (b) What do you understand by Statistical Quality Control? (6)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – ME

Paper — HEAT TRANSFER

Time : 3 Hours *Max. Marks : 60*

Answer ONE question choosing from each Unit.

UNIT – I

1. (a) Explain the different modes of heat transfer with appropriate expressions. (6)

   (b) A steam boiler furnace is made of a layer of fireclay 13.5 cm thick and a layer of red brick 60 cm thick. If the wall temperature inside the boiler furnace is 1200°C and that on the outside wall is 60°C. Determine the amount of heat loss per square metre of the furnace wall. $K_{fireclay}$ = 0.533 W/mk. $K_{red\ brick}$ = 0.7 W/mk. (6)

Or

2. (a) Heat resistance steel tube of inner diameter 32 mm and outside diameter 42 mm are used in a steel super heater for which the inside and outside temperatures are 580°C and 480°C respectively. Estimate the rate of heat flow through the wall of the tube per unit length. K_{steel} = 14 W/m-k. (7)

   (b) Define the following :

   (i) Thermal conductivity.

   (ii) Overall heat transfer coefficient. (5)

UNIT – II

3. (a) Derive the heat conduction equation in cylindrical co-ordinates using an element volume for a stationary isotropic solid. (8)

   (b) Explain the significance of fin effectiveness and efficiency. (4)

Or

4. (a) Explain the following :

   Geometric mean area as applied to hollow sphere. (6)

   (b) Prove that $\frac{Q_{fin(finite\ length)}}{Q_{fin(finite\ length)}} = \tanh(mL) \leq 1$

   where $m^2 = hP/KA$. (6)

[P.T.O.]

UNIT – III

5. (a) Distinguish between and free and forced convection with examples. (4)

(b) A flat plate 1 mt wide and 1.5 mt long is to be maintained at 90°C in air if the free stream temperature at 10°C. Estimate the velocity at which air must flow over the flat plat, so that the rate of heat loss from the plate is 3.75 kW. (8)

Or

6. (a) What is Reynold's Analogy? Describe the relation between fluid friction and heat transfer. (4)

(b) Air at 30°C and 1 atm pressure and flows at a velocity of 2.2 m/sec over a flat plate maintain at 90°C. The length and width of the plate are 900 mm and 400 mm respectively. Calculate the rate of heat transfer from the second half of the plate. (8)

UNIT – IV

7. (a) Discuss how the radiation from gases differ from that of solids. (6)

(b) A pipe carrying steam having an outside diameter of 20 cm runs in a large room, and is exposed to air at a temperature of 30°C. The pipe surface temperature is 200°C. Find the heat loss per metre length of the pipe by convection and radiation taking the emissivity of the pipe surface as 0.8. (6)

Or

8. (a) What are radiations shape factors and why they are used? (5)

(b) Define radiation intensity. Prove that the intensity of radiation is given by $I_b = Eb/\pi$. (7)

UNIT – V

9. (a) Compare LMTD and NTU method of heat exchanger analysis. (6)

(b) 8000 kg/hr air at 105°C is cooled by passing it through a counter flow heat exchanger. Water enters at 15°C and flows at the rate of 7500 kg/hr. U = 145 m/m^2 k; A = 20 m^2 $C_{P(air)}$ = 1 kJ/kg.K. $C_{P(w)}$ = 418 kJ/kg.K. Find the exit temperature of air. (6)

Or

10. (a) Why is a counter flow heat exchanger mare effective than a parallel flow exchanger? (5)

(b) Steam enters at outer flow heat exchanger dry and saturated at 10 bar and leaves at 350°C and its mass flow rate is 800 kg/min. The gas enters the heat exchanger at 650°C and its mass flow rate is 1350 kg/min. If the tubes are 30 mm diameter and 3 mts long. Determine the number of tubes required. Neglect tube wall resistance and fauling resistance. (7)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – ME

Paper – OPERATIONS RESEARCH

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) State and explain different types of models used in operation research. (6)

   (b) What is an OR model? Give the main advantages of an OR model and its limitations. (6)

Or

2. (a) What are the advantages of limitations of an LPP? (4)

   (b) Solve the LP problem (8)

   Max $z = 3x_1 + 5x_2 + 4x_3$

   Subject to the constraints

   $2x_1 + 3x_2 \le 8$

   $2x_2 + 5x_3 \le 10$

   $3x_1 + 2x_2 + 4x_3 \le 15$ and

   $x_1, x_2, x_3 \ge 0$.

