Code : 13CS2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ADVANCED DATA STRUCTURES
(Computer Science & Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION - I

1 (a) Write a short note on List ADT?

(b) Define and discuss circular list operations in detail?

2 (a) Define Data structure? Explain different operations in a linked list?

(b) Differentiate single linked list and double linked list?

SECTION - II

3 (a) Define Queue? Implements the functions for Queue operations?

(b) Explain clearly about binary Heap?

4 (a) Define and explain about dequeues?

(b) Explain the implementation of stack using linked list?

SECTION - III

5 (a) Construct Binary Tree using the following information?

Infix: ECFBGDHAI

prefix: ABCEFDGHI

(b) What is Tree? Discuss the properties of Trees?

6 (a) Write the functions for Tree traversal Techniques?

(b) Define BST? Construct Binary search Tree for the following elements

6 2 4 8 1 3

SECTION - IV

7 (a) Define Red-Black Tree? Explain about its Representation?

(b) Write about splay Trees?

8 (a) Write short note on Single Rotation?

(b) Define AVL Tree? Explain different properties of AVL Trees?

SECTION - V

9 (a) Write and explain Shell sort Routine using Shell's increments?

(b) Explain about 'multi way merge'?

10 (a) Discuss the model for external sorting?

(b) Explain about Heap sort technique?

Code : 13CE2106

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

FLUID MECHANICS

(Mechanical Engineering)

Time : 3 hours Max. Marks :60

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

SECTION - I

1 a What is capillarity? Derive the expression for the height of capillary rise.

b Determine the bulk modulus of elasticity of the liquid when the pressure of liquid is increased from 35 bar to 65 bar and its volume is found to decrease by 0.09%.

c Determine the mass density, specific volume and specific weight of a liquid whose specific gravity is 0.85

2 a The space between two parallel plates is 6 mm apart is filled with crude oil. A force of 4N is required to drag the upper plate at a constant velocity of 1 m/sec. the lower plate is stationary. The area of the upper plate is $0.1m^2$ calculate i)The dynamic viscosity ii) Kinematic viscosity of the oil in stokes if the specific gravity of oil is 0.9

b What is the difference between cohesion and adhesion

SECTION - II

3 a State Pascal's law and explain its importance in fluid.mechanics

b A cylindrical tank of cross sectional area $700m^2$ and 2.8 m height is filled with water up to a height of 1.5 m and remaining with oil of specific gravity of 0.8. The vessel is open to atmospheric pressure, calculate i) Intensity of pressure at the interface ii) Absolute and gauge pressures on the base tank in terms of water head, oil head. iii)the net force experienced by the base of the tank. Take atm pressure as 1 bar.

4 a State hydrostatic law

b A circular plate 3 metres in diameter is submerged in water in such a way that the greatest and least depths of the surface below water surface are 2m and 1m respectively. Calculate

i)the total pressure on front face of the plate ii) The position of centre of pressure.

SECTION - III

5 a Define i)Path line ii)stream line iii)streak line iv) stream tube

b Given the velocity field $V=(7+3xy+t^2)i-(xy^2+10t)j+25k$. What is the acceleration of a particle at 93,0,2) at time t=1

6 a Explain Bernoulli's equation and write its importance in the fluid flow systems

b The water is flowing through a tapering pipe having diameters 350mm and 250mm at sections A and B respectively. The discharge through the pipe is 45 ltrs/sec. The section A is 12 m above datum and section B is 8m above the datum. Determine the intensity of pressure at section B if the pressure at section A is $450kN/m^2$

SECTION - IV

7 a Describe the working principle of differential manometer

b A venturimeter 200 mm inlet diameter and 100 mm throat diameter is used for measuring the flow of oil of specific gravity 0.8. The oil mercury differential gauge shows a deflection of 250 mm. find the discharge of oil through venturimeter take coefficient of discharge as 0.98.

8 a Explain the working of Pitot tube with a neat sketch

b Write the classification of mouth pieces

c Find the discharge from a 80mm diameter external mouth piece fitted to side of a large vessel. If the head over the mouth piece is 6 m.

SECTION - V

9 a List various minor losses in a pipe flow system

b An horizontal pipe with a diameter of 350mm is suddenly enlarged to 625 mm . The discharge through the pipe is $0.425m^3/sec$. if the intensity of pressure in the small pipe is $130kN/m^2$,determine i) loss of head due to sudden enlargement ii)Intensity of pressure in the larger pipe iii)Power lost due to enlargement.

10 a Explain Hagen poiseulle law and loss of head due to friction in a pipe flow

b In a pipe of diameter 250mm and 550m long, an oil of specific gravity 0.9 and viscosity 0.06 poise is flowing at the rate of $0.065m^3/sec$,calculate)The head lost due to friction ii) Power required to maintain flow

Code : 13EE2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ELECTROMAGNETIC FIELDS
(Electrical & Electronics Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION-I

1. a) Obtain an expression for the total force experienced by a point charge due to infinite number of point charges.

   b) Four point charges of 500 μc each are placed at the corners of a square of $3\sqrt{2}$ m side. The square is located in the z=0 plane between x= $\pm \frac{3}{\sqrt{2}}$ m and y= $\pm \frac{3}{\sqrt{2}}$ m in free space. Find the force on a point charge 30μc located at(0,0,4)m.

2. a) Derive Maxwell's First equation as applied to the elecrostatics using gauss's law.

   b) Find the electric flux density $\overline{D}$ at (4,π/4,0) if the potential is V= $\frac{15}{r^2}$ sinΘ cosØ.

SECTION-II

3. a) A dipole with dipole moment 20 a_z nC-m is located at(1,1,1). Find the potential at (1,2,1).

   b) A parallel plate capacitor consists of two plates each 30mm X 30mm, spaced 2mm apart and 2 dielectrics, each 1mm thick, having relative permittivity's of 3 and 5 respectively. If the potential difference between the plates is 5000 volts, calculate the voltage gradient in each dielectric.

4. a) Show that the Torque on a physical dipole $\overline{p}$ in a uniform electric field $\overline{E}$ is given by $\overline{p} \times \overline{E}$.

   b) Given Z<0 is a region of a linear dielectric of relative permittivity 6.5 and Z>0 is free space .Electric field in the free space region is $(-3a_x+4a_y-2a_z)$V/m. Find (i) $\overline{D}$ for Z>0; (ii) tangential components of $\overline{D}$ and $\overline{E}$ on the boundary of Z<0 region.

SECTION-III

5. a) Using Biot-savart law ,find an expression for the magnetic field intensity in the vicinity of a straight current carrying conductor of finite length.
   b) Give the properties of vector magnetic potential.

6. A current distribution gives rise to the vector magnetic potential $A = x^2y\, a_x + y^2x\, a_y - 4xyz\, a_z$ Wb/m. Calculate the following:
   (a) B at (-1,2,5)
   (b) The flux through the surface defined by $z=1, 0 \le x \le 1, -1 \le y \le 4$.

SECTION-IV

7. a) A steady current of ' I' amperes flow in a conductor bent in the form of a square loop of side *a*. Find the magnetic field intensity at the centre of the loop.
   b) Obtain the expression for inductance of a Toroid.

8. a) A solenoid of 500 turns has a length of 50cm and radius of 10 cm. A steel rod of circular cross section is fitted in the solenoid coaxially and tightly. The relative permeability of steel is 3000. A dc current of 10A is passed through the solenoid. Compute the inductance of the system, energy stored in the system and the mean flux density inside the solenoid.
   b) Derive the expression for energy stored and energy density in a magnetic field.

SECTION-V

9. a) Explain the terms (i) Motional EMF (ii) Static EMF.
   b) Find the displacement current within a parallel plate capacitor where $\varepsilon = 100\, \varepsilon_o$, $A = 0.1 m^2$, $d = 0.05$mm and the capacitor voltage is $100 \sin 2000\pi t$ volts.

10. a) Derive the expression of the Maxwell's equation $\text{Curl}(E) = \frac{-\partial B}{\partial t}$.
    b) A circular loop of 10 cm radius is located in the x-y plane in a field given by $\overline{B} = 0.5 \cos 377t\, (3a_y + 4a_z)$ Tesla. Find the emf induced in the loop.

Code : 13CE2103

B.TECH. DEGREE EXAMINATION, NOVEMBER2014

II B.Tech. I Semester

BUILDING TECHNOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION – I

1. (a) Write about the uses of building stones.
   (b) Explain in detail about manufacture of brick with a help of neat sketch.

