R-17 **Code : 17MC2102**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

TECHNICAL ENGLISH & SOFT SKILLS

(Common to CE & ME)

Time : 3 hours Max Marks: 60

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

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SECTION - I

1 What factors can make your presentation as an effective presentation?

2 Explain about the three Ps (Plan, Prepare and Practice) required for an effective presentation

SECTION - II

3 Which qualities are assessed in a Group Discussion when conducted for a job interview?

4 How do you emerge as leader during a Group Discussion?

SECTION - III

5 What is the importance of a resume' and explain the important elements of resume'?

6 Prepare your resume' along with the cover letter for applying for the post of Project Manager in Cap Gemini, Visakhapatnam Branch.

SECTION - IV

7 Explain in detail about Eye contact, Gestures, Movement, and Posture in a technical presentation.

8 Write in detail about Kinesics and Haptics and their importance in non-verbal communication.

SECTION - V

9 What are the techniques required to develop problem solving skills? How do you develop the positive attitude when you are facing frequent problems or failures?

10 How can soft skills be helpful in getting a job?

SECTION - VI

11 In your experience, what is the importance of time management? What are the techniques you follow to manage time effectively?

12 What is the importance of dining etiquette to professionals?

R-17 **Code : 17MC2101**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ENVIRONMENTAL STUDIES

(Common for EEE, ECE ,CSE & IT)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 (a) What are the components of environmental education? Explain in Brief.

(b) Name the various natural resources and briefly summarize on land resources.

2 (a) Environmental Science is multidisciplinary in nature. Explain.

(b) Explain the scope and importance of Environmental Science.

SECTION - II

3 (a) List the adverse effects of mining on environment. Discuss the measures to minimize these effects.

(b) Explain the effects of construction of Dams on forests and tribal people.

4 (a) What are the similarities and differences between food webs energy pyramids.

(b) Justify the urgent need of renewable energy sources in the current environmental scenario.

SECTION - III

5 (a) Illustrate various conservation practices of bio diversity.

(b) Write a note on Forest ecosystem.

6 (a) What do by over you mean by over utilization of surface and ground water?

(b) Outline the structure and functions of grassland ecosystem.

SECTION - IV

7 (a) Discuss about effects and control measures of Noise pollution.

(b) How Biodegradable and Non-biodegradable solid waste can be managed? Explain.

8 (a) List the control measures of air pollution. Explain any one method in detail.

(b) Briefly discuss the causes and effects of Marine pollution.

SECTION - V

9 (a) Describe the role of sanitation on public health.

(b) Explain how do you balance the Industrialization and Environmental protection .

10 (a) Discuss the effects of urbanization.

(b) Describe the effects of Transportation on the quality of Environment.

SECTION - VI

11 (a) Discuss briefly about Air Act.

(b) What was the green revolution and why did it start?

12 (a) Discuss briefly about Environment Protection Act.

(b) Write a note on Fluorosis problem in Andhra Pradesh .

R-17 Code : 17CE2105

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION,FEBRUARY 2023

II B.Tech. I Semester

ENGINEERING GEOLOGY

(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

1. (a) Explain the significance of geology in civil engineering.
   (b) Describe the branches of geology and scope of geological studies in GSI.

2. (a) Describe briefly about physical and chemical properties of minerals.
   (b) Explain the megascopic identification of minerals.

SECTION - II

3. (a) Explain about rock types and their forming processes.
   (b) Describe the structures and textures of igneous rocks.

4. (a) Give an account of classification of sedimentary rocks and their characteristics.
   (b) Explain the engineering consideration of conglomerates, sand stones and shale.

SECTION - III

5. (a) Define the erosion, accretion and their causes.
   (b) Explain the different stages of rivers and its landforms.

6. (a) Describe the different geological agents.
   (b) Explain different sand dunes with neat sketches.

SECTION - IV

7. (a) Explain briefly about the concept of rock deformations and tectonics.
   (b) Describe the parts of folded rocks with neat sketches.

8. (a) Describe the classification faults with neat sketches.
   (b) Describe the consequences of failures as land sliding, earthquake and subsidence.

