Code: 13CE2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Explain in detail the classification of surveying.
(b) Distinguish between Map and Plan? State different types of scales used for preparing Maps and Plans.

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 survey line BAC crosses a river, A and C being on the near and opposite banks respectively. A perpendicular AD, 60m long is set out at A. If the bearings of AD and DC are 45° and 285° respectively and the chainage at A is 356.8m.Find the chainage at C.

SECTION – II

3 (a)Define the terms: True and magnetic bearing. Local attraction, back bearing and magnetic declination.
(b) The following angles were observed in clockwise direction in an open traverse;

∟ABC= 124°15' ; ∟BCD = 156° 30'; ∟ CDE =102° 0'; ∟DEF =95° 15';
∟EFG =215° 45';

Magnetic bearing of the line AB was 241° 30' what would be the bearing of line FG?

4 (a) In an old survey made when the declination was 4° W, the observed magnetic bearing of a given line was 210° 00'. The declination in the same locality at present is 10° E. What are the true and present magnetic bearings of the line?
(b) Explain in detail various types of errors occurred while performing compass surveying.

SECTION – III

5 (a)Explain how you would set up a Plane Table at a station.
(b) What do you understand by the term Resection? Explain plane table resection method in detail.

6 (a) What is two point problem? How is it solved? Explain with neat sketches.

(b) Discuss the advantages and disadvantages of plane table surveying over other methods.

SECTION – IV

7 (a) Explain the terms profile levelling and cross-sectioning.

(b) The following consecutive readings were taken with a dumpy level and a 4m levelling staff on a continuously sloping ground at 30m intervals:
0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945,1.530, 2.250.
The R.L of the starting point was 80.750m. Rule out a page of level book and enter the above readings, carry out reductions of heights by collimation method. Also apply arithmetic checks and determine the gradient of the line joining first and last point.

8 (a) Explain tachometric method of locating contours with a neat sketch. Under what circumstances this method is preferred to.

(b) What are the uses of a contour map? Explain with an example, how will you determine the inter-visibility of points.

SECTION – V

9 (a) Explain various methods adopted to calculate the area of an irregular boundary, from field notes.

(b) The following perpendicular offsets were taken at 10 m intervals from a chain line to an irregular boundary line:

2.50, 3.70, 4.85, 5.95, 6.65, 7.75, 7.45 and 4.70 m

Find the area by (a) Trapezoidal rule , (b) Simpson's rule.

10 (a) Write down the procedure for getting the volume of reservoir from contour map.

(b) A railway embankment 600 m long has a formation width of road is 12.5 m with side slope 2 to 1. If the ground level and formation levels are as follows, calculate the volume of earth work. The ground is level across the centre line.

Distance (m)	0	100	200	300	400	500	600
Ground level(m)	105.2	106.8	107	103.4	105.6	104.7	105
Formation level(m)	107.5	108.6	108.5	104.5	106.9	105.6	106

Code: 13SH2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Using Regula – false method, compute the real root of $\cos x = 3x - 1$ correct to three decimal places.

(b) Find the positive root of $x^4 - x = 10$ correct to three decimal places, using Newton-Raphson method.

2. (a) Using Newton's forward formula, find the value of $f(1.6)$, if

x:	1	1.4	1.8	2.2
f(x):	3.49	4.82	5.96	6.5

(b) Find the polynomial *f(x)* by using Lagranges's formula and hence find $f(3)$ for

x:	0	1	2	5
f(x):	2	3	12	147

SECTION-II

3 (a) Use Gauss – Jordan to solve $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$.

(b) Use Gaussian elimination with partial pivoting to solve the system $2x_1 + x_2 - x_3 = -1$, $x_1 - 2x_2 + 3x_3 = 9$, $3x_1 - x_2 + 5x_3 = 14$.

4 (a) Apply factorization method to solve the equations $10x + y + z = 12$, $2x + 10y + z = 13$, $2x + 2y + 10z = 14$.

(b) Apply Gauss – Seidel iteration method to solve the equations $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$.

SECTION-III

5 (a) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ at $x = 1.1$.

(b) Find the maximum and minimum value of y from the following table

x:	0	1	2	3	4	5
$f(x)$;	0	0.25	0	2.25	16	56.25

6 (a) Evaluate using Simpson's 1/3 rule $\int_0^6 \frac{e^x}{1+x}dx$ taking seven ordinates.

(b) Compute the value of $\int_{0.2}^{1.4}(\sin x - \log x + e^x)dx$ using Simpson's 3/8 rule

SECTION-IV

7 (a) A die is tossed thrice. A success is ' getting 1 or 6' on a toss. Find the mean and variance of the number of successes.

(b) A random variable X has the following probability function:

X:	0	1	2	3	4	5	6	7
$P(X)$:	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

(i) Find the value of k
(ii) Evaluate $P(x<6)$ and $P(x\geq 6)$
(iii) Evaluate $P(0<x<5)$

8 (a) Fit a Poisson distribution to the following

x:	0	1	2	3	4
$f(x)$:	46	38	22	9	1

(b) Fit a binomial distribution to the following frequency distribution:

x:	0	1	2	3	4	5	6
$f(x)$:	13	25	52	58	32	16	4

SECTION-V

9 (a) Prove that z^n (n is positive integer) is analytic and hence find its derivative.

(b) Show that the function $u(x,y)=e^x\cos y$ is harmonic. Determine its harmonic conjugate $v(x,y)$ and the analytic function $f(z)=u+iv$

10 (a) Evaluate $\int_c \frac{z^3e^{-z}}{(z-1)^3}dz$, where $c:|z-1|=\frac{1}{2}$ using Cauchy's integral formula.

(b) Find the Laurent series expansion of the function $f(z)=\frac{z^2-6z-1}{(z-1)(z-3)(z+2)}$ in the region $3<|z+2|<5$

Code : 13CE2103

B.TECH. DEGREE EXAMINATION, NOVEMBER, 2015

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) What are the precautions to be taken while dressing a stone? Explain.
   (b) What do you mean by stone quarrying?

2. (a) Write about manufacture of brick by any one method.
   (b) Describe a test to determine the initial moisture content of fine aggregate in the construction site.

SECTION – II

3. (a) What are the important chemical tests conducted on cement to determine its quality?
   (b) What is the effect of the maximum size of aggregate on concrete strength?

4. What is the importance of pure polymer bound materials and explain briefly their properties and uses.

SECTION – III

5. (a) Discuss various functions served by foundations.
   (b) What are the requirements of a good foundation?

6. (a) Differentiate between English bond, Flemish bond and Double Flemish bond.
   (b) Write important points connected with the supervision of brick work.

SECTION – IV

7. (a) Explain the method of erection of centering for arch construction.
   (b) Discuss the various considerations made in planning of stair cases.

8. (a) List out roof-covering materials commonly used for pitched roofs and explain in detail any two roof covering materials with help of neat sketches.
   (b) What do you understand by an encasement window? Sketch the details of window.

SECTION – V

9. (a) Write a short note on various types of special materials used in plastering.
   (b) List out constituents of a paint and explain any two constituents briefly.

10. (a)When distempers are preferred and explain step by step procedure of distempering.
    (b) List out commonly used weather proof courses and explain any two of them.