2. (a) Describe the process of burning bricks in intermittent kilns.
   (b) What do you mean by stone quarrying? Explain in detail.

SECTION – II

3. (a) Write about various ingredients of cement concrete briefly.
   (b) Write about various laboratory tests for cement.

4. (a) List out different modern renovation materials? Explain any two materials briefly.
   (b) Write a short note on pure polymer bound materials.

SECTION – III

5. (a) Describe with a help of neat sketches, various forms of stone brick composite masonry.
   (b) What are the requirements of a good foundation?

6. (a) Explain in detail about Flemish bond with a help of neat sketch.
   (b) What are the requirements of an ideal material for damp proofing?

SECTION – IV

7. (a) Write about flat roofs and where it will be used in buildings.

   (b) What is the purpose of formwork? Explain in detail.

8. (a) Classify various types of lintels and discuss their relative uses?

   (b) Classify with the help of neat sketches, various types of windows based on their method of opening.

SECTION – V

9. (a) Differentiate between plastering and pointing.

   (b) What are the Qualities expected of a good paint?

10. (a) Write a note on various types of special materials used in plastering.

    (b) Explain various principles that should be kept in mind while designing a house drainage system.

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Code: 13CE2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech., I Semester

SURVEYING - I

(Civil Engineering)

Time : 3 hours Max Marks: 60

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

SECTION - I

1 (a) Discuss in brief the principles of surveying.

(b) What are different tape corrections? Describe in brief, how would you obtain 'combined correction'?

2. (a) Describe the methods of setting out right angle with a tape and cross-staff at a point on the chain line.

(b) A 20 m chain was found to be 10 cms. too long after chaining a distance of 1500 m. It was found to be 18 cms. too long at the end of day's work after chaining a total distance of 2900 m. Find the true distance if the chain was correct before the commencement of the work.

SECTION - II

3 (a) What is magnetic declination? Explain about the variations in magnetic declination.

(b) Following are the bearings taken in a closed compass traverse.

Line	AB	BC	CD	DE	EA
FB	$142^0 30'$	$223^0 15'$	$287^0 00'$	$12^0 45'$	$60^0 00'$
BB	$322^0 30'$	$44^0 15'$	$107^0 45'$	$193^0 15'$	$239^0 00'$

Compute the interior angles and correct them for observational errors.

4 (a) What are the advantages and disadvantages of compass survey? State the limits of precision of compass survey.

(b) Differentiate between:
(i) Fore Bearing and Back Bearing (ii) Declination and Dip
(iii.) True meridian and magnetic meridian

SECTION - III

5 (a) Explain how you would set up a plane table at a station.

(b) State the two point problem and explain how it is solved.

6 (a) Distinguish between 'Resection' and 'Intersection' methods as applied to Plane Table Surveying.

(b) What are different sources of errors in Plane Tabling? How are they eliminated?

SECTION - IV

7 (a) What is Profile Levelling? Describe the procedure for conducting profile leveling of a proposed highway.

(b) The following consecutive reading were taken with a level and 4 meter leveling staff on continuously sloping ground at a common interval of 30 meters: 0.885; 1.545; 2.335; 3.115; 3.825; 0.455; 1.380; 2.055; 2.855; 3.455; 0.585; 1.015; 1.850; 2.755; 3.845. The Reduced Level of the first point was 380.500 m. Make entries in a level book and apply the usual checks. Determine the gradient of the line joining the first and last point.

8 (a) What are the characteristic features of contours? Explain with the help of neat sketches.

(b) What is a grade contour? How it is located (i) on the ground and (ii) on the map.

SECTION - V

9 (a) Mention different methods for calculation of area and explain any one method in detail.

(b) A series of offsets were taken from a chain line to a curved boundary line at intervals of 15 m in the following order: 0.00; 2.65; 3.80; 3.75; 4.65; 3.60; 4.95; 5.85 m. Compute the area between the chain line, the curved boundary and the end offsets by (i) Average Ordinate Rule (ii) Trapezoidal Rule

10 (a) Derive an expression for trapezoidal formula for Volume. Compare it with the Prismoidal formula.

(b) A railway embankment is 10 m wide with side slopes 1.5 : 1. The ground is level in a direction transverse to the centre line. Determine the volume contained in a length of 120 m by Trapezoidal Rule and Prismoidal Rule. The centre heights at 20 m interval are 2.2 m, 3.7 m, 3.8 m, 4.0 m, 3.8 m, 2.8 m and 2.5 m.

Code : 13EE2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

CIRCUITS & NETWORKS
(Common for EEE & ECE)

Time : 3 hours Max. Marks :60

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

SECTION - I

1 (a) A series circuit consists of 325Ω resistance, a 0.6pF capacitor and a coil of 2.93H inductance. Determine the bandwidth if the circuit resonates at 120MHz

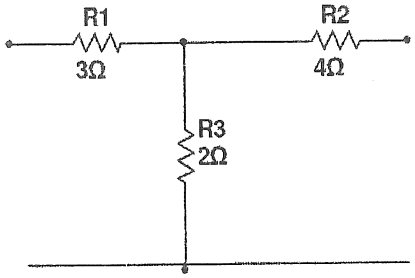
(b) A coil of 20Ω resistance and 0.2H inductance is connected in parallel with a capacitor of 100μF. Determine the resonant frequency and input impedance at resonance.

2 (a) Given a series RLC circuit with R=100Ω, L=0.5H & C=40μF, calculate the resonant, lower and upper half power frequencies.

(b) Write a short note on series resonance.

SECTION - II

3 (a) Derive the expressions for delta to star conversion and for star to delta conversion. Convert the given star connected network into delta connected network?



(b) A three-phase, three-wire, ABC system, with an effective line voltage of 120 V, has three impedances of 5.0 ∟45° Ω in a Δ-connection. Determine the line currents and draw the voltage-current phasor diagram.

4 A balance Δ-connected load has impedances 45+j60Ω. Find the average power delivered to it an effective line voltage of: (i) 400V, (ii) 390V

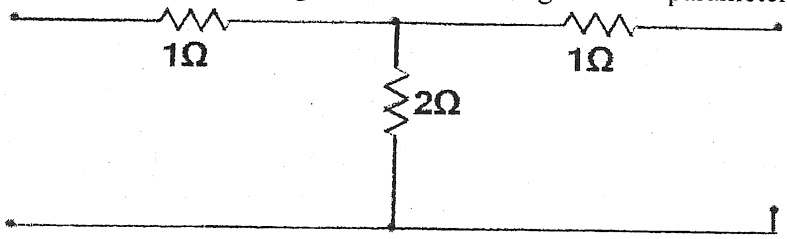
SECTION - III

5 (a) The Z-parameters for a network are Z_{11}=40Ω, Z_{22}=30Ω, Z_{12}=Z_{21}=20Ω compute the transmission parameters for the network. Hence wire the network equation using the two types of parameters.

(b) Define precisely the term driving point impedance, transfer impedance and transfer function with reference to a two port network.

6 (a) A typical two port network is characterized by the equations $2V_1+4I_2=I_1$ & $V_2+6V_1=8I_2$. Determine the values of (i) Y_{11} (ii) Z_{21} and (iii) h_{21}

(b) Find the image parameters for the given network through ABCD parameters

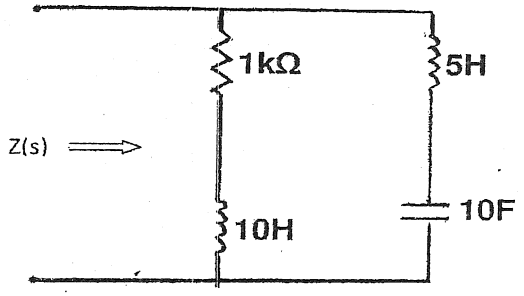


SECTION - IV

7 Obtain any three realizations of driving point admittance.
$Y(s) = S\,(S^2+2)\,(S^2+4)/\,(S^2+1)\,(S^2+3)$

8 (a) Write the restriction on location of poles and zeros in the S-plane.

(b) Obtain the pole zero plot in the S-plane of the driving point impedance function for the network as shown in the figure below.



SECTION - V

9 Determine the solution for the current when switch is closed at $\Phi=90°$ for a series of RLC circuit. Applied voltage $V=100\sin(1000t+\Phi)$ V and an initial charge on the capacitor is zero. Resistance $R=50\Omega$, Inductance $L=0.1H$ and Capacitance of $C=50\mu F$.