SECTION - V

9. (a) Explain the concept of sliding bocks and different controlling factors.
   (b) Describe the types of landslides and their preventions.

10. (a) Give an account of factors controlling water bearing capacity of rocks.
    (b) Explain the causes and effects of earthquakes.

SECTION - VI

11. (a) Describe briefly about Dams and its different types with neat sketches.
    (b) Explain the rock quality designation.

12. (a) Explain the favorable and unfavorable conditions in different types of rocks in presence of various structured features.
    (b) Give an account of suitable site for reservoirs.

R-17 Code : 17EE2103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ELECTRICAL MEASUREMENTS
(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 (a) Explain various methods of providing damping torque in an indicating instruments.

(b) Differentiate between Spring control and Gravity control methods used to produce the controlling torque.

2 (a) Differentiate between indicating, recording and integrating instruments.

(b) What is the difference between ammeter and voltmeter?

SECTION - II

3 (a) What is PMMC instrument? Explain with a neat sketch working of such an instrument when used as an ammeter.

(b) Explain the importance of voltmeter multipliers.

4 (a) Explain the working of a Moving Iron attraction type instrument .

(b) List the advantages & disadvantages of MI type instruments.

SECTION - III

5 (a) Explain the theory and operation of single phase energy meter. Derive the expression for the total number of revolutions.

(b) Discuss the various types of errors and their methods of compensation in the dynamometer type wattmeter.

6 (a) Explain Three phase energy meter with a neat sketch.

(b) Explain the different sources of errors in Induction type Energy meter and how they can be adjusted/compensated.

SECTION - IV

7 (a) Derive the equivalent circuit and phasor diagram of a current transformer. Derive the expressions for its ratio and phase angle errors.

(b) Explain the construction and working of a 3-phase rotating field power factor meter. Prove that the deflection of moving system is equal to the phase angle of the system.

8 (a) Explain the working of a mechanical resonance type frequency meter.

(b) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase angle error.

SECTION - V

9 (a) Describe the construction and working of a polar type potentiometer. Explain the method for standardizing it.

(b) Explain the principle of a rectangular type coordinate A.C. potentiometer. Draw a diagram of scheme of connections and describe how the potentiometer is standardized.

10 (a) Explain the operating principle and constructional details of AC polar type potentiometer, how it is standardized.

(b) A control potentiometer is rated as : resistance = 150Ω ,power rating = 1W.Derate the potentiometer by 10mW/0c, thermal resistance =300C/W.
Can the potentiometer be used with a 10 V supply at 800C ambient temperature.

SECTION - VI

11 (a) Draw circuit diagrams and phasor diagrams of Hay's bridges under balanced conditions. Also derive equations under balanced conditions.

(b) The four arms of a Wheatstone bridge are as follows: AB=100 Ω; BC=10 Ω; CD=4 Ω and DA=50 Ω. The galvanometer has a resistance of 20 Ω and is connected across BD. A source of 10V d.c. is connected across AC. Find the current through galvanometer. What should be the resistance in the arm DA for no current through the galvanometer.

12 (a) Describe working of a low voltage Schering bridge. Derive the equation for capacitance and dissipation factor. Draw the phasor diagram of the bridge under Conditions of balance.

(b) Explain the working of Kelvin's Double Bridge and derive the equation for its balance condition.

R-17 **Code : 17EE2104**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ELECTRICAL TECHNOLOGY

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 Draw a neat sketch of a dc generator. State the functions of each part.

2 (a) Explain the Magnetizing characteristics of a D.C. Shunt Generator.

(b) An 8-pole DC shunt generator has 778 wave connected armature conductors running at 600 rpm, supplies a load of 12.5 Ω resistance at a terminal voltage of 250 V. The armature resistance is 0.24 Ω and the field resistance is 250 Ω. Find the armature current, the induced emf and the flux per pole.

SECTION - II

3 (a) Explain the principle of operation of DC Motor.

(b) What is the significance of back e.m.f ?

4 (a) Explain Armature voltage control method of DC Shunt motor.