Code : 13CE2105

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 erosive work and features of wind
   (b) Describe chemical weathering processes

2. (a) Write about features of stream erosion
   (b) Justify the role of Earth Science in civil engineering projects

SECTION – II

3. (a) Define mineral and write the physical properties of
   (i) Amethyst (ii) Olivine
   (b) Explain the general optical properties of minerals

4. (a) Write physical properties giving their chemical composition, diagnostic Properties and engineering uses of the following
   (i) Calcite (ii) Bauxite
   (b) Write short notes on the following
   (i) Cleavage (ii) Structure of minerals

SECTION – III

5. (a) Explain the structures of igneous rocks
   (b) Describe the following
   (i) Basalt (ii) Gneiss

6. (a) Explain the mode of formation of sedimentary rocks
   (b) Describe the kinds of metamorphism

SECTION – IV

7. (a) Define the terms strike and dip

   (b) Write notes on the following with neat sketches

   (i) Recumbent fold (ii) Isoclinal fold

8. (a) Add a note on the engineering importance on the joints

   (b) Draw the sketch of a fault explaining its parts

SECTION – V

9. (a) Write briefly about the causes of mass movements

   (b) Explain the types of dams with neat sketches

10. (a) Describe the origin of tectonic earthquakes

    (b) Give the properties of aquifers and classify the different rocks as aquifers.

Code : 13CE2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

II B.Tech I Semester

ENGINEERING MECHANICS

(Common to Civil Engineering & Mechanical Engineering)

Time : 3 hours Max.Marks: 60

Answer any FIVE Questions , choosing one question from each section
All questions carry equal marks

SECTION I

1.aThree bars are hinged at A and D and pinned at B and C as shown in Fig. 1.form a four linked mechanism. Determine the value of P that will that will prevent movement of bars.

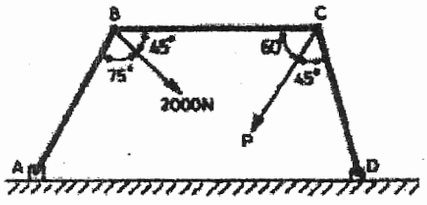


Fig. 1

1.B Two identical smooth cylinders each of weight **W** and radius **r** are placed in a quarter circular cross-sectional channel of radius R as shown in Fig. 2, such that they just fit in the channel. Determine the reactions at the contact surfaces A, B, C and D.

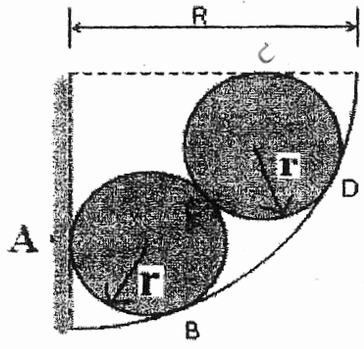


Fig.2

2.a A roller of radius r = 300 mm and weight 2000N is to be pulled over a curb of height of 150 mm shown in Fig. 3 by a horizontal force P applied to the end of a string wound tightly around the circumference of the roller. Find the magnitude of P required to start the roller over the curb. What is the least pull P through the centre of the wheel to just turn the roller over the curb.

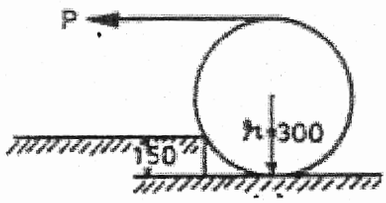


Fig.3

2.b The fiction less pulley A shown in Fig.4 is supported by two bars. AB and AC which are hinged at A and C to a vertical wall. The flexible cable DG hinged at D, goes over the pulley and supports a load of 20 kN at G. The angles between the various members are shown in Fig. 4 Determine the force in bars AB and AC. Neglect the size of the pulley.

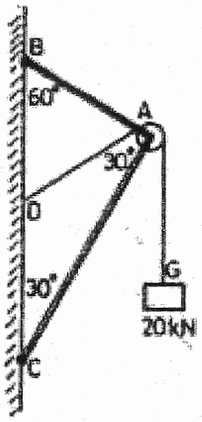


Fig.4

SECTION II

3.a Sate and prove paralle axixs theorem

b. Find the centroid of the shaded area as shown in Fig. 5

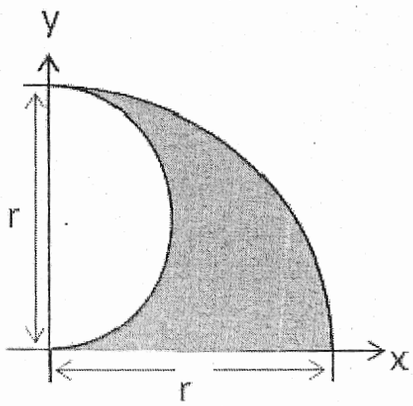


Fig. 5

4.a Locate the center of gravity of the homogeneous wire shown in Fig 6

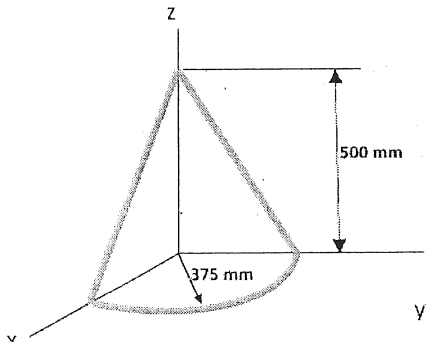


Fig.6

b. Determine the moment of Inertia of the shaded area shown in the Fig.7. All dimensions are in mm.

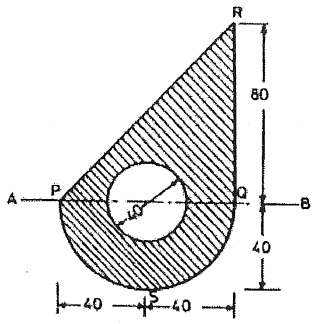


Fig. 7

Section III

5.a A weight 500 N just starts moving down rough inclined plane supported by a force of 200 kN acting parallel to the plane and it is at the point of moving up the lane when pulled by a force of 300 N parallel to the plane as shown in Fig. 8 Find the inclination of the plane and the coefficient of friction between incline plane and the weight.

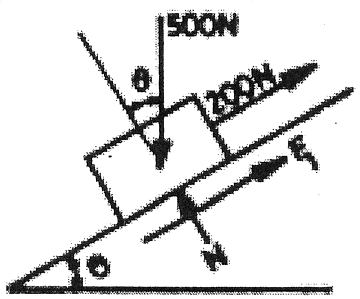


Fig. 8

5.b A 8.5 m ladder weighing 200 kN is placed against a smooth vertical wall with its lower end placed at a distance of 2.5 m away from the wall. If the coefficient of friction between the ladder and the floor is 0.33, show that the ladder is in equilibrium at this position. What is the frictional force acting on the ladder at the point of contact between the ladder and the floor.

6.a.A block of mass 50 kg slides down 35^0 incline and strikes a spring 1.5 m away from it as shown in Fig. 9 The maximum compression of the spring is 300 mm when the block comes to rest. If the spring constant is 1 kN/m, find the coefficient of friction and kinetic friction between the block and the plane.

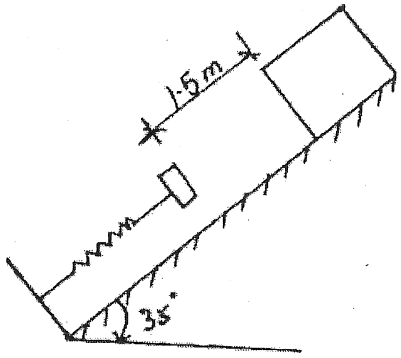


Fig. 9

6.b A belt is running over a pulley of diameter 1.5 m at 3oo rpm. The angle of contact is 150^0 and coefficient of friction is 0.35. If the maximum tension in the belt is 450 kN, determine the power transmitted by it.

SECTION IV

7.a Block of weight 12 N falls at a distance 1.20 m on top of the spring. Determine the spring constant if it is compressed by 125 mm to bring the weight momentarily to rest.

7.b Two rough planes inclined at 30^0 and 60^0 to the horizontal and of the same height are placed back to back. Masses of 12 kg and 24 kg are placed on the faces and connected by a string passing over the top of the planes. If $\mu = 0.6$. find the velocity of block after 5 seconds, starting from rest.