10 Determine the solution for the current when switch is closed at $\Phi=0°$ for a series of RC circuit. Voltage $V=100\cos(500t+\Phi)$ V is applied at $\Phi=45°$. Resistance $R=15\Omega$ and $C=100\mu H$.

Code : 13ME2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

BASIC MANUFACTURING PROCESS
(Mechanical Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION - I

1 (a) Explain the steps involved in the designing a riser for a given mould.

(b) List various allowance for a pattern and specify why it is required?

2 (a) What are the various types of patterns? and mention their applications.

(b) Why riser is essential for a casting?

SECTION - II

3 (a) How is an arc obtained in arc welding?

(b) Explain MIG system of arc welding and give the applications of MIG.

4 (a) Explain the principle of thermit welding.

(b) Why is the TIG welding preferred for welding aluminum plated? Give reasons.

SECTION - III

5 (a) What are the advantages of hot working over cold working of metals?

(b) Briefly explain the principle of rolling with a neat sketch.

6 (a) What is the significance of recrystallization temperature in metal working?

(b) What is the significance of roll diameter with reference to the separating force in rolling?

SECTION - IV

7 (a) Distinguish between bending and drawing in sheet metal shop.

(b) What do you understand by high energy rat forming?

8 (a) Explain drawing operation with the help of figure.

(b) Explain the following die shearing operations in trimming and shaving

SECTION - V

9 (a) List different stages in the drop forging process in production of a component such as spanner.

(b) Explain why brittle materials can be worked by extrusion more successfully than some other metal working?

10 (a) List out forging defects and suggest remedies for them.

(b) Explain hydrostatic extrusion

Code : 13CS2105

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

FILE STRUCTURES
(Computer Science & Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION - I

1 (a) Discuss about Field and Record Organization.
(b) List four basic types of file organization and explain any one of them in detail.

2 (a) What are two views of files and explain?
(b) Explain various operations on Files.

SECTION - II

3 (a) How to make files smaller and explain why to make files smaller?
(b) Discuss in detail about Constructing Huffman Codes.

4 (a) Explain about Storage Fragmentation for Reclaiming Space in Files.
(b) Discuss about Sorting a Disk File in Memory.

SECTION - III

5 (a) Write Indexed view and Sequential View for the following examples of applications.
i. Student record system in a college
ii. Credit card system

(b) Explain steps If index doesn't fit in memory with an example.

6 (a) Discuss in detail about B Trees.
(b) Explain about Internal/root node structure and leaf node structure of B+ tree.

SECTION - IV

7 (a) Write short note on Record distributions.
(b) Explain about collision resolution techniques.

8 (a) Discuss in detail about performance issues in extendible Hashing.
(b) Compare and contrast dynamic hashing and linear hashing.

SECTION - V

9 (a) Write a C++ program to display the contents of a file.
(b) Explain about File handling related classes in C.

10 (a) Explain about FileInputStream and FileOutputStream.
(b) Discuss in detail about RandomAccessFile in JAVA.

Code : 13CE2105

B.TECH. DEGREE EXAMINATION, NOVEMBER2014

II B.Tech. I Semester

ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) Explain the importance of study of Petrology and Structural Geology from Civil Engineering point of view?

(b) Give a brief account of applied importance of Geology in the field of Civil Engineering

2 (a) What do you mean by Weathering of Rocks? Explain why weathered rocks are unsuitable for location of Dams, Reservoirs and Tunnels?

(b) Discuss the various Landforms due to Volcanic process

SECTION – II

3 (a) Write short notes on:

(i) Moh's Scale of hardness (ii) Cleavage

(b) Define a 'Mineral'? What are the advantages of study of minerals by their physical properties in mineral identification?

4 (a) Write the physical properties of

(i) Feldspar (ii) Hornblende

(b) Describe the varieties of Quartz group of minerals with their physical properties?

SECTION – III

5 (a) Define a 'Rock'? Give an account of geological classification of rocks with two examples of rocks for each group?

(b) Mention the various Structures and Textures of Igneous rocks with neat sketches?

6 (a) Write the properties of

(i) Granite (ii) Basalt

(b) What do mean by Metamorphism? Discuss various Metamorphic rocks with their origin?

SECTION – IV

7 (a) Define 'Outcrop'? Discuss the importance of Structural Geology in Civil Engineering point of view?

(b) Write short note on

(i) Strike (ii) Dip

8 (a) Describe the classification of Folds

(b) Mention the disadvantages of Faults in civil engineering structures like dams and reservoirs?

SECTION – V

9 (a) Give an account of various geological considerations in the selection of a dam site

(b) Write short notes on:

(i) Earthquakes (ii) Landslides

10 (a) Explain how Tunnels differ from Dams & Reservoirs from construction point of view?

(b) Discuss various Geophysical Investigations in Ground Water Exploration?

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Code : 13EE2103

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ELECTRO MECHANICAL ENERGY CONVERSION - I
(Electrical & Electronics Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION – I

1 (a) Explain the working principle of a DC generator with simple loop generator and draw neat sketches of it. (6M)

(b) What are the important types of excitation of DC generators? Show how the terminal voltage varies with load current in each type. (6M)

2 (a) Discuss about various losses taking place in a DC generator. How can they be minimized? (6M)

(b) Derive the expressions for demagnetizing AT/Pole and cross-magnetizing AT/Pole.(6M)

SECTION – II

3 (a) An 8 pole dc shunt generator has 778 wave –connected armature conductors running at 500 rpm, supplies a load of 12.5Ω resistance at a terminal voltage of 250V.the armature resistance is 0.24Ω and the field resistance is 250Ω.find out the armature current, the induced emf and the flux per pole. (6M)

(b) (i)What is critical speed? Explain the significance of critical speed?

(ii) What is the purpose of compensating winding? Explain in detail. (3+3M)

4 Explain the commutation process in a d.c. machine with neat diagrams and methods of improving commutation. (6+6M)

SECTION – III

5 (a) Define torque. Derive the expression for torque developed by a DC motor from fundamentals. State the factors on which the torque depends. (6M)

(b) A series motor takes 20A at 400V and runs at 250 rpm. The armature resistance is 0.06Ω and the field resistance is 0.4Ω. The torque required by the device varies as square of the speed. Find the applied voltage and current to run the device at 350 rpm. (6M)

6 (a) Explain what is the necessity of a starter. Explain the working principle of a 3-point starter of a d.c. shunt motor. (6M)

(b) A 230 V DC shunt motor takes an armature current of 20 A on a particular load. The armature circuit resistance is 0.5 ohms. Find the resistance required in series with the armature to reduce the speed by 50% if (i) The load torque is constant and (ii) The load torque is proportional to the square of the speed. (6M)

SECTION – IV

7 (a) Explain Hopkinson's test on d.c machines with a neat sketch. (6 M)

(b) The Hopkinson's test on two similar machines gave the following full load results. Line current = 48 A ; Line voltage = 110 V ; Motor armature current = 230 A The field currents are 3 A and 3.5 A. Armature resistance of each machine is 0.035 ohms. Calculate the efficiency of each machine assuming a brush contact drop of 1V per brush. (6 M)

8 (a) Explain the exact procedure for connecting a shunt generator in parallel with others already supplying a load. (6 M)

(b) Two d.c generators operating in parallel have linear characteristics. One machine has terminal voltage of 270V on no load and 220V at a load current of 30A.the other machine has a voltage of 280V on no load and 220V at 40A.Calculate the output current of each machine and the bus voltage when(i)the total load current is 50A, and (ii) load resistance is 10Ω. (6 M)

SECTION – V

9 (a) Explain the principle of operation of single phase transformer and derive the emf equation of transformer. (6 M)

(b) A 230/115 V, 1- phase transformer takes a no load current of 1.7 A at a power factor of 0.18 lagging with LV winding kept open. If the LV is now loaded to take a current of 13 A at 0.8 power factor lagging. Find the current taken by high voltage. (6 M)

10 (a) Define voltage regulation of a transformer. Deduce the expressions for voltage regulation. (6 M)

(b) A 230/230 V, 3KVA transformer gives the following results:
O.C test: 230V, 2A, 100W
S.C test: 15V, 13A, 120W
Determine the efficiency and regulation at full-load 0.8 p.f lagging.