UNIT – II

3. (a) List out various methods that can be used for obtaining an initial basic feasible solution for a transportation problem. (4)

   (b) Use Vogel's method for determine initial feasible solution and also find the optimum distribution (solution) (8)

		A_1	B_1	C_1	D_1	E_1	Supply
	A	2	11	10	3	7	4
Origin	B	1	4	7	2	1	8
	C	3	9	4	8	12	9
	Demand	3	3	4	5	6	

Or

4. (a) Explain the differences between transportation problem and an assignment problem. (4)

   (b) Explain the Hungarian method to solve an assignment problem with example. (8)

[P.T.O.]

UNIT – III

5. (a) Explain briefly how replacement models are classified. (4)

(b) A machine owner finds from his past records that the cost/year of maintaining a machine whose purchase price is 7500 are given below. Determine at what age is a replacement due. (8)

Year :	1	2	3	4	5	6	7	8
Maintenance cost (Rs.) :	1000	1200	1400	1800	2300	2800	3400	4,000
Resale price :	3000	1500	750	375	200	200	200	200

Or

6. (a) Distinguish between sequencing and scheduling. (4)

(b) There are five jobs, each of which must go through the two machines A and B in the order AB. Processing times are given in table. Find the optimal method.

Processing time (hours)

Job :	1	2	3	4	5
Time for A :	5	1	9	3	10
Time for B :	2	6	7	8	4

UNIT – IV

7. (a) What is economic order quantity? Discuss step by step development of EOQ formula. (6)

(b) Find the EOQ for the following data.

Annual usage – 2,000 pieces. Expedising cost = Rs. 8 per order. Cost per price = Rs. 500. Inventory holding cost = 20% of average inventory ordering cost = Rs. 6 order. Material holding cost = Re 1 per price. (6)

Or

8. (a) Explain ABC analysis. What are its advantages and limitations? (6)

(b) A company purchases three items A, B and C. Their annual demand and unit prices are given in following tables. (6)

Items	Annual demand (units)	Unit price (Rs.)
A	1,00,000	3
B	80,000	2
C	600	96

If the company wants to place forty orders per year for all the three items. What is the optimal number of orders for each item?

UNIT – V

9. (a) Explain Kendalt's notations for representing queuing models. (6)

(b) Customer's arrive at a sales counter manned by a single person according to a Poisson process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Find average waiting time of a customer. (6)

Or

10. (a) What is game theory? List out the assumptions made in the theory of games. (4)

(b) Find the saddle point and hence solve the following games. (8)

(i)
$$\begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \end{array} \begin{array}{c} \begin{array}{ccc} B_1 & B_2 & B_3 \end{array} \\ \begin{pmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{pmatrix} \end{array}$$

(ii)
$$\begin{array}{c} \\ A_1 \\ A_2 \\ A_3 \end{array} \begin{array}{c} \begin{array}{cccc} B_1 & B_2 & B_3 & B_4 \end{array} \\ \begin{pmatrix} 1 & 7 & 3 & 4 \\ 5 & 6 & 4 & 5 \\ 7 & 2 & 0 & 3 \end{pmatrix} \end{array}$$

(iii)
$$\begin{array}{cc} & \\ A & \begin{matrix} I \\ II \end{matrix} \end{array} \begin{array}{c} \begin{array}{ccc} & B & \\ I & II & III \end{array} \\ \begin{pmatrix} 6 & 8 & 6 \\ 4 & 12 & 2 \end{pmatrix} \end{array}$$

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch — Mechanical Engineering

PRINCIPLES OF MACHINE DESIGN

Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT – I

1. (a) What are the factors to be considered for the selection of materials for the design of machine elements? Explain. (6)

   (b) Explain the role of preferred numbers in design. List out the manufacturing considerations in design. (6)

Or

2. (a) Explain Rankine's theory of failure. In what way Rankine's theory differ from Tresca's theory of failure? (4)

   (b) A spindle as shown in (fig. 1.1) is a part of brake system and is loaded as shown. Each load '*P* which is equal to 4 kN is applied at the middle of the bearing. Find the diameter of the spindle, if the maximum bending stress is 120 MPa. (8)