8.a Two bodies of weight W_A = 800 N and W_B = 500 N are connected to the two ends of light inextensible string which passes over a sooth pulley. The weight 800 n is placed on an inclined plane of angle 15^0 and block B is vertically hanging in air. If the coefficient of friction is 0.2, determine the velocity of block B, if it falls through a vertical distance of 2.0 m,

8.b a boat has to cross a river of width 750 m. the river water is flowing with a velocity of 8m/hr and the boat's velocity 24 km/hr. Assuming that the boat moves with uniform velocity throughout, find the direction in which it should move to reach the opposite bank in minimum time. When and where it will reach the opposite bank.

SECTION V

9.a Draw stress strain diagram for mild steel with all salient points and define stress, strain and Poisson's ratio.

9.bTwo parallel walls 8 m apart, are to be stayed together by a steel rod of 30 mm diameter with the help f washers and nuts at the ends. The steel rod is passed through the metal plate and is heated. When the temperature is raised t 90^0 C , the nuts are tightened. Determine the pull in the bar when it is cooled to 24^0 C if i) the ends do not yield ii) the total yielding at the ends is 2 mm. take E = 200 GPa and $\alpha_s = 11 \times 10^{-6}/^0$ C.

10.a A bar 12 mm in diameter is acted upon y an axial load of 20 kN. The change in diameter is measured as 0.003 mm. Determine the i) the Poisson's Ratio ii) the modulus of elasticity and bulk modulus. The value of modulus of rigidity is 80 GPa.

10.b What is volumetric strain? Show that it is the algebraic sum of three mutually perpendicular strains.

Code : 13EC2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

II B.Tech. I Semester

ELECTRONIC DEVICES & CIRCUITS

(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) Explain the operation bridge rectifier. Also find its efficiency and peak inverse voltage.
(b) Briefly explain the current components of diode. Mention PN diode applications.
2 (a) Explain the operation of UJT. How it can be used as sweep circuit?
(b) Explain the operation of full wave rectifier with inductor filter section as output.

SECTION - II

3 (a) Explain the biasing stability factors S, S' and S''.
(b) Draw and explain small signal analysis of single stage BJT amplifiers.
4 (a) Design Hybrid model analysis for single stage CE amplifier. Find its input and output impedances.
(b) What is the advantage of bypass capacitors in low frequency response of CE amplifier?

SECTION - III

5 (a) Differentiate direct coupling and capacitor coupling for CE-CE amplifier section.
(b) Draw and explain cascode amplifier. Compare its characteristics with cascade pair.
6 (a) Explain the operation of Darlington amplifier circuit and compare its input impedance characteristic with other multistage circuits.
(b) For achieving high bandwidth response in multistage amplifiers which type coupling method is suitable? Illustrate.

SECTION - IV

7 Draw the small signal model of common drain amplifier and derive expression for voltage gain and input impedance.
8 (a) What is meant by biasing? What is the need for biasing?
(b) Explain briefly about the following bias circuits: i) Fixed bias ii) voltage divider bias.

SECTION – V

9 (a) Write a short note on crystal oscillator.
(b) Distinguish between LC and RC oscillator.
10 (a) What are the effects of negative feedback?
(b) Derive an expression for frequency of oscillation for RC phase shift oscillator.

Code : 13EC2103

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

II B.Tech. I Semester

ELECTROMAGNETIC FIELDS & WAVES
(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) Three charges of 2.5 μC each are placed at the vertices of an equilateral triangle whose sides is 10 cm. Determine the magnitude and direction of resultant force on one charge due to other charges.

   (b) Assume an infinite uniform line charge of 5 nC/m lie along the Z-axis. Find **E** at P (5, π/4, 2).

2. (a) State and prove Gauss's law.

   (b) Given a potential $V= (3x^2 + 4y^2)$ volts. Find the energy stored in the volume described by $0 \leq x,y,z \leq 1$ m.

SECTION - II

3. (a) A conductor of uniform cross section and 150m long has a voltage drop of 1.3 V and a current density of 4.65×10^5 A/m. What is the conductivity of the material in the conductor?

   (b) Find the magnitude of **D, P** and ε_r for a dielectric material in which **E** = 0.15M V/m and electrical susceptibility is 4.25

4. (a) State and explain the boundary conditions for electric fields at an interface between two dielectrics.

   (b) A boundary exists at z=0 between two dielectrics. ε_{r1} =2.5 for region z<0 and ε_{r2}=4 for region z>0. The field in the region of ε_{r1} is $\mathbf{E}_1$=-30a_x+50a_y+70a_z V/m. Find E_{n1}, E_{t1}, D_{n2}, D_{t2}, E_2, D_2 and the angles θ_1 and θ_2 that **E** makes with normal in both regions.

SECTION - III

5. (a) A circular loop located on z=0 plane with center at origin and of radius 3 m carrying direct current of 10 A along a_φ direction. Find **H** at P (0,0,4).

   (b) Find the magnetic flux density **B** for the given vector potential
   $A= \frac{\cos\theta}{r^2} a_r + \frac{\sin\theta}{r} a_\theta$

6. (a) The magnetic field in certain region is **B** = 40 a_x milli wb/m^2 . A conductor that is 2 m in length lies in the z – axis and carries a current of 5 A in the a_z direction. Calculate the force on the conductor.

   (b) Derive the expression for the energy in a magneto static field.

SECTION - IV

7. (a) Assume that dry soil has $\sigma = 10^{-4}$ S/m, $\varepsilon = 3\varepsilon_0$ and $\mu = \mu_0$. Determine the frequency at which the ratio of the magnitudes of the conduction current density and the displacement current density is unity.

   (b) In free space E(z,t) = 50 Cos ($\omega t - \beta z$) V/m. Find the average power crossing the circular area of radius 2.5m in the plane z=constant.

8. (a) A uniform plane wave propagating in a medium has $\mathbf{E} = 2e^{-\alpha z} \text{Sin}[10^8 t - \beta z]\, a_y$ V/m. If the medium is characterized by $\mu_r = 20$, $\varepsilon_r = 1$ and $\sigma = 3$s/m, find α, β and $\mathbf{H}$.

   (b) Show that the characteristic impedance of uniform plane wave in any medium is $\sqrt{\frac{j\omega\mu}{\sigma + j\omega\varepsilon}}$.

SECTION - V

9. (a) Explain the concept of polarization.

   (b) A 100M Hz plane wave is incident from air on to a dielectric medium ($\varepsilon = 4\varepsilon_0$) at normal incidence. Find reflection coefficient, standing wave ratio and the percentage of the power density that is reflected from the interface.

10. (a) Discuss the reflection of plane wave at the interface of conductor with normal incidence.

    (b) Derive an expression for Brewster's angle for parallel and perpendicular polarizations.

Code: 13EE2120

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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. Discuss the magnetization and load characteristics of a DC Generator.
b. A 4-pole lap connected DC machine has an armature resistance of 0.15 ohm. Find the armature resistance of the machine is rewound for wave connection.

2 a. Derive the torque equation of a DC motor.
b. A shunt generation has a full load current of 196 A at 220V. The stay losses are 720W and the shunt field coil resistance is 55ohms. If it has a full load efficiency of 88%, find the armature resistance. Also, find the load current corresponding to maximum efficiency.

SECTION - II

3 a. Derive the emf equation of a Transformer.
b. Explain the constructional details of a transformer with neat sketch.

4 a. Explain the operation of a transformer on NO-LOAD with a phasor diagram.
b. A 2200/250V transformer takes 0.5A at a P.F of 0.3 on open circuit, find magnetizing and working components of no-load primary current.

SECTION - III

5 What are the different types of starting methods of three phase induction motor and explain clearly.

6. a. Explain the torque-slip characteristics of a three phase induction motor.
b. A three phase induction motor is wound for 4 poles and is supplied from 50Hz System. Calculate
i) Synchronous speed
ii) The rotor speed when slip is 4% and
iii) Rotor frequency when rotor runs at 600 RPM.