**********END**********

Code: 13EE2120

B.TECH DEGREE EXAMINATION, NOVEMBER 2014

II B.TECH, I SEMESTER

ELECTRICAL TECHNOLOGY

(Electronics & Communication Engineering)

Time: 3 hours Max.Marks: 60

Answer **FIVE** Questions, Choosing **ONE** Question from each section

All Questions carry equal marks

SECTION – I

1 (a) Explain the internal and external characteristics of a d.c.shunt generator.

(b) A 4 pole compound long shunt d.c.generator with wave connected armature having shunt field, series field and armature resistances of 50, 0.05 and 0.1 ohms respectively, supplies sixty numbers of 100 volts, 40 watt lamps. Calculate the total armature current, the current per armature path and the generated e.m.f.

2 (a) Derive the torque equation of a d.c.motor.

(b) A 500 V d.c.shunt motor takes 4 A on no load. The armature resistance including that of the brushes is 0.2 ohms. The field current is 1 A. Estimate the efficiency of the motor when the input current is 100 A.

SECTION – II

3 (a) Obtain an expression for the voltage induced in a single-phase transformer

(b) Explain the action of transformer at no load and also when loaded. Draw the corresponding vector diagrams.

4 (a) Explain how the parameters of the equivalent circuit of a transformer can be determined experimentally.

(b) The following are the test results on a 2.5KVA, 220/110 V, 50 Hz single phase transformer.

Open circuit test : 220V, 0.7 A, 70W
Short circuit test : 15V, 11A, 125W

(i) determine the parameters of the equivalent circuit.

(ii) find the regulation at full load ; 0.8 p.f lagging

Turn over

SECTION – III

5 (a) Explain how a rotating magnetic field is produced in a 3-phase induction motor.
(b) Briefly describe different starting methods of 3-phase induction motor.

6 (a) Show that the ratio of mechanical power developed and rotor copper losses in a 3-phase induction motor is given by (1- S) / S where 'S' is a fractional slip.
(b) The stator loss of a 500 V, 50 Hz, 6 pole, 3-phase induction motor running at 975 r.p.m. on full load is 1.5 KW, the corresponding input being 50 KW. When the motor is run under no load conditions, it takes a power of 2 KW, calculate the rotor copper loss, output of the motor and efficiency on full load.

SECTION – IV

7 (a) Derive an expression for the e.m.f. induced in an alternator in terms of frequency, flux per pole and number of conductors.
(b) Find the number of stator conductors per slot for a 3-phase, 50 Hz alternator if the winding is star connected and has to give a line voltage of 13 KV on open circuit. The flux per pole is 0.15 wb. Assume full-pitched coils and the stator to have 3 slots/pole/phase. The speed is 300 r.p.m.

8 (a) Explain how the regulation of an alternator can be determined in the laboratory.
(b) A 100 KV, 3000 V, 50 Hz, 3-phase, star connected alternator has an armature resistance of 0.2 ohms. A field current of 40 A produces a short circuit current of 200 A and an open circuit line to line voltage of 1040 V. Calculate the full load percentage regulation at 0.8 p.f lag and lead.

SECTION – V

9 (a) Explain briefly the double revolving field theory.
(b) With the help of diagram explain the construction and operation of two types of single phase induction motors.

10 (a) (I) How can you reverse the direction of rotation of single phase induction motor.
(ii) What are the applications of single phase induction motor?

(b) Explain the operation of Stepper motor and mention its applications.

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Code : 13ME2102

B.TECH. DEGREE EXAMINATION, NOVEMBER2014

II B.Tech. I Semester

BASIC THERMODYNAMICS
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION – I

1 (a) What is the difference between a closed system and an open system?

(b) Explain the following :

(i) Thermodynamic state (ii) Intensive property
(iii) Pure substance (iv) Thermodynamic state

(c) State and explain Zeroth Law of thermodynamics.

2 (a) Explain the control volume technique in a variable flow process

(b) Air enters a compressor operating at steady state at a pressure of 1 bar, a temperature of 290K, and a velocity of 6 m/s through an inlet with an area of $0.15m^2$. At exit, the pressure in 7 bar the temperature is 450 K and the velocity in 2.5 m/s. Heat transfer from the compressor to surroundings occurs at the rate of 185 KJ/min. Employing the ideal gas model, calculate the power input to the compressor. Take $C_p = 1005KJ/KgK$.

SECTION – II

3 (a) Define universal gas constant and explain that it is of much more practical value than characteristic gas constant.

(b) The initial volume of 0.1 Kg of certain gas was 215 litres at a temperature of 15^0C and a pressure of 1.05 bar. After isentropic compression to 64.2 litres, the pressure was found to be 4.26 bar. Determine :

(i) Gas constant (ii) Molecular mass of the gas
(iii) Ratio of specific heats (iv) C_p and C_v
(v) Change of internal energy

4 (a) State and explain Clausiu's statement of the second law of thermodynamics

(b) Two reversible heat engines A and B are arranged in series, A rejecting heat directly to B, Engine 'A' receives 200 KJ at a temperature of 421^0C from a hot source, while engine B is in communication with a cold sink at a temperature of 4.4^0C. If the work out of A is twice that if 'B', find

(i) The intermediate temperature between A and B,
(ii) The efficiency of each engine
(iii) The heat rejected to the cold sink.

SECTION – III

5 (a) Establish the inequality of clauses.

(b) An aluminium block (Cp=400J/KgK) with a mass of 5Kg is initially at 40^0C in room at 20^0C. It is cooled reversibly by transferring heat to completely reversible cyclic heat engine until the block reaches 20^0C. The 20^0C room air server as a constant temperature sink for the engine. Compute

(i) The change in entropy for the block
(ii) The change in entropy for the room air
(iii) The work done by the engine.

6 (a) What are Helmholtz function and Gibbs function?

(b) Calculate the decrease in energy when 25 Kg of water at 90^0C mix with 35 Kg of water at 40^0C, the pressure being taken as constant and the temperature of the surrounding being 15^0C (CP of water = 4.2 KJ/Kg.K).

SECTION – IV

7 (a) Show that the efficiency of the otto-cycle depends only on the compression ratio.

(b) Derive an expression for the efficiency of diesel cycle.

8 In an air standard Brayton cycle the compression ratio is 7 and the maximum temperature of the cycle is 800^0C. the compression begins at 0.1 MPa, 35^0C. Compare the maximum specific volume and maximum pressure with the otto cycle of compression ratio is 7, and compression begins at 35^0C, 0.1 MPa, the max temperature of the cycle is 1100^0C. Find :

(i) The heat supplied /Kg of air
(ii) The net work done per Kg of air
(iii) The cycle efficiency

SECTION – V

9 (a) Compare S1 and C1 engines.

(b) Explain the working two stroke petrol engine.

10 (a) Explain :

(i) Indicated thermal efficiency
(ii) Volumetric efficiency .

(b) The following particulars refers to a four stroke diesel engine Bore = 10Cm, stroke = 15Cm clearance value = $50cm^3$, indicated power = 30 kW, Fuel consumption = 6Kg/m and calorific value of fuel = 85000 KJ/Kg calculate

(i) Thermal efficiency
(ii) Air standard efficiency
(iii) Relating efficiency, assume V.

Code : 13ME2102

B.TECH. DEGREE EXAMINATION, NOVEMBER2014

II B.Tech. I Semester

BASIC THERMODYNAMICS
(Mechanical Engineering)

: 3 hours Max. Marks: 60

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

* * *

SECTION – I

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(ii) Air standard efficiency
(iii) Relating efficiency, assume V.

Code: 13SH2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

COMPUTATIONAL TECHNIQUES, STATISTICS AND COMPLEX ANALYSIS

(Civil Engineering)

Time : 3 hours Max Marks: 60

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

SECTION - I

1 (a) Find a positive root of the equation 3x=cosx+1 by Iteration method

(b) Using Newton-Raphson method, find the real root of the equation $x\ log_{10}x = 1.2$ correct to four decimal places

2. (a) From the following table, estimate the number of students who obtained marks between 40 and 45

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

(b) Find the unique polynomial P(x) of degree 2 or less such that P(1)=1, P(3)=27, and P(4)=64 using Lagrange interpolation formula

SECTION - II

3 (a) Apply Gauss elimination method to solve the equations
2x+2y+z = 12; 3x+2y+2z = 8; 5x+10y-8z =10

(b) Apply Gauss Jordan method to solve the equations
2x-3y+4z = 7; 5x-2y+2z = 7; 6x-3y+10z =23

4 (a) Apply factorization method to solve the equations
3x+2y+7z = 4; 2x+3y+z = 5; 3x+4y+z =7

(b) Use Newton-Raphson method to solve the equations $x = x^2 + y^2$, $y = x^2 - y^2$ correct to two decimals, starting with the approximation (0.8, 0.4).