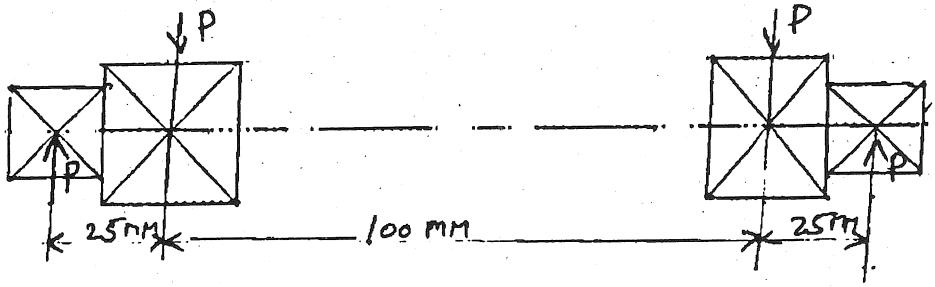


Fig. 1.1

UNIT – II

3. (a) Explain the effect of endurance limit with the following parameters : (4)

   (i) Surface finish factor.

   (ii) Size factor.

   (iii) Ultimate tensile strength.

   (b) A bar of circular cross section is subjected to alternating tensile force varying from 200 kN to 500 kN. Ultimate tensile strength of 900 MPa and endurance limit of 700 MPa is to be considered for a material. Determine diameter of the bar. Assume suitable factor of safety and stress concentration factor of 1.55 for fatigue loading. (8)

Or

4. (a) Explain the concept of combined stress w.r.t. Gerber method and Goodman method. (6)

(b) A steel connecting rod is subjected to a completely reversed axial load of 160 kN. Find the diameter of rod. The ultimate tensile strength of the material is 1100 MPa and yield strength 930 MPa. Assume suitable factor of safety. Neglect column action and the effect of stress concentration. (6)

UNIT – III

5. (a) Draw any three thread profiles with nomenclature. State the advantages of thread joints. (4)

(b) The cylinder head of a steam engine is subjected to a pressure of 1 N/mm^2. It is held in position by means of 12 bolts. The effective diameter of the cylinder is 300 mm. A soft copper gasket is used to make the joint leak proof. Determine the size of bolts and the stress value is not exceeding 100 MPa. (8)

Or

6. (a) Derive an expression for the maximum load in a bolt when a bracket with circular base is bolted to a wall by means of 4 bolts. (6)

(b) Find the diameter of screwed boiler stays, each stay supports an area equal to 200 mm × 150 mm. The steam pressure is 1 N/mm^2. The permissible tensile stress for the stay material is 34 MPa. (6)

UNIT – IV

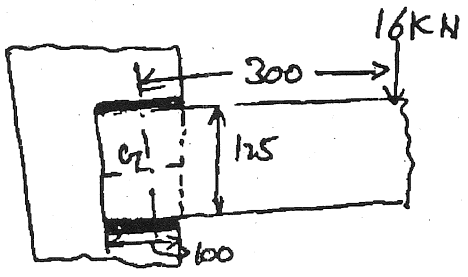
7. (a) Sketch various types of welded joints and discuss. (4)

(b) A 125 × 90 × 15 mm angle is joined to a frame by two parallel fillet welds along the edges of 150 mm leg. The angle is subjected to a tensile load of 180 kN. Find the lengths of weld if the permissible static load per mm weld length is 430 N. (8)

Or

8. (a) What is an eccentric loaded welded joint? Discuss the procedure for designing such a joint. (4)

(b) A 125 × 95 × 10 mm angle is welded to a frame by two 10 mm fillet welds, as shown in Fig. 4.1. A load of 16 kN is applied normal to the gravity axis at a distance of 300 mm from the center of gravity of welds. Find maximum shear stress in weld.



(All dimensions are in mm)

Fig. 4.1

UNIT – V

9. (a) Derive an expression for deflection of a helical spring. (4)

(b) A load of 2 kN is dropped axially on a close coiled helical spring, from a height of 250 mm. The spring has 20 effective turns and is made of 25 mm diameter wire. The spring index is '8'. Find the maximum shear stress induced in the spring and the amount of compression produced. The modulus of rigidity for the material of spring wire is 84 kN/mm^2. (8)

Or

10. (a) Define the following terms : (4)

(i) Spring rate

(ii) Spring index

(iii) Free length

(iv) Stress factor.