SECTION - IV

7 Explain the synchronous impedance method for calculating the regulation of a three phase alternator.

8 Find the No-load phase and line voltage of a star connected 3 phase , 6 pole alternator which runs at 1200 RPM, having flux per pole of 100 mwb, its stator has 54 slots. Each coli has 8 turns and the coil is chorded by one slot.

SECTION - V

9 Explain the operation and starting methods of single phase induction motor.

10 Explain various types of stepper motors.

13EC 2101

Code :13EC2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) What is meant by signal? Contrast the difference between the energy and the power signals.

b) Explain briefly the operations on signals.

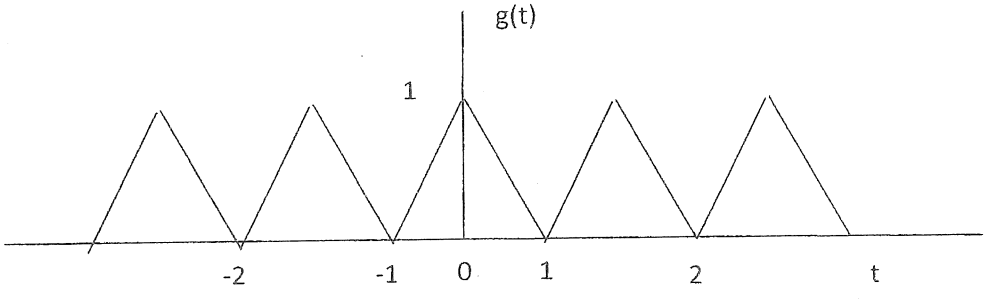
2 a) How can we represent a signal by orthogonal set of functions in time?

b) Express the rectangular function defined by $f(t) = \begin{cases} 1 & ; 0 \le t \le \pi \\ -1 & ; \pi \le t \le 2\pi \\ 0 & ; elseware \end{cases}$

in terms of orthogonal set functions {sin(nt)} over $(0,2\pi)$ and also find the MSE by considering one two and three terms.

SECTION - II

3 a) Find the exponential Fourier series of a period signals as shown in figure.

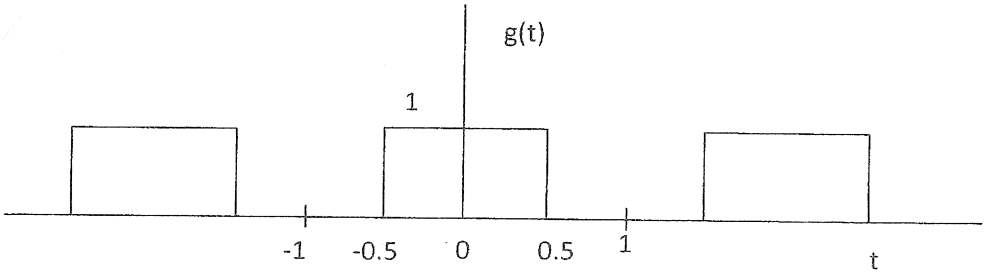


b) For the following signals, Find Fourier Transform and sketch their magnitude spectrum.

(i) $10\cos t + 5\sin t$ (ii) $10\cos t \sin t$

4 a) Find the exponential Fourier series of a periodic train of rectangular pulses of duration T and period To, as shown in figure.

b) Define Fourier Transform. Explain its Time shifting and differentiation properties.



SECTION - III

5 a) What is Linear Time invariant system? List out its properties.

b) Show that the impulse response of a ideal low pass filter is $h(t) = 2B\sin c(2B(t-t_0))$, where B is the bandwidth of a low pass filter.

6 a) For the following signals, Find the Hilbert Transform

(i) $\sin t/t$ (ii) $\frac{1}{1+t^2}$

b) Explain the base band representation of any band pass signal.

SECTION - IV

7 a) Explain the classification of Discrete-time systems.

b) Determine the DTFT of each of the following sequences:

(i) $n(1/2)^n u(n)$ (ii) $\cos(\omega_1 n)\cos(\omega_2 n)$

8 a) The following discrete time systems are i) Time invariant or variant

ii) Linear or nonlinear and iii) Stable or unstable

i) $y(n) = x(n) + nx(n+1)$ ii) $y(n) = x(n) + \frac{1}{x(n-1)}$

b) Determine the convolution between the signals $x_1(n)$ and $x_2(n)$, Where

$x_1(n) = (1/2)^n u(n)$ and $x_2(n) = (1/4)^n u(n)$

SECTION - V

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

b) Write a program to find the convolution and correlation of any two signal using MATLAB.

10 a) Write a program to find the frequency response of the following signals using MATLAB.

(i) $a^n u(n), a < 1$ (ii) $\cos(w_0 n)$

b) Write a program to find the Z-transform of a discrete time signal using MATLAB.

Code : 13EE2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Derive the expression for resonant frequency for a circuit which consists of two parallel branches, where one has R-L series network and other has R-C series network.

(b) An inductive circuit of resistance 2 ohms and inductance of 0.01H is connected to a 250V 50Hz supply, what could be the value of capacitance, which can produce resonance. If frequency is 60Hz, what could be the change in current.

2 (a) Derive the quality factor for R-L and R-C circuits

(b) Obtain locus of current through series R-L network when R is Varied from 0 to ∞.

SECTION - II

3 (a) Derive the relations between line current and phase current in a delta connected 3-phase network and line voltage and phase voltage in a star connected 3-phase network

(b) Obtain the relation for real, reactive power in 3-phase balanced load network

4 (a) Calculate line currents, active power drawn, reactive power drawn and power factor for a star connected balanced network with $15+j20\Omega$ in each branch, when it is excited by 11KV AC balanced 3-Φ supply.

(b) Calculate the phase voltages of a star connected three wired unbalanced load network, which has $Z_R = 1+j\sqrt{3}\ \Omega$, $Z_Y = 1.5+j2\ \Omega$, $Z_B = 4.5+j6\ \Omega$, when it is supplied from a 400V 3-ϕ balanced ac supply.

SECTION - III

5 (a) Obtain the Y-parameters of a passive π network whose Admittances are Y_A, Y_B and Y_C, where Y_C appears in series branch.

(b) Derive Z-parameters in terms of ABCD parameters

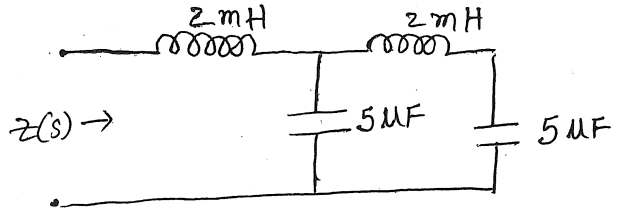
6 (a) Explain ABCD-parameter model of a passive two port network. Mention its applications

(b) Derive the Y-parameters in terms of individual Y-parameters of two two-port networks when they are parallel connected.

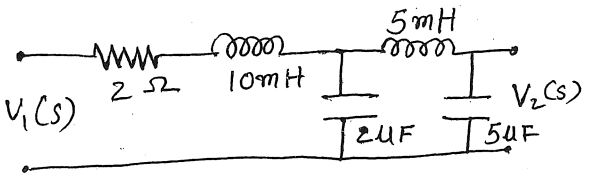
SECTION - IV

7 (a) Explain the necessary conditions of transfer functions

(b) Obtain the driving point impedance function of the network given below



8 (a) Obtain voltage transfer ratio $V_1(s)/V_2(s)$ for the network given below.



(b) Explain the restrictions on locations of poles and zeros of a system in s-plane.

SECTION - V

9 (a) Derive the expression for current in R-C series circuit at $t > 0$, when it is switched to dc voltage source at $t = 0$s.