(b) Find the efficiency at Full load for a 600 V shunt generator using the following data: Full load output power 1200 kW, armature resistance = 0.005 Ω, shunt field resistance = 60 Ω, brush contact drop = 1 V per brush, mechanical and iron losses at rated load = 20 kW, stray load loss = 1.2% of output

SECTION - III

5 (a) Explain the constructional details of single phase transformer.

(b) A 500 KVA, 11000 V/400 V, 50 Hz, single phase transformer has 100 turns on the secondary winding. Calculate: (i) The approximate number of turns in the primary winding. (ii) The approximate value of the primary and secondary currents. (iii) The maximum value of flux in the core

6 (a) Derive the condition for maximum efficiency of a single phase transformer.

(b) Open circuit and short circuit tests on a 2 KVA, 230/115 V, 50 Hz, single phase transformer gave the following results:
O.C test: 115 V, 1 A, 30 W
S.C test: 40 V, 17.6 A, 100 W
Determine the efficiency at full load 0.8 power factor lagging and leading.

SECTION - IV

7 (a) Explain the principle of operation of 3-phase induction motor.

(b) A 3-phase, 6-pole, 50 Hz induction motor has a slip of 1% at no load and 3% at full load. Find: (i) No load speed. (ii) Full load speed. (iii) Frequency of rotor current on full load.

8 (a) Explain the torque slip characteristics of 3-phase induction motor.

(b) Derive the expression for torque in an induction motor.

SECTION - V

9 (a) Explain the construction of alternator.

(b) A 4 pole, 3-phase, 50 Hz, star connected alternator has 60 slots with 4 conductors per slot. Coils are short pitched by 3 slots. If the phase spread is 60°, find the line voltage induced for a flux per pole of 0.0943 Wb, distributed sinusoidal in space. All the turns in phase are in series.

10 Explain the voltage regulation of an alternator by using synchronous impedance method.

SECTION - VI

11 (a) Why single phase induction motor is not self starting?

(b) With a neat sketch, discuss about the operation of shaded pole induction motor .

12 (a) Explain the construction and working of Permanent magnet stepper motor.

(b) List out the applications of stepper motors.

R-17 Code : 17SH2106

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

PROBABILITY & STATISTICS
(Common to CSE & IT)

Time: 3 hours Max. Marks: 60

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

1 (a) State and prove addition theorem on probability for two events.

(b) The probabilities of 3 students to solve a problem in statistics are 1/2, 1/3, 1/4 respectively. Find the probability that the problem to be solved.

2 (a) State and prove Baye's theorem

(b) A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B.

SECTION – II

3 A random variable X has the following probability function

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

Determine (i) k (ii) Evaluate $P(x<4)$, $P(x\geq 5)$, $P(3<x\leq 6)$
(iii) what will be the minimum value of k so that $P(x \leq 2) > 0.3$

4 Suppose a continuous random variable X has the probability density function $f(x)=k(1-x^2)$ for $0<x<1$, and $f(x)=0$ otherwise. Find a) k b) Mean c) variance

SECTION – III

5 (a) Find the mean and variance of Binomial distribution.

(b) If X is a Poisson variate such that $3p(x=4)=\frac{1}{2}p(x=2)+p(x=0)$

Then find (i) the mean of x (ii) $p(x<2)$

6 In Normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.

SECTION – IV

7 A population consists of 5 numbers 2, 3,6, 8 and 11. consider all possible samples of size 2 which can be drawn with replacement from this population, Find
(a) The Mean of the population
(b) The Standard Deviation of the Population
(c) Mean of the sampling distribution of Means
(d) The Standard Deviation of the Sampling Distribution of Means

8 (a) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence.

(b) A sample of size 300 was taken whose variance is 225 and mean 54. Construct 95% confidence interval for the mean.

SECTION – V

9 A die is tossed 960 times and it falls with 5 upwards 184 times. Is the die unbiased at a level of significance of 0.01?

10 The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches.

SECTION – VI

11 In 16 one hour test runs, the gasoline consumption of an engine averaged 16.4 gallons with a S.D of 2.1 gallons. Test the claim that the average gasoline consumption of this engine is 12.0 gallons per hour.