(b) A semi-elliptical laminated vehicle spring to carry a load of 6000 N is to consists of seven leaves 65 mm wide two of the leaves extending the full length of the spring. The spring is to be 1.1 m in length and attached to the axle by two U-bolts 80 mm apart. The bolt hold the central portion of the spring so rigidly that they may be considered equivalent to a band having a width equal to the distance between the bolts. Assume the design stress for spring material as 350 MPa. Determine

(i) thickness of leaves

(ii) deflection of spring

(iii) diameter of eye

(iv) length of the leaves. (8)

(10 ME 32)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech – II SEMESTER EXAMINATION

Branch – ME

ANALYSIS OF PRODUCTION SYSTEMS AND RELIABILITY ENGINEERING

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What is the objective of production? Explain its production functions. (6)

   (b) What is lean manufacturing and explain its applications. (6)

Or

2. What is continuous production systems and explain its characteristics, advantages and demerits. (12)

UNIT – II

3. (a) Explain factors affecting on plant location. (6)

   (b) Explain computer based layout technique 'CRAFT' with one example. (6)

Or

4. (a) Explain the objectives of good plant layout. (6)

   (b) Explain the use of REL charts and travel charts. (6)

UNIT – III

5. (a) Explain aggregate planning methods. (6)

   (b) Explain inputs and outputs of MRP system. (6)

Or

6. The demand for a particular item during 10 months of a year is as given below. The manager is considering how well the exponential smoothing serves as an appropriate technique in forecasting demand of this item. She is testing 3 values of smoothing constant $\alpha = 0.2, 0.5, 0.8$. You are required to (a) calculate forecasted value using each of given α values, assuming the initial forecast as 208, and (b) calculate MAD for each of these series of estimates and suggest which them is most appropriate. (12)

Month :	1	2	3	4	5	6	7	8	9	10
Demand :	213	201	198	207	220	232	210	217	212	225

[P.T.O.]

UNIT – IV

7. (a) Explain the algorithm for n jobs and two machines. (6)

   (b) Explain flow shop scheduling and its characteristics. (6)

Or

8. (a) Explain job shop scheduling and its characteristics. (6)

   (b) Explain the procedure to solve a two jobs and m machines job shop scheduling problem. (6)

UNIT – V

9. (a) What are the factors effecting the reliability? (6)

   (b) Explain about fault tree analysis. (6)

Or

10. (a) For a system composed of three elements in parallel, determine system reliability for 2000 hrs of operation and find MTTF. The three components have identical failure rate of 0.0005/hr and time to failure distribution is exponential in each case. What is MTTF of each component? (6)

    (b) Explain about types of failures. (6)

CSE

(10 CE 35)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – CSE

Paper — PRINCIPLES OF PROGRAMMING LANGUAGES

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What is the role of symbol table in a compilation process? (6)
   (b) Which one is better for faster program execution, a compiler or pure interpreter? (6)

Or

2. (a) Write a grammer for simple arithmetic expressions? (6)
   (b) Explain about attribute gramamrs. (6)

UNIT – II

3. (a) Explain floating – point data types. (6)
   (b) Define array. Explain different categories of arrays. (6)

Or

4. (a) Explain mixed-mode assignment in Ada and Java. (6)
   (b) Explain overloaded operators. (6)

UNIT – III

5. (a) Explain Generic subprograms in Ada, C++ and Java. (6)
   (b) Explain parameter passing models with examples. (6)

Or

6. (a) Explain Recursion with example. (6)
   (b) Explain parametric polymorphism. (6)

UNIT – IV

7. (a) Define abstract data type. Explain abstract data types in Ada, C++, Java. (6)
   (b) Explain packages in Java and Ada. (6)

Or

8. (a) Explain object-model of Java Script. (6)
   (b) Explain allocation and deallocation of objects in object oriented languages. (6)

[P.T.O.]

UNIT – V

9. (a) Explain event handling in Java. (6)

   (b) How exceptions are handled in C++? (6)

Or

10. (a) Explain LISP functional programming language. (6)

    (b) Explain mathematical functional forms. (6)

(10 EC 33)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch — CSE

MICROPROCESSOR

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) Explain the instructions with examples of each (i) DAA (ii) XLAT (iii) AAA. (6)

   (b) Write a program to change the sequence of sixteen 2-byte numbers from ascending to descending order, the numbers are stored in the data segment stores the new series at address starting from 6000 H. Use the LIFO property of the stack. (6)

Or

2. (a) Draw and explain the timing diagram of 8086 for write operation. (6)

   (b) Write an 8086 program to compare the factorial of a number N from 1 to 9. (6)

UNIT – II

3. (a) With a neat block diagram explain the 8288 bus controller. (6)

   (b) Implement a simple I/O data transfer between the microprocessor and a AOC, DAC in a microprocessor based system. (6)

Or

4. (a) Explain the operation of a 8284 clock generator with a neat logic diagram. (7)

   (b) Write the differences between IO mapped IO and memory mapped IO. (5)

UNIT – III

5. Design a programmable timer using 8253 and 8086, interface 8253 at an address 0040H for counter O and write the following ALPS. The 8086 run at 6mHz and 1.5 mHz respectively.