(b) Obtain the instantaneous value of current in R-L series network at $t = 1$ms if it is switched to a ac source of $v(t) = 250\sin(314t+30^0)$. $R = 10\Omega$ and $L = 10$mH.

10 (a) Derive the expression for current after t=0, in a RLC parallel circuit when it is switched to an ac source at t=0seconds, which has $v(t)=V_m\sin(\omega t+\theta)$.

(b) Compute the instantaneous value of current at t=15μs, which flows through a RC series circuit. Where R=5Ω and C=1μF. This circuit is switched to 10V DC at t=0seconds.

Code: 13SH2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Solve $2x\frac{\partial z}{\partial x} - 3y\frac{\partial z}{\partial y} = 0$ using Method of separation of variables.

(b) If a string of length 'ℓ' is initially at rest in equilibrium position and each of its points is given the velocity $V_0 \sin^3(\frac{\pi x}{\ell})$, Find the displacement y(x, t).

2 An insulated rod of length 'L' has its ends A and B maintained at 0^0C and 100^0C respectively until steady state conditions prevail. If 'B' is suddenly reduced to 0^0C and maintained at 0^0C, find the temperature at distance 'x' from A at time't'.

SECTION-II

3 (a) Show that $J_n'(x) + \frac{n}{x} J_n(x) = J_{n-1}(x)$

(b) Express $J_{\frac{3}{2}}(x)$ and $J_{\frac{-3}{2}}(x)$ in terms of sine and cosine functions.

4 (a) Show that $x^4 = \frac{1}{35}[8P_4(x) + 20P_2(x) + 7P_0(x)]$

(b) Express $x^3 + 2x^2 - x - 3$ in terms of Legendre polynomials.

SECTION-III

5 (a) Define an analytic function .Find the analytic function f (z) = u + iv

where u= a (1+cosθ).

(b) If f (z) is a regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f^1(z)|^2$

6 (a) Find the analytic function whose imaginary part is e^{-x}(x cos y+ y sin y).

(b) Find the region in the w-plane in which the rectangle bounded by the lines x=0, y=0, x=2, y=1 is mapped under the transformation w=z+ (2+3i)

SECTION-IV

7 (a) Evaluate $\int_{0,0}^{1,3}(3x^2y)\,dx+(x^3-3y^2)dy$ along the paths (a) y = 3x (b) $y = 3x^2$

(b) Find the Laurent's series expansion of the function $\frac{z^2-1}{(z+2)(z+3)}$ if $2 < |z| < 3$.

8 (a) Evaluate $\int_c \frac{z+1}{z^2+2z+4}dz$ where $c: |z+1+i| = 2$, using Cauchy's integral formula.

(b) Show that $\int_0^{2\pi}\frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}, a > b > 0$ using Residue theorem.

SECTION-V

9. (a) (i) Find $Z\{\frac{1}{n+1}\}$

(ii) If Z { f(n)} = F(Z) Then prove that $Z\{n\, f(n)\} = -z\frac{dF(Z)}{dz}$

(b) Find the inverse z-transform of $\frac{z^2}{(z-4)(z-5)}$ using convolution theorem

10. Solve the difference equation $y_{n+2} - 4\,y_{n+1} + 3y_n = 0$ given that $y_0=2$ and $y_1=4$, using z- transform.

Code : 13EE2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Find the work done in moving a 10C charge from infinity to origin in electric field of intensity $E = \frac{5a_r}{r^2+1}$

b) Derive the relation between electric field and electric potential in rectangular Coordinates

2 a) Consider a coaxial cable with inner radius 'a' and outer radius 'b'. Derive the expression for $\bar{D}$ for the region a< r < b using Gauss Law.

b) State and Explain Coulomb's law?

SECTION - II

3 a) State and prove the conditions on the tangential and normal components of the electric flux density and electric field intensity at the boundary between two different dielectrics

b) A spherical capacitor with inner sphere of radius 1.5 cm and outer sphere of radius 3.8 cm has an homogeneous dielectric of $\varepsilon = 10\ \varepsilon_0$. Calculate the capacitance of the capacitor. Derive the formula used.

4 a) Express ohm's law in point form and also describe equation of continuity.

b) In spherical coordinates V=0 for r=0.1 and V=100 for r=2 m. Find the potential function. Use Laplace's equation.

SECTION - III

5 a) Develop an expression for the magnetic field at any point on the line through the center at a distance h from the center and perpendicular to the plane of the plane circular loop of radius 'a' and carrying a current of I Amps.

b) A current sheet K $=10a_z$A/m lies in the x=4 m plane and second sheet K $= -8a_z$ A/m is at x=-5m. Find H in all regions

6 a) Derive the expression for point form of Ampere's circuital law.

b) If the vector magnetic potential is given by $A=\frac{10}{x^2+y^2+z^2}a_x$, find magnetic flux density and the current density.

SECTION - IV

7 a) When current carrying wire is placed in a uniform magnetic field show that torque experienced by it is $T = mXB$ where m is the magnetic moment and B is the magnetic flux density.

b) Calculate the inductance of a solenoid of 2000 terns wound uniformly over a length of 0.5m on a cylindrical paper tube of 0.04m in diameter the medium is air.

8 a) Drive the expression for mutual inductance between a straight long wire and a square loop wire in the same place.

b) Explain magnetic dipole and dipole moment.

SECTION - V

9 a) Explain Faraday' s law of electromagnetism.

b) Derive Maxwell's equation based on Ampere's circuit law for a time varying field.

10 a) Explain poynting theorem and poynting vector.

b) What is displacement current? Find the displacement current density with a parallel plate capacitor having dielectric with $\in_r = 8$, area of plates = $0.01m^2$, distance of separation = 0.05 mm and the capacitor voltage is 200 sin 200t.

Code : 13EE2103

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 DC Generator and draw neat sketches of it?
(b) A 4-pole lap connected dc generator has no-load generated e.m.f of 500 V when driven at 1200 r.p.m. Calculate the flux per pole if the armature has120 slots with 6 conductors per slot.

2 (a) What are the detrimental effects of armature reaction? Discuss in brief.
(b) A 250kW, 500 V, 8-pole d.c. machine has a lap-wound armature with 1000 conductors. The pole-arc to pole-pitch ratio is 0.5. Calculate the number of pole-face conductors of the compensating winding in each pole, such that uniform air-flux density is obtained under pole-faces.

SECTION – II

3 (a) The open-circuit characteristics of a d.c. shunt generator driven at rated speed is as follows :

Field Amperes :	0.5	1.0	1.5	2.0	2.5	3.0	3.5 A
Induced Voltage :	60	120	138	145	149	151	152 V

If resistance of field circuit is adjusted to 53 ohms, calculate the open circuit voltage and load current when the terminal voltage is 100 V. Neglect armature reaction and assume an armature resistance of 0.1 ohm.
(b) Four terminals of a DC shunt machine are available, but these are unmarked. How would you Identify the field and armature terminals?

4 (a) Explain the characteristics of DC series Generator with sufficient equations and mention the applications of the of DC series Generator in Practical.
(b) Explain in Detail about Critical resistance and Critical Speed. And Explain How to Find them.

SECTION - III

5 (a) Explain the principle of operation of D.C. Motor. Derive the Torque equation in dc motor.

(b) A 4-pole series motor has 944 wave connected armature conductors. At a certain load, the flux per pole is 34.6 mWb and the total mechanical torque developed is 209 N-m. Calculate the line current taken by the motor and the speed at which it will run with an applied voltage of 500 V. Total motor resistance is 3 ohm.

6 (a) Explain what would happen if the dc motor is directly switched on to the supply without any starter.

(b) (I) Explain the function of no-volt release in a three-point starter.

(II) Explain the Advantages of four-point starter over the three point starter.

SECTION - IV

7 (a) Explain the process of parallel operation of two series generators connected in parallel.