SECTION - III

5 (a) Find the value of cos(1.747) using the values given in the table below

x:	1.70	1.74	1.78	1.82	1.86
sinx:	0.9916	0.9857	0.9781	0.9691	0.9584

(b) From the table below, for what value of x, y is minimum? Also find this value of y

x:	3	4	5	6	7	8
y:	0.205	0.240	0.259	0.262	0.250	0.224

6 Given that

x:	4.0	4.2	4.4	4.6	4.8	5.0	5.2
log x:	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6484

Evaluate $\int_4^{5.2} \log x \, dx$ by (a) Simpson's 1/3 rule (b) Simpson's 3/8 rule

SECTION - IV

7 (a) A variate X has the probability distribution

x:	-3	6	9
P(X=x):	1/6	1/2	1/3

Find E(X) and E (X^2). Hence evaluate $E(2X + 1)^2$.

(b) The daily consumption of electric power (in millions of kW-hours) is a random variable having the probability density function (p.d.f)

$$f(x) = \begin{cases} \frac{1}{9}xe^{-x/3}, & x>0 \\ 0, & x\leq 0 \end{cases}$$

If the total production is 12 million kW-hours, determine the probability that there is power cut (shortage) on any given day

8 (a) A discrete random variable X has the mean 6 and varience 2. If it is assumed that the distribution is binomial, find the probability that $5\leq X \leq 7$

(b) A certain number of articles manufactured in one batch were classified into three categories according to a particular characteristic, being less than50,between 50 and 60 and greater than 60. If this characteristic is known to be normally distributed, determine the mean and standard deviation for this batch if 60%, 35% and 5% were found in these categories

SECTION - V

9 (a) If w=log z, find dw/dz and determine where w is non-analytic

(b) Find the analytic function whose imaginary part is e^x(x siny +y cosy).

10 (a) Evaluate $\int_C \frac{\sin^2 z}{(z-\pi/6)^3} dz$ where C is the circle $|z|=1$

(b) Expand f(z)=1/{(z-1)(z-2)} in the region:

(i) $|z| < 1$

(ii) $1< |z| <2$

(iii) $|z| > 2$

Code : 13SH2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech I Semester

NUMERICAL METHODS & STATISTICS
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

SECTION - I

1 (a) Find a real root for $2x^3 - 3x - 6 = 0$ using Newton - Raphson method corrected to 4 decimal places.

(b) Find a real root of $e^x \sin x = 1$ using Regula Falsi method.

2 Solve the equations $10x_1 - 2x_2 - x_3 - x_4 = 3$, $-2x_1 + 10x_2 - x_3 - x_4 = 15$, $-x_1 - x_2 + 10x_3 - 2x_4 = 27$, $-x_1 - x_2 - 2x_3 + 10x_4 = -9$ by Gauss-Seidel iteration method.

SECTION - II

3 (a) Using Lagrange's interpolation formula find the value of $y(10)$ from the following table

x	5	6	9	11
y	12	13	14	16

(b) From the following table of values of x and y, obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for $x = 1.2$:

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

4 Find the values of $\int_0^1 \frac{dx}{1+x}$ by using the trapezoidal rule with $h = 0.5,\ 0.25$ and 0.125. Then obtain a better estimate by using Romberg's method.

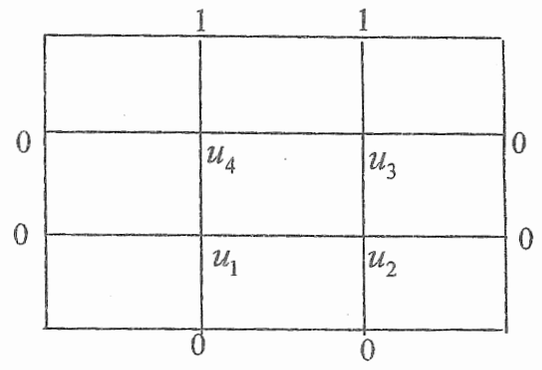
SECTION - III

5 (a) Find the value of $y(0.1)$ using tailor's series given that $\frac{dy}{dx} = x^2 - y,\ y(0) = 1$

(b) Use Runge – Kutta method to evaluate $y(0.2)$ given that $y' = 1 + y^2,\ y(0) = 0$

6 Solve the equation $u_{xx} + u_{yy} = 0$ in the domain of figure given below by Gauss – Seidel's method

(P.T.O.)



SECTION - IV

7 (a) R is the resistance to maintain a train at speed V ; fit a curve of the type $R = a + bV^2$ connecting R and V by the method of least squares, using the following data:

$V(miles/hour)$:	10	20	30	40	50
$R(lb/ton)$:	8	10	15	21	30

(b) Fit a second degree polynomial to the following data by the method of least squares

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

8 (a) Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (I.R.) and engineering ratio (E.R.). Calculate the co-efficient of correlation.

Student	A	B	C	D	E	F	G	H	I	J
I.R.	105	104	102	101	100	99	98	96	93	92
E.R.	101	103	100	98	95	96	104	92	97	94

(b) Ten participants in a contests are ranked by two judges as follows:

x	1	6	5	10	3	2	4	9	7	8
y	6	4	9	8	1	2	3	10	5	7

Calculate the rank correlation coefficient ρ

SECTION - V

9 (a) A pair of dice is tossed twice. Find the probability of scoring 7 points (i) once (ii) at least once (iii) twice.

(b) The probability density function of a variate X is

X:	0	1	2	3	4	5	6
$p(X)$:	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$

Find $P(X<4)$, $P(X\geq 5)$, $P(3<X\leq 6)$.

10 (a) The probability that a pen manufactured by a company will be defective is 1/10. If such pens are manufactured, find the probability that

(i) exactly two will be defective (ii) at least two will be defective

(iii) none will be defective.

(b) X is a normal variate with mean 30 and standard deviation 5, find the probabilities that (i) $26\leq X\leq 40$, (ii) $X\geq 45$, (iii) $|X-30|>5$

Code : 13SH2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ENGINEERING MATHEMATICS - III
(Common to EEE & ECE)

Time : 3 hours Max. Marks :60

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

SECTION - I

1 (a) Using the method of separation of variables, Solve
$\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$, *when* $u(x,0) = 6e^{-3x}$

(b) A homogeneous rod of conducting material of length 100cm has its ends kept at zero temperature and the temperature initially is

$$u(x,0) = x, \quad 0 \le x \le 50$$
$$= 100 - x, 50 \le x \le 100$$

Find the temperature u(x, t) at any time.

2 *Solve* $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$

subect to the conditions $u(0, y) = u(l, y) = u(x,0) = 0$ *and* $u(x, a) = \sin\left(\frac{n\pi x}{l}\right)$

SECTION - II

3 (a) Show that $J_n^{\,1}(x) = \frac{1}{2}[J_{n-1}(x) - J_{n+1}(x)]$

(b) Show that $J_0^{\,2} + 2J_1^{\,2} + 2J_2^{\,2} + 2J_3^{\,2} + \text{---} = 1$

4 (a) Show that $(1 - 2xt + t^2)^{-1/2} = \sum_{n=0}^{\infty} t^n P_n(x)$

(b) Show that $n P_n(x) = xP_n^{\,1}(x) - P_{n-1}^{\,1}(x)$

[P.T.O]

SECTION - III

5 (a) Show that $\frac{\partial u}{\partial r}=\frac{1}{r}\frac{\partial v}{\partial \theta}$; $\frac{\partial v}{\partial r}=-\frac{1}{r}\frac{\partial u}{\partial \theta}$

(b) If f(z) = u+iv is an analytic function , find f(z) if u-v = e^x (cos y – sin y)

6 (a) If f(z) = u+iv is an analytic function, Prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)\log|f'(z)|=0$

(b) Find the Bilinear Transformation which maps the points z = 1,i,-1 onto the points w = 0,1, ∞

SECTION - IV

7 (a) Evaluate $\int_0^{1+i}(x^2+iy)dz$, *along* $y=x$

(b) Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}dz$, *where* $c:|z|=3$

8 Evaluate $\int_0^{2\pi}\frac{\cos 3\theta}{5-4\cos\theta}d\theta$

SECTION - V

9 (a) Show that $Z(\cos n\theta)=\frac{z(z-\cos\theta)}{z^2-2z\cos\theta+1}$

(b) Find $Z^{-1}\left[\frac{2z^2+3z}{(z+2)(z-4)}\right]$

10 Solve $y_{n+2}+2y_{n+1}+y_n=n$ *with* $y_0=y_1=0$, using Z-transforms.

Code : 13CS2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Computer Science & Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION - I

1 (a) Prove the implication $(P \wedge (P \square Q)) \rightarrow Q$ is a Tautology.