   (a) to generate a square wave of period 1ms

   (b) to interrupt the processor after 10ms. (12)

Or

6. (a) Explain the demand transfer mode and block transfer mode of 8237. (6)

   (b) Draw the block diagram of 8251 and explain each block. (6)

[P.T.O.]

UNIT – IV

7. With a neat block diagram explain the internal architecture of numeric data processor. (12)

Or

8. (a) Discuss the communication between I/O processor 8089 and the CPU 8086. (6)

   (b) What are the different data types supported by 8087? (6)

UNIT – V

9. (a) Discuss the following signal descriptions. (6)

   (i) ALE/PROG

   (ii) $\overline{EA}$ / UPP

   (iii) $\overline{PSEN}$

   (iv) RXD

   (v) T_0 and T_1

   (vi) $\overline{RD}$.

   (b) Write the important features of 80196. (6)

Or

10. (a) With a neat diagram explain the memory map of 80196 for registers, vectors, ROM and RAM. (6)

    (b) Describe different types of data transfer instructing in 8051 and explain the differences between MOV, MOVC, MOVX instructions. (6)

(10 CS 39)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – CSE

Paper — SOFTWARE ENGINEERING

Time : 3 Hours *Max. Marks : 60*

Answer ONE from each Unit.

UNIT – I

1. (a) Differentiate between prototyping and incremental models. (6)
   (b) Discuss various phases of assessment. (6)

Or

2. (a) What is waterfall model? How is it different from other process models? (6)
   (b) Elaborate software evolution. (6)

UNIT – II

3. (a) What is a software practice? Why is it needed? Explain planning practices? (6)
   (b) What is requirements management? Explain. (6)

Or

4. (a) Explain the principal requirements engineering activities. (6)
   (b) Why is requirements review conducted? Discuss various types of it. (6)

UNIT – III

5. (a) Explain how to build a analysis model using class-based modeling. (6)
   (b) What is meant by user interface? What are the three areas that user interface design focuses? (6)

Or

6. (a) What are the analysis modeling approaches? Explain. (6)
   (b) Explain abstraction and requirement? Also differentiate them. (6)

UNIT – IV

7. (a) Discuss data design activity. (6)
   (b) What is coupling and cohesion? Differentiate them. (6)

Or

[P.T.O.]

8. (a) What is component? Explain component diagram. (6)

(b) Explain the styles and patterns of architectural design. (6)

UNIT V

9. (a) What is software testing? Explain system testing. (6)

(b) Explain control structure testing. (6)

Or

10. (a) What is white box testing and black box testing? Differentiate them. (6)

(b) Explain the basic path testing. (6)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech – II SEMESTER EXAMINATION

Branch – CSE

NETWORK SECURITY AND COMPUTER ETHICS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each unit.

UNIT – I

1. (a) What is a digital signature? Explain in detail about digital signature. (1 × 6 = 6)
   (b) What are authentication protocol? Explain one-way authentication protocol. (1 × 6 = 6)

Or

2. (a) Discuss in detail about DSA digital signature standard. (1 × 6 = 6)
   (b) Explain about X.509 certificate. (1 × 6 = 6)

UNIT – II

3. (a) Explain in detail about public key management in pretty good privacy. (1 × 6 = 6)
   (b) What are five principle service in PGP? Discuss in brief. (1 × 6 = 6)

Or

4. (a) Explain about IP security auditors. (1 × 6 = 6)
   (b) Explain about Oakley key determination protocol. (1 × 6 = 6)

UNIT – III

5. (a) What is web security? Discuss about web security threats and web traffic security approaches. (1 × 6 = 6)
   (b) Explain in detail about SSL architecture and SSL record protocol. (1 × 6 = 6)

Or

6. (a) Discuss about key featurer of secure electronic transactions and secure electronic transactions participants. (1 × 6 = 6)
   (b) What are ethics? Why do we need computer ethics and what are the new possibilities? (1 × 6 = 6)

UNIT – IV

7. (a) Explain about morally significant characteristics of ethics. (1 × 6 = 6)
   (b) Discuss in detail about Hacking and Hacker ethics. (1 × 6 = 6)

Or

8. (a) Write short notes on code of ethics and professional conduct. (1 × 6 = 6)