(b) Why we do parallel operation for dc generators, Explain in brief and Write down their advantages?

8 (a) Explain Brake test on a d.c. machines with a neat sketch.

(b) In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 r.p.s. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.

SECTION – V

9 (a) Define a Transformer. How is the energy transferred from one circuit to another? Distinguish between primary and secondary windings.

(b) A 25 kVA transformer has 500 turns on the primary and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Find the full-load primary and secondary currents, the secondary e.m.f. and the maximum flux in the core. Neglect leakage drops and no-load primary current.

(c) Why is the transformer core laminated?.

10 (a) Consider a 20 kVA, 2200/220 V, 50 Hz transformer. The O.C./S.C. test results are as follows:

O.C. test : 220 V, 4.2 A, 148 W (L.V. Side)

S.C. test : 86 V, 10.5 A, 360 W (H.V. Side)

Determine the regulation at 0.8 p.f. lagging and at full load. What is the p.f. on Short-Circuit ?

(b) Write down the short notes on cooling mechanism employed in transformers.

Code : 13CE2106

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Elaborate the difference between dynamic viscosity and kinematic viscosity.

(b) Calculate the maximum capillary raise of water to be expected between two vertical clean glass plates spaced 1mm apart. If the water is replaced by mercury, what would be the maximum capillary depression of mercury in the same space? Assume appropriate values for the surface tension and angle of contact.

2 (a) Define the terms specific volume and weight density.

(b) In a 50 mm long journal bearing arrangement, the clearance between the two at concentric condition is 0.1 mm. The shaft is 20 mm in diameter and rotates at 3000RPM. The dynamic viscosity of the lubricant used is 0.01 Pa and the velocity variation in the lubricant is linear. Considering the lubricant to be Newtonian, calculate the frictional torque and the journal has to overcome, and corresponding power loss.

SECTION – II

3 (a) Differentiate between absolute, gauge and atmospheric pressure.

(b) A cylindrical roller gate 3m in diameter is placed on the dam in such way that the water is just going to spill. If the length of the gate is 6m, calculate the magnitude and direction of the resultant force due to water acting on it.

4. (a) State and prove Pascal law and give some examples where this principle is applied

(b) A square plate 4m x 4m hangs in a water from one of its corners and its centroid lies at a depth of 8m from the free water surface. Workout the total pressure on the plate and locate the position of centre of pressure with respect to plate centroid.

SECTION – III

5 (a) State the classification of fluid flow and mention the application of each one.

(b) In a steady fluid flow, the velocity components are u=2kx, v=2ky, w=-4kz, find the equation of streamline passing through the point (1, 0, 1).

[P.T.O.]

6 (a) Apply Bernoulli equation for real fluid by considering friction.

(b) A 2m long pipeline tapers uniformly from 10cm diameter to 20cm diameter at its upper end. The pipe centre line slopes upwards at an angle 30^0 to the horizontal and the flow direction is from smaller to bigger cross- section. If the pressure gauges installed at the lower and the upper ends of the pipeline read 200kPa and 230kPa respectively, determine flow rate and fluid pressure at the mid length of the pipeline. Assume no energy losses.

SECTION – IV

7 (a) What is an orifice plate? How will the discharge through a pipe line be measured with the help of an orifice plate?

(b) Water flows at the rate of $0.15m^3/s$ through a 15cm diameter pipe. If the pressure gauges fitted upstream and downstream of the orifice indicate readings of 2 bar and 1 bar respectively, make calculations for the discharge coefficient for the orifice meter.

8 (a) Briefly explain the principle employed in manometer used for measurement of pressure.

(b) A u-tube differential manometer connects two pressure pipes A and B. A contains carbon tetrachloride having specific gravity 1.6 under a pressure of 120kPa and pipe B contains oil of specific gravity 0.8 under a pressure of 200 kPa. The pipe A lies 2.5 m above pipe B, and mercury level in the limb communicating with pipe A lies 4m below A. Find the difference in the levels of mercury in the two limbs.

SECTION – V

9 A horizontal pipe of 5cm diameter conveys and oil of specific gravity 0.9 and dynamic viscosity 0.8 kg/ms. Measurements indicate a pressure drop of 20 kN/m^2 per meter of pie length traversed. Make calculation for the

(i) Flow rate of oil and centre line velocity,
(ii) Wall shear stress and the frictional drag over 100 m pipe length
(iii) Power of the pump required assuming an overall efficiency of 60 percent
(iv) The velocity and shear stress at 1cm from the pipe surface.

10 (a) Derive Darcy equation for head loss due to friction.

(b) State various minor head losses in flow through pipe.

Code : 13EE2120

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) State and Explain Ohm's law.

(b) A factory is supplied with power at 220V through a pair of feeders of total resistance 0.0225ohm. The load consists of 250V, 60-W lamps and four motors each taking 40A of current. Find (i) Total current required (ii) Power wasted in feeders (iii) Voltage at the station end of feeders

2 (a) Define i) Resistance ii) Inductance iii) capacitance.

(b) Three impedences are connected in series $Z_1 = (5 + j\ 5)\Omega$, $Z_2 = (10 - j\ 3)\Omega$, Z_3. If current through the circuit is $10 + j\ 25$ A and voltage applied is 250 V , 50 Hz AC supply .find Z_3 and voltage drop across each impedence and power factor of the circuit.

SECTION - II

3 (a) What do you mean by transformation ratio? Write its significance.

(b) Derive an emf equation of a single phase transformer.

4 (a) Define efficiency and regulation of a single phase transformer.

(b) A 100 kVA single phase transformer has a full load current of 400A and total resistance referred primary is 0.006 ohm. If the iron loss about to 500 W, find the efficiency at full load and half load at 0.8 p.f lagging.

SECTION - III

5 (a) Explain the construction and working principle of three phase induction motor.

(b) Draw the torque-slip characteristics of 3-phase induction motor.

6 (a) Why Single phase induction motors are not self starting? Explain the operation of single phase induction motor.

(b) Explain the applications of induction motors.

[P.T.O.]

SECTION – IV

7 (a) Discuss about zener diode and explain its characteristics.

(b) Explain how the diode acts as switch

8 (a) Explain the operation of Bridge Rectifier with neat circuit diagram and necessary waveforms.

(b) What is ripple factor and obtain the ripple factor for single phase full wave rectifier.

SECTION - V

9 (a) Explain CE Configuration of BJT with neat sketches.

(b) Write the specifications of BJT.

10 (a) Explain how transistor will act as an amplifier.

(b) Compare CE, CB and CC Configurations.

Code : 13ME2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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. What are the different types of patterns used in casting process? Explain with neat diagrams?
   b. What are the properties of molding sand? Explain?

2. a. What are the different types of centrifugal casting methods? Explain true centrifugal casting method with suitable diagrams?
   b. What is a. riser? Explain different types of risers with suitable diagrams?

SECTION - II

3 a. What are the different types of welds? Show with neat diagrams?
   b. Explain the principle of plasma arc welding with suitable diagram?
   c. Explain the principle of MIG welding with suitable diagram?

4 a. What are the different types of resistance welding? Show with neat diagrams?
   b. Explain the principle of TIG welding with suitable diagram?
   c. How cutting of metals taking place with plasma arc cutting process? Explain?

SECTION - III

5. a. What do you understand by mechanical working of metals? Explain?
   b. Define re-crystalline temperature? Why different metals having different re-crystalline temperatures? Explain?
   c. Define hot working of metals. What are its advantages and disadvantages?

6. a. Explain hot rolling and various type of rolling mills used in hot rolling
   b. What are the specific advantages, limitations and applications of cold working?

SECTION - IV

7. a. Explain hot spinning process with neat diagram?
   b. Explain bending process with neat diagram?
8. a. Explain HERF process with neat diagram?
   b. What are the different sheering operations performed on sheet metal? Explain?