(b) Prove that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$

2 What is Conjuctive Normal Form? Obtain the CNF of the following formulae.
$\neg(P \vee Q) \square (P \wedge Q)$ *and* $(Q \vee (P \wedge R)) \wedge \neg((P \vee R) \wedge Q)$

SECTION - II

3 (a) What is an Equivalence relation? X={1,2-----,7} and R = {x,y)/x-y is divisible by 3}. In X, then show that R is an Equivalence relation.

(b) What is compatibility relation? Explain the procedure to find the maximum compatibility blocks.

4 (a) Find the inverse of the following function :

(i) $F(x)= 5e^{(2x+3)}$ (ii) $F(x) = \log(2x+4)$

(b) Explain various types of functions with examples.

SECTION – III

5 Define Group? Show that the set of real numbers R under usual addition is a Group.

6 (a) What is Pigeon hole principle? Explain any two of its applications.

(b) How many permutations of the letters of TOM AND JERRY so that same letters do not appear together?

(c) A mother distributes 5 different apples among 8 children then
(i) How many ways this can be done if each receives at most one
(ii) How many ways this can be done if each receives any number of apples.

SECTION - IV

7 Solve the recurrence relation $a_{n+1} - 2a_n = 5$ for $n \geq 0$ given that $a_0 = 1$.

[P.T.O]

8 (a) Solve the recurrence relation $a_n = 3a_{n-1} - 2a_{n-2}$ for $n \geq 2$ given that $a_1 = 5$ and $a_2 = 3$

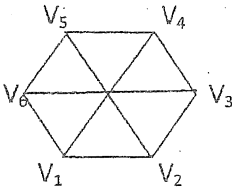
(b) Solve the recurrence relation $F_{n+2} = F_{n+1} + F_n$ for $n \geq 0$ given that $F_0 = 0$, $F_1 = 1$.

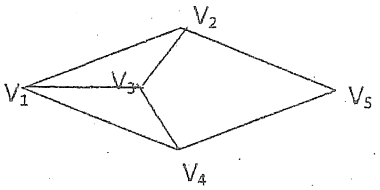
SECTION - V

9 (a) If G is a Bipartite graph, show that G has no cycles of odd length.

(b) If G is a planar graph then sum of the degree of the regions determined by G is $2|E|$ where $|E|$ is the number of degree of G?

10 (a) What is the chromatic number? Find the chromatic number of the following graphs.





(b) Explain about BFS and DFS methods.

Code: 13CE2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ENGINEERING MECHANICS

(Common to Civil Engineering & Mechanical Engineering)

Time : 3 hours | Max Marks: 60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*
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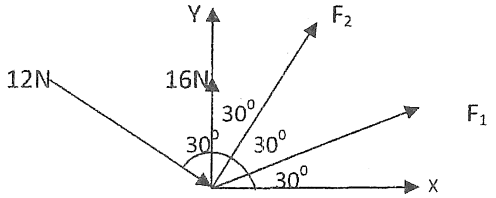
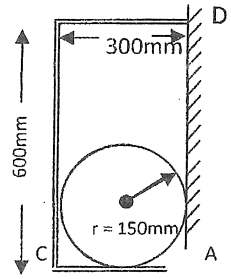
SECTION-I

1 (a) Determine the magnitudes of F_1 and F_2 for the following system of forces, as shown fig. which are in equilibrium.

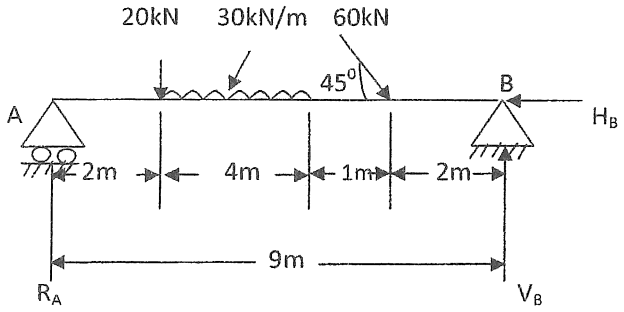


(b) A 600 N cylinder is supported by the frame BCD as shown in Fig. The frame is hinged at D. Determine the reactions at A, B, C and D.



2 (a) Briefly explain about the classification of force system with sketches.

(b) Find the reactions at supports A and B of the loaded beam shown in Fig.

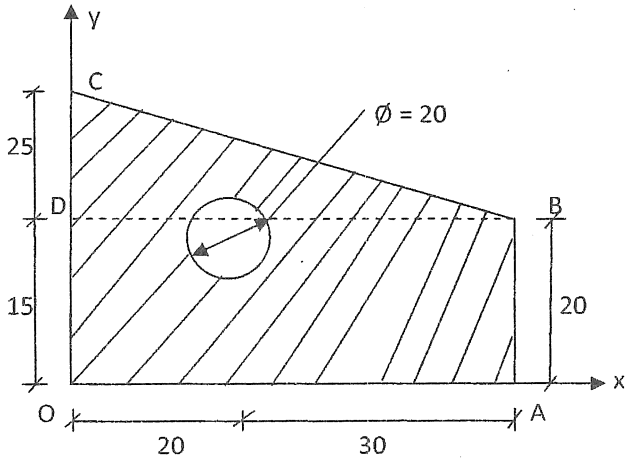


[P.T.O]

SECTION-II

3 (a) State and prove the perpendicular axis theorem.

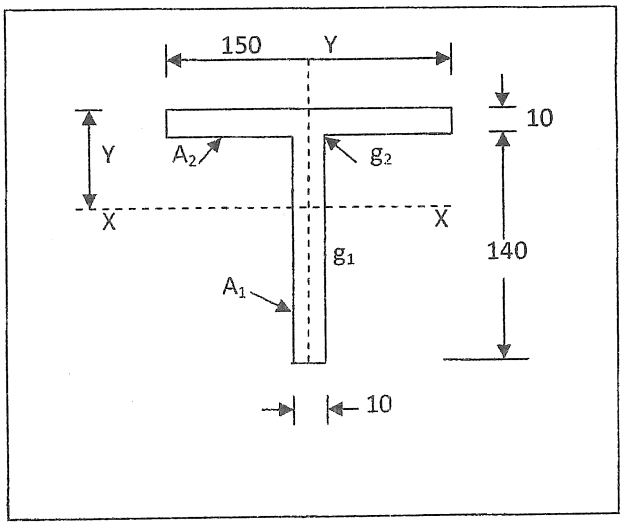
(b) Determine the centriod of the shaded area as shown in the figure.



All dimensions are in mm

4 (a) Derive an expression for the centroid of a circle.

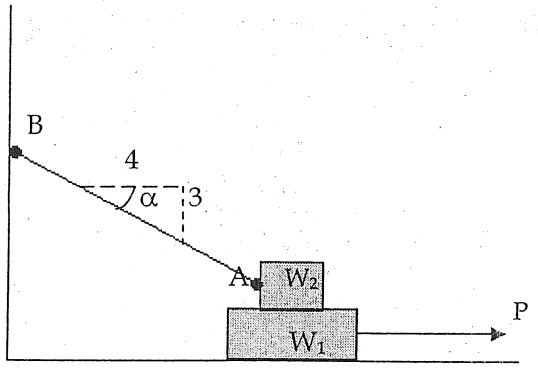
(b) Determine the moment of inertia of the section shown in fig about an axis passing through the centriod and parallel to the top most fiber of the section.



All dimensions are in mm

SECTION-III

5 A block of weight W_1=200N rests on a horizontal surface and supports on top of it another block of weight W_2=50N. The block W_2 attached with vertical wall by a string AB, is shown in figure. Find the amount of horizontal force P, applied to the lower block necessary for impending slipping. The coefficient of friction for all contiguous surfaces is 0.3.



6 (a) Define friction and State Laws of friction.