(b) Discuss in brief about professional relationships and conflicting responsibilities. (1 × 6 = 6)

UNIT – V

9. (a) What is privacy? How importance is privacy as a social good? (1 × 6 = 6)

(b) What are various proposals for better privacy protection? (1 × 6 = 6)

Or

10. (a) Is internet democratic technology? What are democratic value in internet? Discuss. (1 × 6 = 6)

(b) Discuss about the legislative back ground of social privacy. (1 × 6 = 6)

(10CS03)

FOUR YEAR B.TECH DEGREE EXAMINATION, APRIL 2013
III B.Tech II Semester
Branch: COMPUTER SCIENCE
Paper: ADVANCED COMPUTER ARCHITECTURE

Time: 3 Hours Max.Marks:60

Answer any One question from each Unit

UNIT-I

1. What is Instruction-Level Parallelism (ILP)? Explain the challenges.

OR

2. Describe the trends and challenges in power in Integrated Circuits.

UNIT-II

3. (a) What are the limitations on instruction-Level Parallelism? Explain.
   (b) Explain the performance and efficiency in advanced Multiple-issue processors.

OR

4. (a) Discuss the limitations on ILP for Realizable processors.
   (b) Explain Multithreading.

UNIT-III

5. Explain the IA-64 Architecture and Itanium processor.

OR

6. Explore the Hardware support for exposing parallelism.

UNIT-IV

7. (a) What are the characteristics of scientific applications? Discuss.
   (b) Explain Inter process communication & Synchronization.

OR

8. Describe the performance Measurement of Parallel processors with Scientific Applications.

UNIT-V

9. (a) Explain various cache coherence and synchronization mechanisms.
   (b) Differentiate between Virtual memory and virtual machine.

OR

10. Explain the AMD Opteron Memory Hierarchy.

* * * * *

EICE

(10 EI 05)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch — EICE

INDUSTRIAL INSTRUMENTATION

Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT – I

1. (a) Explain the construction and working of drag cup tachometers.

   (b) Distinguish between AC and DC Tachogenerators.

Or

2. (a) Explain the torque measurement using strain gauges.

   (b) Distinguish between pneumatic load cell and hydraulic load cell.

UNIT – II

3. Explain the principle of operation of Bourdona gauges with neat sketches.

Or

4. Explain different methods used for measurement of low pressure.

UNIT – III

5. Explain the concept of radiation pyrometers. List their fields of applications, advantages and disadvantages.

Or

6. (a) Explain construction and working of resistance thermometer.

   (b) Explain the advantages of 3 lead and 4-lead arrangement of resistance thermometer.

UNIT – IV

7. (a) Explain the working principle of ultrasonic flow meter list its advantages.

   (b) Write short notes on variable head flow meter.

Or

8. Explain the working principle of an electromagnetic type flow meter compare the operations of this meter when its is excited by Dc & AC.

[P.T.O.]

UNIT – V

9. Explain the different electrical methods for measurement of liquid level. Compare their advantages and disadvantages.

Or

10. Write short notes on :
    (a) Ultrasonic level gauging
    (b) Say bolt viscometer
    (c) Rotameter viscometer.

(10 SH 15 A)

FOUR YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech.–II SEMESTER EXAMINATION

Branch – ECE,EEE and EICE

ECONOMICS AND ACCOUNTANCY

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT I

1. (a) What is managerial economics and discuss its nature and scope?

   (b) What is equi-marginalism? Explain the law of equi-marginal utility?

Or

2. (a) Define income elasticity of demand and explain its usefulness in business decisions.

   (b) Explain the relationship between Economics and other functional areas of business.

UNIT II

3. (a) Explain the concept of production function with the help of indifference curve analysis.

   (b) Explain the cost behavior with reference to short-run and long-run.

Or

4. (a) Explain about Marginal Rate of Technical Substitution.

   (b) Explain the significance and limitations of break-even analysis.

UNIT III

5. (a) Explain how price is determined under perfect competition.

   (b) What are the types of monopoly? Under what conditions monopoly is justified?

Or

6. (a) What are the main feature of monopolistic competition?

   (b) Explain price rigidity under oligopoly with kinky demand curve.

[P.T.O]

UNIT IV

7. (a) What are the various features of a Parthership organization?

   (b) Explain the types of shares and their merits and limitations.

Or

8. (a) How does the trail balance differ from a balance sheet?

   (b) Enter the following transactions in the cash book with cash, bank and discount columns:

   1.6.2012 cash in hand Rs. 18,000; overdraft at bank Rs. 2,000

   16.6.2012 received a cheque of Rs. 780 from vamsi and discount allowed to him Rs. 20.