12 Given the following contingency table for hair colour and eye colour. Find the value of chi-square. Is there good association between the two?

	Hair colour		
Eye colour	15	5	20
	20	10	20
	25	15	20

R-17 **Code : 17EE2105**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

ELECTRICAL MACHINES & CONTROL SYSTEMS
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) Explain the construction details of DC generator.

(b) Briefly explain the types of excitations of DC generator.

2 (a) Explain the characteristics of DC generator.

(b) What are the applications of DC generator.

SECTION - II

3 (a) Explain the principle of operation of DC motor.

(b) Explain the characteristics of DC motor.

4 (a) Explain the speed control of DC shunt motor, using i) Field control method ii) Armature control method.

(b) List the different types of losses in a DC machines and explain.

SECTION - III

5 (a) Explain the principle of operation of single phase transformers.

(b) Derive the EMF equation of a single phase transformer.

6 (a) Write short notes on
(i) Regulation of a transformer
(ii) Losses and Efficiency of a transformer.

(b) Explain OC and SC tests performed on a transformer and Explain its importance.

SECTION - IV

7 (a) What are the advantages and disadvantages of a microprocessor.

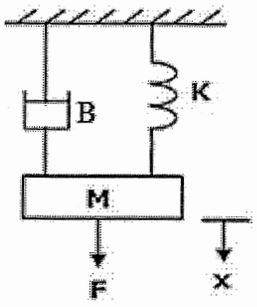
(b) Explain the pin configuration of a microprocessor.

8 With a complete block diagram explain the architecture of a microprocessor.

SECTION - V

9 (a) Briefly explain the transfer function process of a system.

(b) With the help of analogy between electrical and mechanical systems write the electrical equivalent circuit of the system shown.



10 Explain the three different types of controllers and their benefits.

SECTION - VI

11 (a) Explain I/O modules and Power supplies.

(b) Briefly explain Programming device and system buses.

12 (a) Explain different PLC's available in the market and explains its's benefits.

(b) Explain counter and timer in detail.

R-17 **Code : 17CS2105**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

SOFTWARE ENGINEERING
(Common to CSE & IT)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 (a) Write and explain Software Evolution Laws.

(b) Explain Process framework activities.

2 (a) Explain the maturity levels of CMMI.

(b) Explain the different sequential phases of the classical waterfall model.

SECTION - II

3 (a) Explain Software Process Framework activities.

(b) Explain various steps of Requirement Analysis.

4 (a) Explain various Umbrella activities that take place during a software development process.

(b) Explain requirements elicitation methods.

SECTION - III

5 (a) Explain various elements of class-based modeling.

(b) How many levels of phases of design? Explain each.

6 (a) How the data objects are transformed in Flow oriented modeling? Explain.

(b) Write and explain the objectives of Software Design.

SECTION - IV

7 (a) List out the architectural styles and give example for each category.

(b) How do we map data flow into software architecture? Explain.

8 (a) Explain various architectural patterns .

(b) Write the basic design principles applicable to component level design.

SECTION - V

9 (a) Explain the debugging approaches.

(b) Explain various types of system testing.

10 (a) Write the differences between black-box testing and white-box testing.

(b) Explain Basis path testing.

SECTION - VI

11 (a) Write the differences between Reactive and Proactive Risk strategies.

(b) Explain major Software quality assurance activates.

12 (a) Explain different types of risks in software project development.

(b) Explain the types of Software Reviews.

R-17 Code : 17EC2104

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ELECTROMAGNETIC FIELDS & WAVES

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 60

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

All Questions carry equal marks

* * *

SECTION - I

1 (a) Write shot notes on three co-ordinates.

(b) Given the two points A(x=2,y=3,z=-1) & B(r=4,θ=25°,Φ=120°). Find the spherical coordinates of A and cartesian coordinates of B.

2 (a) State Stroke's theorem & Write mathematical expression for Stroke's theorem.

(b) Determine the gradient of the scalar filed $F = 5r^2+r\ \text{Sin}\theta$. Show that vector $H = 3y^4z^2a_x+4x^3z^2a_y+3x^2y^2a_z$ is solenoidal.