(b) An open belt of width 75mm moves over two pulleys 3m apart. Larger pulley on secondary shaft has diameter 0.65 m and smaller pulley on machine shaft has diameter 0.45m. The secondary shaft has a speed of 120rpm.Determine the maximum transmitted power if allowable tension in the belt is 20N/mm and coefficient of friction is 0.3.

SECTION-IV

7 (a) A mortar bursts on contact with the ground and splinters fly-off in all directions with velocity 26 m/s. How much time can be taken by a splinter to hit a person standing 38 m away?.

(b) A fly wheel of diameter 50 cm starts from rest with constant angular acceleration of 2 rad/s^2. Determine the tangential and the normal components of acceleration of a point on its rim 3 s after the motion began.

8 A 1500 N block is in contact with a level plane, the coefficient of friction between two contact surfaces being 0.1. If the block is acted upon by a horizontal force of 300 N, what time will elapse before the block reaches a velocity of 16 m / sec starting from rest? If 300 N force is then removed, how much longer will the block continue to move? Solve the problem using impulse momentum equation?

[P.T.O]

SECTION-V

9 (a) Define types of stresses and strains.

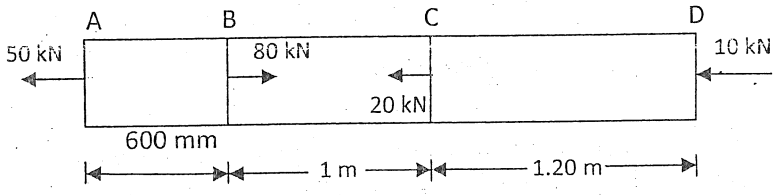
(b) A tensile test was conducted on a mild steel bar. The following data was obtained from the test.

(i) Diameter of the steel bar	= 3 cm
(ii) Gauge length of the bar	= 20 cm
(iii) Load at elastic limit	= 250 kN
(iv) Extension at a load of 150 kN	= 0.21 mm
(v) Maximum load	= 380 kN
(vi) Total extension	= 60 mm
(vii) Diameter of the rod at the failure	= 2.25 cm.

Determine:
(a) the Young's modulus, (b) the stress at elastic limit,
(c) the percentage elongation, and (d) the percentage decrease in area.

10 (a) Determine the value of Young's modulus and Poisson's ratio of a metallic bar of length 30 cm, breadth 4 cm and depth 4 cm when the bar is subjected to an axial compressive load of 400 kN. The decrease in length is given as 0.075 cm and increase in breadth is 0.003 cm.

(b) A brass bar, having cross-sectional area of 1000 mm^2, is subjected to axial forces as shown in Fig



Code : 13CS2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

DIGITAL LOGIC DESIGN

(Computer Science & Engineering)

Time : 3 hours Max. Marks :60

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

* * *

SECTION - I

1 (a) Solve for x

(i) $(0.1101)_2 = (x)_{10}$ (ii) $(44)_8 = (x)_2$, (iii) $(AB)_{16} = (x)_2$
(iv) $(AB2.234)_{16} = (x)_2$

(b) Perform the following subtractions of binary Nos, using both 1's and 2's complements.

(i) 110-10 (ii) 11.11-10.111 (iii) 0.1111-0.101 (iv) 0.111-0.1001

2 (a) Ptovr the two basic De Morgan theorms, using the proof by perfect induction.

(b) Prove the following rules using the proof by perfect induction

(i) XY' + XY = X (ii) X + X'Y = X +Y

SECTION – II

3 (a) Obtain the simplified expression in Sum of Products for the following Boolean function,

$F(A,B,C,D,E) = \sum (0,1,4,5,16, 17,21,25,29)$

(b) A'B'CE' + A'B'C'D' + B'D'E' + B'CD' +CDE'+ BDE'

4 (a) Implement a full subtractor with two half subtractor and an OR gate.

(b) Design a BCD to Excess-3 code converter with BCD- to – Decimal decoder and OR gate.

SECTION – III

5 (a) Obtain the logic diagram of a Master-Slave J-K Flip-Flop with AND and NOR gates.

(b) Show the logic diagram of a clocked RS Flip-Flop with NAND gates

6 (a) Design a Synchronous BCD counter with J-K Flip-Flop

(b) Draw the neat diagram of a 4 – bit binary ripple counter using Flip-Flops.

SECTION – IV

7 (a) Explain about type of RAMs using in the real world.

(b) Explain about Micro Computer System with neat Block diagram.

8 (a) Explain in detail about PLA.

(b) Explain the following
i)EPROM ii)EAROM iii)EEROM

SECTION – V

9 (a) Explain about Latches and it types in detail.

(b) Explain about asynchrous sequential circuits.

10 (a) Explain the benefits of asynchronous circuits

(b) Describe the importance of cycles in asynchronous sequential circuits.

Code :13EC2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

SIGNALS & SYSTEMS
(Common for EEE & ECE)

Time : 3 hours Max. Marks :60

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

SECTION - I

1 (a) Evaluate following integrals
i) $\int_{-\infty}^{\infty}(t-3)^2\delta(t-2)dt$ ii) $\int_{-\infty}^{\infty}[\delta(t)cos2t+\delta(t-2)sin2t]dt$
iii) $\int_{-\infty}^{\infty}e^{-at^2}\delta(t-5)dt$

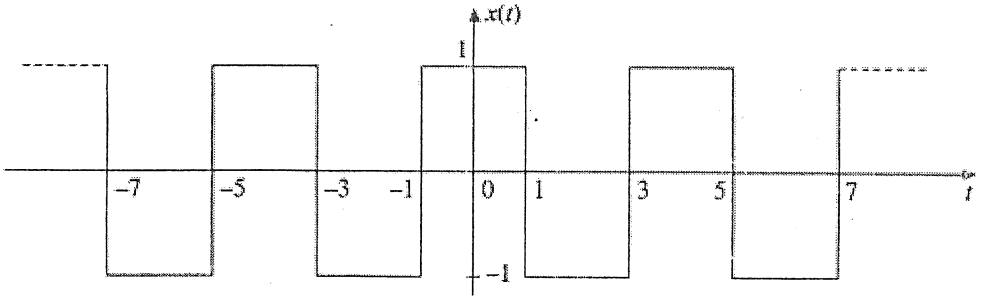
(b) What are the classification of the signals and explain them with an example?

2 (a) Show that the functions Sin($n\omega_0 t$) and Cos($m\omega_0 t$) are orthogonal over any interval {t_0 to $t_0+\frac{2\pi}{\omega_0}$} for integral values of n and m.

(b) Find auto-correlation of f(t)=Sin($\omega_c t$).

SECTION - II

3 Determine the Trigonometric and Exponential Fourier series representation of x (t) shown in Fig. below.



4 (a) State and prove following properties of Fourier transform
i. Time shifting ii. Differentiation time domain

(b) Find the Fourier transform of the following signal
i.x(t)=Cos($\omega_0 t$)u(t) ii. x(t)=$te^{-at}u(t)$

SECTION - III

5 (a) What is an LTI System? Explain about the linearity, causality and stability of a continuous time systems.

(b) Find the convolution of the following signals:
$x_1(t) = e^{-3t}u(t)$ $x_2(t)=u(t+3)$

6 (a) Sketch the frequency response of ideal LPF, HPF, and BPF.

(b) Define bandwidth and rise time. Derive the relationship between rise time and bandwidth.

SECTION - IV

7 (a) Write in detail about the following properties of DTFT.
(i) Multiplication (ii) Convolution

(b) Check whether the systems a) y(n)=x(-n),b) y(n)=x(n/2)are
(i) Casual or Non Causal (ii) Time Variant or Time Invariant

8 (a) (a).Determine the convolution sum of two sequences.
$x[n]=\alpha^n u[n]$ $h[n]=u[n]$

(b) Determine the impulse response of the system described by the following difference equation

$$y[n]=\frac{1}{4}y[n-1]+x[n]$$

If $x[n]=\delta[n-1]$

SECTION - V

9 Write a MATLAB program for the generation of impulse, step, ramp and exponential signals.

10 Write a MATLAB program for convolution of any two signal using MATLAB.

Code: 13CE2105

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

FLUID MECHANICS - I

(Civil Engineering)

Time : 3 hours Max Marks: 60

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

SECTION-I

1 (a) A soap bubble is formed when the inside pressure is 5N/m^2 above the atmospheric pressure. If surface tension in the soap bubble is 0.0125N/m, find the diameter of the bubble formed

(b) Define the term capillarity & derive the equation for capillary rise and fall.