SECTION - V

9 a. How the bolt head are manufactured? Explain the process with suitable diagrams?
b. Differentiate hot and cold extrusion process?

10 a. How the connecting rod of an IC engine is made? Explain the process with suitable diagrams?
b. Explain the impact extrusion process with suitable diagrams?

Code : 13SH2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 the positive root of $e^x sinx = 1$ by the method of false position.

b) Solve the equation $x^3 - 3x - 5 = 0$ by Newton raphson method and find root.

2 Using Guass Crout's method, solve the following system of equations x+y+z=1, 4x+3y-z=6, 3x+5y+3z=4.

SECTION - II

3 Find f(2.5) using Newton forward formula from the following table.

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

4 Find the first and second derivatives of the function tabulated below at the point x=1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
y	3.375	7	13.625	24	38.875	59

SECTION - III

5 Tabulate y (0.1), y (0.2) and y (0.3) using Taylor's series method that $dy/dx=y^2+x$ and y(0)=1.

6 Apply R-K fourth order Method to find an approximate value of y for x=0.2 given that dy/dx=x+y and y=1 when x=0 taking h=0.1

SECTION - IV

7 Fit a second degree polynomial to 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 Prices indices of cotton and wool are given below for the 12 months of a year. Obtain the equations of line of regression between the indices and also find correlation coefficient.

Price index of

Cotton(x)	78	77	85	88	87	82	81	77	76	83	97	93
Wool(y)	84	82	82	85	89	90	88	92	83	89	98	99

SECTION - V

9 a) The probability function of a variate X is

x	0	1	2	3	4	5	6
P(x)	k	3k	5k	7k	9k	11k	13k

i) Find k ii) $P(X< 4)$ iii) $P(X \geq 5)$ iv) $P(3 < x \leq 6)$.

b) In 256 sets of 12 tosses of a coin in how many cases one can expect 8 heads and 4 tails.

10 a) A Hospital switch board receives an average of 4 emergency calls in a 10 minutes interval. What is the probability that i) there are at most 2 emergency calls in a 10 minutes intervals ii) there are exactly 3 emergency calls in 10 minutes interval

b) In a test on 2000 electric bulbs, it was found that the life of a particular make was normally distributed with a average life of 2040 hours and S.D of 60 hours. Estimate the number of bulbs likely to burn for a) more than 2150 hours b) less than 1950 hours c) more than 1920 hours and but less than 2160 hours.

Code : 13ME2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 do you understand by macroscopic and microscopic view points?

(b) Differentiate between intensive and extensive properties. Give examples in each case?

2 (a) State Zeroth law of thermodynamics. What is its significance?

(b) A turbine operates under steady flow conditions, receiving steam at the following state: Pressure 1.2 MPa, temperature 188°C, enthalpy 2785 kJ/kg, velocity 33.3 m/s and elevation 3 m. The steam leaves the turbine at the following state: Pressure 20 kPa, enthalpy 2512 kJ/kg, velocity 100 m/s, and elevation 0 m. Heat is lost to the surroundings at the rate of 0.29 kJ/s. If the rate of steam flow through the turbine is 0.42 kg/s, what is the power output of the turbine in kW?

SECTION – II

3 (a) What are the limitations of First law of Thermodynamics.

(b) A cyclic heat engine operates between a source temperature of 750°C and sink temperature of 25°C. What is the least rate of heat rejection per kW net output of the engine?

4 A mass of air is initially at 250°C and 650 kPa and occupies 0.028 cubic meter. The air is expanded at constant pressure to 0.084 cubic meter.. A polytropic process with n=1.48 is then carried out followed by a constant temperature process which completes the cycle. All the processes are considered as reversible.

(i) Sketch the cycle in p-v and T-s planes.
(ii) Find the heat received and heat rejected in the cycle
(iii) Find the efficiency of the cycle

SECTION – III

5 (a) a) Define available energy and unavailable energy?

(b) Air in a piston cylinder arrangement is heated at constant pressure by addition of 100 kj/kg of air. The air is initially at 28^0C while the surroundings is at 21^0C. calculate the change in availability per kg of air. Take C_p=1.005 KJ/Kg-K and atmospheric air pressure is 1 bar.

6 4 kg of water at 27^0C is mixed with 1 kg of ice at 0^0C. assuming adiabatic mixing, determine the final temperature of the mixture of water and ice. Calculate the net change in entropy. Assume enthalpy of fusion of ice as 335 KJ/Kg.

[P.T.O]

SECTION – IV

7 In an air standard Diesel cycle, the pressure and temperature conditions a beginning of compression are 0.1 MPa and 20°C respectively. The compression is 16. Heat addition takes place at constant pressure until the temperature is 15(Calculate the following:

a) Cut-off ratio
b) The heat supplied per kg of ai
c) The cycle efficiency
d) The mean effective pressure.

8 A Gas turbine plant works in temperature limits of 300° K and 900° K and pressure limits are 1 bar and 4 bar. The isoentropic efficiency of the compressor is and that of the turbine is 0.85. Estimate the thermal efficiency of the plant and power available in kilowatts, if the air consumption is 1 kg/s. The heating value of fuel is 42,000 kJ/kg.

SECTION – V

9 (a) Explain with the help of suitable sketches, the working of a four stroke Diesel engi

(b) Discuss the differences between actual and air standard cycles used to analyse Engine operation.

10 (a) What are the instruments or equipment used for measuring the following parameter of an I.C. Engine.

i). Brakle power
ii). No emissions
iii). Air flow rate
iv). Pressure of combustion gases
v). co emissions.

(b) A six-cylinder petrol engine operates on four-stroke cycle. The bore of each cylin is 70 mm and stroke 100 mm. The clearance volume per cylinder is 67 cc. at a sp of 4000 rpm, the fuel consumption is 20 kg/h and the torque developed is 150 Nm C.V. = 44000 kJ/kg , Calculate:

i) Brake power ii) bmep and iii) Brake thermal efficiency

Code : 13CS2104

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Define ADT. What is List ADT? Describe linked list implementation of List.
(b) Describe the insertion and deletion operations on singly linked list and circular linked list.

2 (c) Compare, in terms of advantage(s) and disadvantage(s), the two popular implementations of the List ADT.
(d) Describe any two operations on a List using array implementation.

SECTION - II

3 (a) What is Stack? Describe the basic operations on stack and the applications of stack.
(b) Describe the implementation of stack using arrays.

4 (a) What is Queue? Illustrate various operations on queues with suitable example.
(b) Describe the applications of Queues and Priority Queues.

SECTION - III

5 (a) Define Binary tree. Construct an expression tree for postfix expression
A B + C D E + * *
(b) Discuss various tree traversal strategies. Generate preorder, inorder, and postorder traversal for the constructed expression tree in 5 (a).

6 (a) Describe the properties of Binary Search tree. Construct a binary search tree for the given set of numbers: 4, 2, 1, 3, 6, 5, 7.
(b) Describe any two operations that are usually performed on binary search tree with suitable examples.

SECTION - IV

7 (a) Define an AVL tree. Compare an AVL tree with a binary tree
(b) Describe insert and delete operations on an AVL tree with suitable examples.

8 Write short notes on (i) Red-Black Trees and (ii) 2-3 Trees

SECTION - V

9 (a) Explain the difficulty in sorting a large number of elements. Describe the model useful for sorting large number of elements with suitable example.
(b) Write short notes on Polyphase Merge.

10 (a) Illustrate heap sort with suitable example.
(b) Illustrate the sorting of 19, 13, 05, 27, 01, 26, 31, 16, 02, 09, 11 and 21 using radix sort.

Code : 13CS2103

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 about the programming paradigms?
b) Explain the type of Variables? Life of the Variable?

2 a) Write a JAVA program to find the first 10 even numbers?
b) Explain about operator presidence with suitable example?