SECTION - II

3 State and prove Gauss law. Write applications of Gauss law. Describe any one application of Gauss law.

4 (a) Drive an expression for energy stored and energy density in electrostatic field.

(b) Given a filed $E =(-6y/x^2)\ a_x +(6/x)\ a_y +5\ a_z$ v/m. Find the potential difference V_{AB} given A(-7,1,2) & B (4,1,2).

SECTION - III

5 (a) Derive an expression for capacitance of co-axial cable.

(b) State properties of conductor and dielectric materials.

6 State and derive continuity equation in integral and differential form.

SECTION - IV

7 (a) State Ampere's circuital law and give its applications.

(b) State and explain Biot-savart's law.

8 Find the magnetic field intensity due to co-axial cable.

SECTION - V

9 Derive the expressions for boundary conditions in magnetic fields.

10 Derive the expression for self inductance of solenoid and toroid.

SECTION - VI

11 (a) Write short notes on faradays law of electromagnetic induction.

(b) Derive the expression for displacement current density and give its significance.

12 State Maxwell's equations in point form and give the word statements.

R-17 Code : 17ME2104

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

BASIC THERMODYNAMICS
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 (a) What do you understand by thermodynamic equilibrium? Explain.

(b) Describe constant volume gas thermometer with a neat sketch.

2 (a) Differentiate between Closed, open, and isolated system.

(b) It is desired to melt aluminium at 15°C with solid state specific heat 0.9 kJ/kg, latent heat 390 kJ/kg, atomic weight 27, density in molten state 2400 kg/m^3 and final temperature is 710°C. The melting point of aluminium is 660°C. The specific heat of aluminium in liquid state is 29.93/atomic weight. The furnace rating is 210×10^3 kW and furnace efficiency is 75%. If the diameter of the furnace is 1.1m and length is 2.2 m. What is the mass of the aluminium can be held in the furnace. Find out how much metal can be melted per hour.

SECTION - II

3 (a) Derive steady flow energy equation.

(b) A stationary mass of gas is compressed without friction from an initial state of 0.5 m^3 and 0.105 MPa to a final state of 0.15 m^3 and 0.105 MPa. There is a transfer of 37.6 kJ from the gas during the process. How much does the internal energy of gas change?

4 (a) State First Law of Thermodynamics for a process and show that energy is a property of the system.

(b) In a steady flow apparatus, 140 kJ of work is done by each kg of fluid. The specific volume of the fluid, pressure, and velocity at the inlet are 0.36 m^3/kg, 600 kPa, and 15 m/s respectively. The inlet is 30 m above the floor, and the discharge pipe is at floor level. The discharge conditions are 0.65 m^3/kg, 100 kPa, and 260 m/s. The total heat loss between the inlet and discharge is 10 kJ/kg of fluid. In flowing through this apparatus, does the specific internal energy increase or decrease, and by how much.

SECTION - III

5 (a) Explain Dalton's law of partial pressures and Avogadro's Law.

(b) A mass of 8 kg gas expands within a flexible container so that the p–v relationship is of the from $pv^{1.2}$ = constant. The initial pressure is 1000 kPa and the initial volume is 1 m^3. The final pressure is 5 kPa. If specific internal energy of the gas decreases by 40 kJ/kg, find the heat transfer in magnitude and direction.

6 (a) What is ideal gas equation and derive it mathematically?

(b) A piston-cylinder device operates 1.5 kg of fluid at 18 atm pressure. The initial volume is 0.05 m^3. The fluid is allowed to expand reversibly following process $pV^{1.45}$ = constant so that the volume becomes double. The fluid is then cooled at constant pressure until the piston comes back to the original position. Keeping the piston unaltered, heat is added reversibly to restore it to the initial pressure. Determine the work done in the cycle.

SECTION - IV

7 (a) Explain Carnot cycle. Write its specialties.

(b) A heat engine receives heat from a source at 1200 K at a rate of 30000 kJ/min and rejects the waste heat to a medium at 300 K. The power output of the heat engine is 180 kW. Determine the reversible power and the irreversibility rate for this process.