   17.6.2012 deposited Vamsi's cheque in the bank.

   29.6.2012 the cheque received from vamsi on 16.6.2012 was dishonored.

UNIT V

9. (a) Explain the techniques of capital budgeting decision. Which one is suggestible?

   (b) Calculate the Net Present Value of the following project requiring initial cash outlays of Rs. 20,000 and has a no scrap value after 6 years. The net profit after depreciation and taxes for each year is Rs. 6,000 for 6 years. Assume the present value of an annuity of Re. 1 for 6 years at 8% p.a interest is Rs. 4.623.

Or

10. (a) What is budgeting? Discuss the types of budgets in a business firm.

    (b) The following budget estimates are available from a factory working at 50% of its capacity.

Variable expenses	Rs. 60,000
Semi-variable expenses	Rs. 20,000
Fixed expenses	Rs. 10,000

Prepare a budget for 75% of the capacity assuming that semi variable expenses increase by 10% for every 25%.

(10 EE 15)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – EEE & EICE

Paper — MODERN CONTROL THEORY

Time : 3 Hours *Max. Marks : 60*

Answer any ONE question from each Unit.

UNIT – I

1. Explain the effect of P, PI, PID controllers on a second order control system.

Or

2. Design suitable lag compensator for system with $G(s)=\frac{1}{s(s+1)(1+0.5s)}$ to meet the following specifications

   (a) $K_v \geq 0.5 \text{ sec}^{-1}$

   (b) $P.M \geq +40^\circ$

   (c) $G.M \geq 10dB$.

UNIT – II

3. Construct the state model using phase variables if the system is described by differential equation

   $\frac{d^3y(t)}{dt^3}+\frac{4d^2y(t)}{dt^2}+7\frac{dy(t)}{dt}+2y(t)=5u(t)$. Draw the state model.

Or

4. (a) State and explain explain the observability theorem.

   (b) Evaluate the observability of the system with

$$A=\begin{bmatrix}0 & 1 & 0\\ 0 & 0 & 1\\ 0 & -2 & -3\end{bmatrix} \quad B=\begin{bmatrix}0\\0\\1\end{bmatrix} \quad \& \quad C=\begin{bmatrix}3 & 4 & 1\end{bmatrix}.$$

[P.T.O]

UNIT – III

5. Describe in detail about full order and reduced order observers.

Or

6. (a) Define state transition matrix and derive an expression to obtain state transition matrix.

   (b) Find the state transition matrix for $A = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix}$.

UNIT – IV

7. (a) Explain the following non–linearities.

   (i) Saturation and

   (ii) Dead – zone.

   (b) Discuss the describing function analysis of non – linear systems.

Or

8. (a) Explain the classification of singular points.

   (b) Explain the method of isoclines for constructing phase trajectories.

UNIT – V

9. (a) Explain the method of constructing Lyapunov functions by Krasovski's method for non – linear system.

   (b) Use Krasovski's theorem show that the equilibrium state $x = 0$ of the system described by

   $\dot{x}_1 = -3x_1 + x_2$,

   $\dot{x}_2 = x_1 - x_2 - x_2^3$ is a symptotically stable in the large.

Or

10. (a) Explain the variable gradient method to investigate stability.

    (b) Determine the stability of the non – linear system

    $\dot{x}_1 = -x_1 - x_2^2$

    $\dot{x}_2 = -x_2$ by using variable gradient method.

(10 EE 15)

IV YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. — II SEMESTER EXAMINATION

Branch – EICE

Paper — ELECTRONIC MEASUREMENTS AND INSTRUMENTS

Time : 3 Hours *Max. Marks : 60*

Answer ONE question choosing from each Unit.

UNIT – I

1. (a) Explain the principle of operation of a Dual Trace CRO's. (9)
   (b) What are the applications of CRO? (3)

Or

2. (a) Explain the use of a CRO for frequency measurement? (6)
   (b) Explain the Basic Principle of a Digital Storage Oscilloscope (DSO). (6)

UNIT – II

3. (a) Explain the principle of a successive approximation type DVM. (8)
   (b) A $4\frac{1}{2}$ digital voltmeter is used for voltage Measurements. (4)
   (i) Find its resolution.
   (ii) How would 12.98 V be Displayed on a 10 V range?
   (iii) How would 0.6973 V be Displayed on a 1 V and 10 V ranges.