2. (a) If the velocity profile of a fluid over a plate is a parabolic with a vertex 20cm from the plate, Where the velocity is 120cm/sec. Calculate the velocity gradients and shear stress at a distance of 0, 10 and 20 cm from the plate, if the viscosity of fluid is 8.5 Poise.

(b) Define the terms
(i)Density (ii) Specific weight (iii) Specific gravity (iv) Specific Volume (v) Surface Tension.

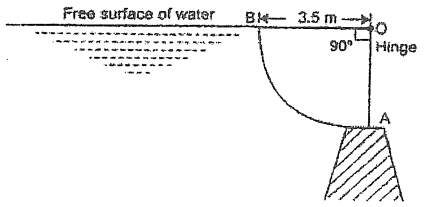
SECTION-II

3 (a) With neat sketches explain the conditions of equilibrium of a floating body and a submerged body.

(b) Explain how to derive an expression for the metacentric height of a floating body experimentally. Explain with the help of neat sketches.

4 (a) Differentiate between manometer and mechanical gauge

(b) Find the resultant force due to water per meter length, acting on the circular gate of radius 3.5 m as shown in figure. Find also the angle at which the resultant for acts



SECTION-III

5 (a) Distinguish between i) compressible and incompressible flow ii) rotational irrotational flow iii) free and forced vortex

(b) In a two dimensional incompressible flow, the fluid velocity components are given by u= x-4y and v=-y-4x. Show that the velocity potential exists and find its form as well as stream function.

6 (a) Derive expressions for angular deformation and pure rotation for a fluid element

(b) The velocity vector in a fluid flow is given by $V=4x^3i - 10x^2yj + 2tk$. Find the velocity and acceleration of fluid particle at (2,1,3) at time t=1;

SECTION-IV

7 (a) State Bernoulli's equation. List out the assumptions and limitations of Bernoulli's equation. What are various applications of this equation?

(b) Water is flowing through a pipe of diameter 300 mm with a rate of flow as 250 litre per second. If the pipe is bent by 135^0 find the magnitude and direction of the resultant force on the bend. The pressure of the water flowing in the pipe is 400 kPa.

8 (a) Define Momentum equation and explain its applications.

(b) A jet of water of diameter 65 mm moving with a velocity of 45 m/s, strikes a curved plate tangentially at one end at an angle of 35^0 to horizontal. The jet leaves the plate at an angle of 25^0 to the horizontal. Find the force exerted by the jet on the plate in he horizontal and vertical directions.

SECTION-V

9 (a) Derive an expression for discharge over a triangular notch

(b) Explain the different types of similarities that must exist between a prototype and its model

10 (a) State the limitations of dimensional analysis and what are the advantages of model testing

(b) Describe with a neat sketch, the principle and working of a pitot tube.

Code : 13EC2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

ELECTRONIC DEVICES & CIRCUITS
(Common for EEE & ECE)

Time : 3 hours Max. Marks :60

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

SECTION - I

1. Give a schematic diagrams of the SCR and drive its equivalent representation in terms of transistors.
2. Draw the circuit diagram of a Bridge rectifier circuit with π-filter followed by L-section filter and explain its operation.

SECTION - II

3. Derive the expressions for voltage gain, current gain, input impedance, output impedance of CE amplifier, using its h-parameter model.
4. Explain the effect of bypass capacitor on low frequency response.

SECTION - III

5. Explain the operation of Darlington pair with neat diagram.
6. Explain hybrid-π model of BJT and derive the expression for f_β.

SECTION - IV

7. Explain the high frequency response of FET amplifier.
8. (a) Draw the small-signal equivalent circuit of FET amplifier in CS amplifier and derive the equations of voltage gain and output resistance.
   (b) For a JFET amplifier g_m=2.5mA/V, r_d=500kΩ, the load resistance is 10KΩ, Find the voltage gain.

SECTION - V

9. (a) Compare different types of feed back amplifiers.
   (b) Explain about Barkhausen criterion.

10. (a) With a neat circuit diagram, explain the working of RC-Phase shift oscillator. Also derive the expression for frequency of oscillation.

    (b) A crystal has the following parameters. L=0.5 H, Cm=0.06 PF, C=1 PF, and R= 5KΩ. Find the series parallel resonant frequencies.

Code : 13EE2120

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech I Semester

ELECTRICAL & ELECTRONICS ENGINEERING
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

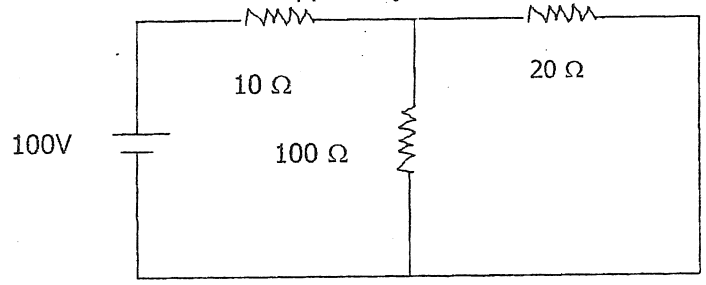
SECTION – I

1 (a) Define the terms average value, root mean square value, peak factor, form factor, power factor, real and reactive powers.

(b) A resistor 'R' is connected in series with a parallel circuit comprising of two resistances 12 Ω and 8 Ω respectively. The total dissipated in the circuit is 100 watts when applied voltage is 25 V. calculate the value of 'R'.

2 (a) Explain the voltage division in series circuit which has two resistances.

(b) Determine the current supplied by the source in the network shown in fig.



SECTION – II

3 (a) Derive expressions for the r.m.s values of the induced voltages in the two windings of a single phase transformer connected to a sinusoidal supply.

(b) A 30KVA single phase transformer has 500 primary turns and 30 secondary turns. The primary is connected to a 3300V a.c. supply . neglecting losses, calculate
(i) the secondary voltage (ii) the maximum flux in the core and
(iii) the primary and secondary currents.

4 (a) Explain S.C test on single phase transformer

(b) Define the voltage regulation of transformer? Derive the expression using the equivalent circuit

[P.T.O]

SECTION – III

5 (a) Explain the principle of operation of a three phase induction motor.

(b) The voltage applied to the stator of a three phase induction motor has a frequency of 50Hz. The frequency of the emf induced in the rotor is 2Hz. Calculate the slip and speed at which motor is running.

6. (a) Discuss why single phase induction motor do not have a starting torque.

(b) What are different types of starting methods of 1-Ø induction motor? Explain the double revolving field theory.

SECTION – IV

7. (a) Draw and explain the V-I characteristics of Diode for both forward and reverse biased conditions.

(b) b) Write Zenor diode application, which bias it is operated and explain

8. Define Rectifier, and explain operation of full wave bridge rectifier with diagram

SECTION – V

9. (a) What is a transistor? Explain about its operation.

(b) Describe the functioning of a BJT in common Collector configuration

10. (a) Prove that the transistor acts an amplifier with suitable circuit diagram.

(b) Analyze a Single stage transistor amplifier using h-parameters

Code : 13CS2103

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

II B.Tech. I Semester

OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Computer Science & Engineering)

Time : 3 hours | Max. Marks : 60

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

* * *

SECTION - I

1 a) Explain the basic concepts of Object Oriented Programming?
b) Explain about different Data Types in Java with suitable examples?

2 a) Explain about the control structures in a Java?
b) What is Recursion ? Explain in detail with suitable example?

SECTION - II

3 a) Write a program in JAVA to add two 3x3 matrices?
b) Explain about input output file structures example?

4 a) Write a JAVA program to find the trace of the 5x5 matrix?
b) Explain Arrays with suitable examples?

SECTION - III

5 a) What is Inheritance ? Explain the importance of the Inheritance?
b) What is a Constructor? Explain with suitable example?

6 a) Explain about the polymorphism with suitable example?
b) Explain Interfaces with suitable example?

SECTION - IV

7 a) Explain the Exception Handling with suitable example?
b) Explain Multi Threading with suitable example?

8 a) Explain about Try Catch Exceptions and Finally method with suitable example?
b) Explain Life Cycle of Threading with suitable example?

SECTION - V

9 a) Explain the concept of Applet with suitable example?
b) Explain the concept of Event Handling with suitable example?

10 a) Explain Applet Life Cycle with suitable Example?
b) What is an Adapter Class? Explain with suitable example?