SECTION - II

3 a) Write a JAVA program to find biggest of n numbers ?
b) What is an Input Stream? What is an Output Stream? Explain With suitable example?

4 a) Explain the concept of Arrays with suitable example?
b) Explain the concept of Strings with suitable example?

SECTION - III

5 a) Explain the concept of Multiple Inheritance with suitable example?
b) Explain about the built in constructors in JAVA?

6 a) What is the difference between the Operator Overriding and Operator Over Loding ?
b) What is a Package? Explain with suitable example?

SECTION - IV

7 a) Explain the Benefits of Exception handling?
b) Explain the concept of Multi Threading ?

8 a) Explain about Priority threads?
b) Explain Throw, Throws and Finally with suitable example?

SECTION - V

9 a) What is Applet and Explain Applet Life Cycle with suitable example?
b) Write a java program to draw a polygon of eight edges

10 a) Explain the differences between Applets and applications?
b) Explain about Inner classes?

Code : 13CS2101

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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 that $(\exists x)(P(x) \wedge Q(x)) \Rightarrow (\exists x)P(x) \wedge (\exists x)Q(x)$

b Show the following formula is a tautology without constructing truth table.
$(P \wedge (P \rightarrow Q)) \rightarrow Q$

2.a Prove that, for any three propositions p, q, r
$[(p \vee q) \rightarrow r] \Leftrightarrow [(p \rightarrow r) \wedge (q \rightarrow r)]$

b Test whether the following is a valid argument.
If sachin hits a century, then he gets a free car. Sachin does not get a free car. Therefore, sachin has not hit a century.

SECTION – II

3.a Let P(A) be the power set of any non empty set A, then prove that the relation $\subseteq$ of set inclusion is not an equivalence relation.

b What is relation? Give properties of binary relation.

4.a Let A={1,2,3,6} and $\leq$ be the relation of divisibility. Draw the Hasse diagram of $(A, \leq)$.

b Let L be a lattice then prove that $a \wedge b = a$ iff $a \vee b = b$.

SECTION - III

5.a Find the number of arrangements of the letters of TENNESSEE.

b In how many ways can 6 men and 6 women be seated in a row.
i.If any person may sit next to any other.
ii. If men and women must occupy alternate seat.

6.a Show that the set N of natural numbers is a semi group under the operation $x*y=\max\{x,y\}$. Is it a monoid?

b Find a recurrence relation and the initial condition for the sequence 2,10,50,250,.... Hence find the general term of the sequence.

SECTION - IV

7 Solve the recurrence relation $a_n-4a_{n-1}+3a_{n-2}=0$ for $n\geq 2$ with initial conditions $a_0=2$ and $a_1=4$ by using generating functions.

8.a Solve the recurrence relation by using substitution method $a_n=a_{n-1}+n$ where $a_0=2$.

b Show that every subgroup of a cyclic group is cyclic.

SECTION - V

9.a Explain Prim's and Kruskals algorithms with example.

b What is the chromatic number of a cycle graph and a complete graph of n vertices.

10.a Define planar and non planar graphs.

b Show that k_n is planar if $n \leq 4$.

c Is there a graph with degree sequence (1, 3, 3, 3, 5, 6, 6).

Code : 13CS2105

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Explain in detail about
   a) What are the characteristics that file organization performs?
   b) File access and organization

2 (a) Summarize the record organization concept.
(b) Briefly list the record structures and write notes on them.

SECTION – II

3 Explain in detail about internal sorting with two suitable sorting techniques.

4 Brief about the following
   (a) Binding concept
   (b) Retrieve the information using combination of secondary keys

SECTION – III

5 Demonstrate the following
   (a) Properties of B-trees
   (b) Operations in a B-tree

6 Explain in detail about indexed sequential file access.

SECTION – IV

7 Write about the following
   (a) Hashing functions (b) Progressive Overflow (c) Scatter Tables

8 Explain in detail about tries with suitable examples.

SECTION – V

9 (a) List the file handling functions in C and C++.
(b) Write a program that copy the content of one file (source.txt) to other file (output.txt)

10 Write a C++ program that merges two file contents into a single file.

Code : 13CS2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Convert the following numbers into equivalent decimal numbers
(i) $(B65F)_{16}$ (ii) $(110101)_2$ (iii) $(165.15)_8$
(b) Explain the following with examples.
(i) BCD (ii) Gray Code

2 (a) Explain in brief, basic theorems of Boolean algebra.
(b) Explain with examples, minterms and maxterms for three binary variables.

SECTION - II

3 Simplify the following functions by using K-maps.
$F(w,x,y,z)=\sum (1,3,7,11,15)$
Which has don't care conditions
$d(w,x,y,z) = \sum (0,2,5)$

4 (a) Design half adder with two binary inputs and two binary outputs.
(b) What is encoder? Write truth table for octal-to-binary encoder. Explain it.

SECTION - III

5 Explain SR, JK, and D flips with graphic symbols and characteristic tables.

6 (a) What is a register? Explain about four bit registers using four D flip flops.
(b) Write about binary ripple counter.

SECTION - IV

7 (a) Discuss about in detail about Random Access memory.
(b) What is ROM? List and explain types of Read Only Memories.

8 Discuss Programmable Logic Arrays(PLA).

SECTION - V

9 Discuss in detail about circuits with latches.

10 (a) Explain problem in asynchronous circuits.
(b) Describe cycles in asynchronous circuits.

Code : 13CE2102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2015

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) Explain Bulk modulus of elasticity and Vapour pressure

(b) Find the kinematic viscosity of an oil having density 985kg/m^3 when at a certain point in the oil, the shear stress in 0.3N/m^2 and velocity gradient 0.3m/sec.

2. (a) Define the terms Surface tension and Capillarity.

(b) If the pressure of liquid is increase from 4Mpa to 8Mpa its volume is found to decrease by 0.075 percent. What is the bulk modulus of elasticity of the liquid?

SECTION-II

3 (a) Define the terms Atmospheric pressure, Gauge pressure, Vaccum pressure and Absolute pressure

(b) The inlet to pump is 12m above the bottom of sump from which it draws water through a suction pipe. If the pressure at the pump inlet is not to fall below 30kPa absolute, determine the minimum depth of water in the tank. Take atmospheric pressure as 100kPa.

4 (a) Explain Hydrostatic law and Pascal's law.

(b) A wooden block 4.2mX1.2mX0.5m is floating in water. Its specific gravity is 0.76. Find the volume of concrete of specific gravity 2.25, that may be placed on the block which will immerse

(i) The block completely in water
(ii) The block and concrete completely in water.

SECTION-III

5 (a) Define the terms (i) Flow net (ii) Vorticity

(b) The velocity vector in a fluid flow is given by V=$2x^3$ i -5x2y j +4t k, find the velocity and acceleration of a fluid particle at (1, 2, 3) at time, t =1.

6 (a) Explain the terms Stream lines streak lines.

(b) A stream function is given by 2x-5y, calculate the velocity components and also magnitude and direction of the resultant velocity at any point.

[P.T.O.]

SECTION-IV

7 (a) Explain Moment of momentum equation.

(b) Water is flowing through a pipe having diameters 35cm and 25cm at bottom and upper end respectively. The intensity of pressure at the bottom end is 3.5 bar and the pressure at the upper end is 1 bar. Determine the difference in datum head if the rate of flow through pipe is 60 lit/sec.

8 (a) Derive the expression for the Euler's equation of motion along a streamline.

(b) A jet of water of diameter 10cm moving with a velocity of 35m/sec strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.

SECTION-V

9 (a) Describe the working of Pitot tube and mention its applications.

(b) Write the applications of Orifices and Mouth pieces in Civil Engineering and also sketch them.

10 (a) Explain Bucking hams π theorem in detail and write its importance.

(b) What are the Undistorted and distorted models?