Or

4. (a) Explain the Operation of a basic Digital Millimeter. (6)
   (b) What are the advantages of Digital Instruments over analog instruments? (6)

UNIT – III

5. (a) Define the sensitivity of a Multimeter. (2)
   (b) Draw the block diagram of a simple Multi meter and explain its operation. (6)
   (c) What series resistance must be used to extend the 0-200 V range of a 20000 Ω/V meter to 2000 V? What must be the power of this resistor? (4)

Or

6. (a) What is the difference between a Wave Analyser and Harmonic distortion analyser? (4)
   (b) Explain with the help of a block diagram the working of a Spectrum Analyzer? (8)

[P.T.O.]

UNIT – IV

7. (a) What is a multiplexer? Where it is used? (4)

   (b) Explain the different Multiplexing techniques. (8)

Or

8. (a) Define sensor. (2)

   (b) Explain the different advance Instrumentation techniques used in sensors. (10)

UNIT V

9. (a) What are dot matrix printers? How is printing done? (6)

   (b) Explain the function of laser Printers. (6)

Or

10. (a) What are the Two major types of a Strip chart recorder? (9)

    (b) If the frequency of a signal to be recorded with a strip-chart recorder is 20 hz. What must be the chart speed used *t* record one complete cycle on 5 mm of recording paper? (3)

THREE YEAR B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – EICE

Paper — ANALYTICAL INSTRUMENTATION

Time : 3 Hours *Max. Marks : 60*

Answer any ONE questions from each Unit.

UNIT – I

1. (a) What are the types of filters used in absorption spectrometers? Explain with suitable diagrams.

   (b) Explain the various components of an absorption instrument.

Or

2. (a) Write a short note on ultraviolet and visible absorption spectroscopy.

   (b) Explain the properties of electromagnetic radiation.

UNIT – II

3. (a) Describe the components of single beam null type spectra photometer.

   (b) Explain in detail about the instrumentation technique for analyzing liquid samples.

Or

4. (a) Explain the sampling Techniques for variable path length cells.

   (b) Describe the IR absorption spectroscopy of optical NULL- method.

UNIT – III

5. Give the constructional details of ESR spectrometer with neat diagram.

Or

6. (a) Write in detail about the components of double focusing mass spectrometer.

   (b) Explain the principle of chemical ionization.

UNIT – IV

7. With a neat schematic diagram, explain the working of GM Counter.

Or

8. (a) Explain the principle of X-Ray flouresence spectrometry with neat diagram.

   (b) Explain about the trace technique for quantitative estimation and analysis.

UNIT – V

9. (a) Explain the principle of oxygen analyzer in detail with neat diagram.

   (b) What is chromatograph? Explain the construction and working of Gas chromatograph.

Or

10. (a) Define a PH. What is the design criteria of PH meter. Explain any one type of PH meter in detail.

    (b) Write about conductivity measurements using high frequency methods.

IV B.Tech. DEGREE EXAMINATION, APRIL 2013

III B.Tech. – II SEMESTER EXAMINATION

Branch – EICE

OPTO ELECTRONIC AND LASER INSTRUMENTATION

Time : 3 Hours *Max. Marks : 60*

Answer ONE question from each Unit.

UNIT – I

1. (a) What are the elements of optical fiber communication? Explain.

   (b) Discuss the advantages and disadvantages of optical fibers.

Or

2. (a) A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 150 and a cladding refractive index of 147.

   Determine the

   (i) Numerical aperture for the fiber

   (ii) The acceptance angle in air for the fiber

   (b) Discuss about light guidance.

UNIT – II

3. (a) Explain about Q-switching.

   (b) List out the characteristics of laser.

Or

4. (a) With a neat sketch explain about Nd-Yag laser.

   (b) Write a short note on Acoustic-optic modulator.

UNIT – III

5. (a) Explain about the inferometer method of measurement of length.

   (b) Briefly describe about IR detectors.

Or

6. (a) Write in detail about measurement of temperature using thermocouple.

   (b) List out the applications of optic sensors.

UNIT – IV

7. (a) List out the industrial applications of lasers.

   (b) Explain about laser Doppler velocity meter with neat diagram.

Or

8. (a) Write short notes on laser heating and cutting.

   (b) What are the applications of holography?

UNIT – V

9. (a) What is tissue interaction? Explain.

   (b) Explain how laser instruments are used for surgery.

Or

10. (a) Explain how laser instruments are used for removal of tumours from vocal cords.

    (b) What is laser interaction? Explain.