8 (a) Differentiate heat engine, heat pump and refrigerator.

(b) A cyclic heat engine operates between a source temperature of 850 °C and a sink temperature of 40 °C. What is the least rate of heat rejection per kW net output of the engine?

SECTION - V

9 (a) Explain the principle of increase of entropy.

(b) 5 kg of air is compressed in a reversible steady flow polytropic process from 100 kpa and 40 °C to 1000 kpa and during this process the law followed by the gas is $pV^{1.25} = C$. Determine the change in entropy if $C_v = 0.717$ kJ/kgK, $R = 0.287$ kJ/kgK.

10 (a) What is Helmholtz function and Gibbs function? Explain.

(b) One kg of ice at 0°C is exposed to the atmosphere which is at 25°C. The ice melts and comes in the thermal equilibrium with the atmospheres. Determine the entropy change when the ice melts from 0°C to 25°C.

SECTION - VI

11 (a) Compare Otto, Diesel and Dual cycles based on compression ratio, same maximum temperature and same maximum pressure.

(b) In an Otto cycle the inlet parameters are 1 bar and 333 K, while it develops a maximum pressure of 20 bar. Assuming bore as 275 mm, Stroke as 350 mm and clearance volume as 0.0025 m^3, determine (i) air standard efficiency and (ii) mean effective pressure of the cycle.

12 (a) Develop an expression for the efficiency of Otto cycle.

(b) In an ideal Brayton cycle, air from the atmosphere at 1 atm, 27 °C is compressed to 6 atm and the maximum cycle temperature is limited to 827 °C by using a large air-fuel ratio if the heat supply is 0.1GW. Find (a) thermal efficiency of the cycle (b) work ratio (c) power output.

R-17 **Code : 17EE2102**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

GENERATION OF ELECTRIC POWER
(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 60

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

1 (a) What are the factors of selection of the site for thermal power stations?

(b) Explain briefly about feed water and steam circuit thermal power station.

2 (a) What are the various types of boilers used in Thermal power station? Explain any one.

(b) Outline the growth of thermal power in India .

SECTION - II

3 (a) Explain the function of any following components of Hydro electric Power Plant.
1) Dam 2) Trash Rack 3) Forebay 4) Surge Tank 5)Penstock

(b) Discuss briefly bout the working principle of a hydro power plant.

4 (a) Describe briefly about Kaplan turbine used for hydro power generation.

(b) Describe briefly about the growth of hydro power in India.

SECTION - III

5 (a) Explain the functions of the following in nuclear reactors.
(i) Control rods (ii)Moderator
Also specify the material used for the above.

(b) Explain briefly about chain reaction.

6 (a) Discuss briefly about waste disposal in a nuclear power plant.

(b) Explain the operation of PWR and draw its diagram.

SECTION - IV

7 (a) Explain concentrating solar energy collector with a neat diagram.

(b) Explain role of solar energy in present scenario.

8 (a) Explain the mechanism of photo conduction in a photo-voltaic cell.

(b) What do you mean by solar energy storage? Explain why and when it is necessary?

SECTION - V

9 (a) List the various types of Wind Energy Conversion System (WECS). Explain Hybrid WECS System

(b) Explain the working of a windmill.

10 (a) With a neat diagram explain the working of horizontal axis wind mills.

(b) Explain with a real diagram a wind electric generating power plant.

SECTION - VI

11 (a) Explain briefly about diversity factor and demand factor.

(b) A generating station supplies the following loads :15000KW ,12000KW,8500KW, 6000KW and 450KW.The station has a maximum demand of 22000KW.Determine the following:
i) Demand factor ii).Diversity factor and iii) No. of units consumed annually if the load factor is 48%.

12 (a) Explain briefly about three part tariff? Give its advantages.

(b) A supply is offered on the basis of fixed charges of Rs1400 per annum plus Rs1.5/unit or alternatively at the rate Rs3.0/ unit for the first 400 units per annum and 2.5 rupees for all the additional units .Find the number of units consumed per annum for which the cost under both the tariffs become the same.

R-17 **Code : 17CE2104**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

SURVEYING - I
(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) With suitable diagram explain principles of surveying.

(b) Define (i) Map (ii) Plan (iii) Scale.

2 (a) Explain the following terms (i) Tie line (ii) Check line (iii) Base line.

(b) Write breif notes on obstacle to ranging but not chaining.

SECTION - II

3 (a) Define (i) True bearing (ii) True Meridian (iii) Magnetic meridian.

(b) What are the sources of errors in compass survey and what precautions will you take to eliminate them?

4 (a) Define (i) Fore bearing (ii) Back bearing (iii) Magnetic declination.

(b) What is local attraction? How is it detected and eliminated?

SECTION - III

5 Describe the necessary accessories used in plane table survey.

6 (a) Write short notes on various temporary adjustments involved in plane table survey.

(b) Explain the following plane table methods with suitable diagram..
(i) Traversing (ii) Intersection method

SECTION - IV

7 (a) Define (i) Datum (ii) Vertical line (iii) Horizontal line.

(b) Discuss about the curvature in leveling with neat diagram.

8 (a) Write short notes on following terms. (i) Back sight (ii) Fore sight (iii) Turning point

(b) List out various instrumental errors in leveling and explain how to fix those errors.

SECTION - V

9 Explain various characteristic of contours with suitable diagram.

10 What is grade contour? How you will you locate it?
(i) On the ground (ii) On the map

SECTION - VI

11 A series of offsets were taken from a chain line to a curved line to a curved boundary line at intervals of 15 metres in the following order
0 , 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 (iii) Simpson's rule

12 (a) What is Prismoid? Derive its formula.

(b) Derive an expression for trapezoidal formula for volume.

R-17 **Code :17EE2101**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

ELECTRO MECHANICAL ENERGY CONVERSION - I

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) What is singly excited electromagnetic system? Explain briefly with one example.

(b) In a rectangular electromagnetic relay excited from a voltage source, the current and flux linkages are related as $I = \lambda (\lambda + 2 (1 - X) 2)$; $x<1$. Find force on the armature as a function of λ

2 (a) Explain the principle of energy conversion of electromechanical system.

(b) Derive an expression for the energy stored in a magnetic field.

SECTION - II

3 (a) Explain the constructional features of DC generators.

(b) An 8-pole generator has 500 armature conductors and has a useful flux per pole of 0.065 Wb. What will be the emf generated if it is lap connected and runs at 1000 rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave wound?

4 (a) How do you compensate the armature reaction in DC machines?

(b) A 4-pole dc generator has 1200 armature conductors and generates 250 V on open circuit when running at a speed of 500 rpm. The diameter of the pole shoe circle is 0.35 m and the ratio of pole arc to pole pitch is 0.7 while the length of the shoes is 0.2 m. Find the mean flux density in the air gap. Assume lap connected armature winding

SECTION - III

5 (a) What is commutation? Explain how to improve commutation in DC machines.

(b) With neat and necessary diagrams explain the internal and external characteristics of DC shunt generators.

6 (a) With neat and necessary diagrams explain the load characteristics of DC compound generators.

(b) A long shunt compound generator delivers a load current of 50 A at 500 V, and the resistance of armature, series field and shunt fields are 0.05 Ω, 0.03Ω and 250Ω respectively. Calculate the generated emf and the armature current. Allow 1.0 V per brush for contact drop.

SECTION - IV

7 (a) Explain clearly how the direction of rotation of a DC motor can be reversed.

(b) A 220V shunt motor takes 60A when running at 800rpm. It has an armature resistance of 0.1. Find the speed and armature current if the magnetic flux is weakened by 20%, contact drop per brush =1V. Total torque developed remains constant.

8 (a) Explain the characteristics of DC motors. Also give their applications.

(b) A 200V shunt motor with a constant main field drives a load, the torque of which varies at square of the speed, when running at 600 r.p.m., it takes 30A. Find the speed at which it will run and the current it will draw, if a 20Ω resistor is connected in series with armature. Neglect motor losses.

SECTION - V

9 (a) What are the conditions for parallel operation of DC shunt generators? And hence explain how paralleling is done for dc shunt generators.

(b) A shunt dc motor is fed from a 250 V dc bus. The motor is operating at 1200 rpm supplying 30 HP to a coupled mechanical load. From an ammeter reading, the line current to the motor is 102 A. It is known that $R_a = 0.2\ \Omega$ and $R_f = 125\ \Omega$. Determine (*i*) the value of rotational losses and (*ii*) the efficiency.

10 (a) What are the various losses in DC machine and hence derive the condition for maximum efficiency.

(b) Explain the necessity of equalizers in DC machines.

SECTION - VI

11 (a) Explain the Retardation Test in DC machines.

(b) The following readings are obtained when doing a load test on D.C. Shunt Motor using a brake-Drum Spring Balance reading: 10 kg & 35 kg. Diameter of Drum 40 cm. Speed of the Motor: 950 R.P.M. Applied Voltage 200 V Line Current 30 A. Calculate the output power and efficiency?

12 (a) Justify that the Swinburne's Test cannot be conducted on DC series motor with necessary diagrams.

(b) Two DC generators are operating in parallel and take equal shares of a 900-kW bus load at 555 V. Generator A is rated at 500 kW, 600 V, and 3 percent regulation. Generator B is rated at 750 kW, 600 V, and 5 percent regulation. If the bus load drops to 1000 A, determine (a) new bus voltage (b) current supplied by each machine.

R-17 **Code: 17EC2103**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ANALYSIS OF ELECTRONIC CIRCUITS

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 60

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

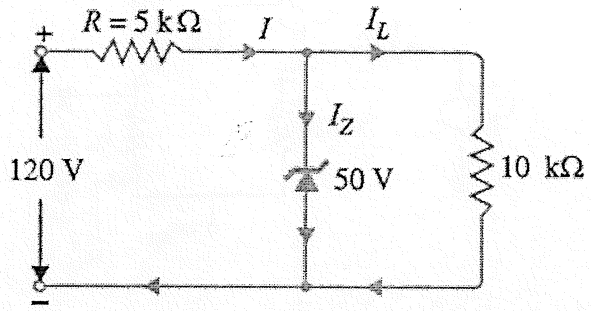
* * *

SECTION - I

1 Derive the expressions for efficiency, ripple factor, transformer utilization factor, peak factor, and form factor.

2 (a) Define regulation. What is the need for a regulator?

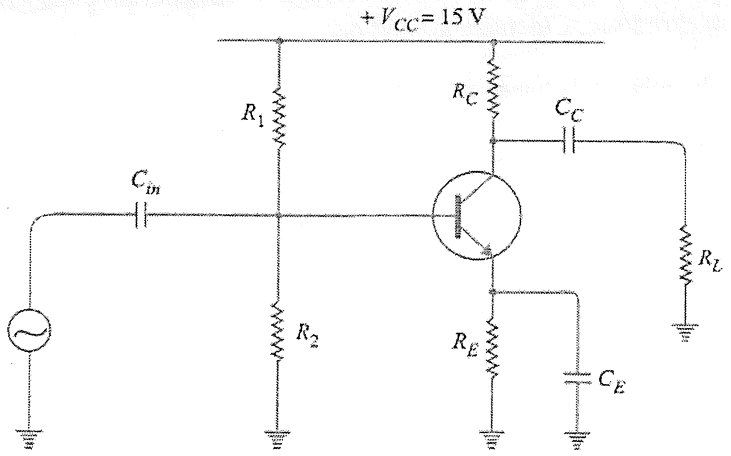
(b) For the circuit shown in Fig.1 (i), find: (i) the output voltage (ii) the voltage drop across series resistance (iii) the current through Zener diode.



SECTION - II

3 (a) Define operating point. List out factors effecting operating point. Explain the methods to maintain the operating point constant.

(b) For the transistor amplifier shown in below figure, R1 = 10 kΩ, R2= 5 kΩ, RC = 1 kΩ, RE = 2 kΩ and RL= 1 kΩ.
(i) Draw d.c. load line (ii) Determine the operating point (iii) Draw a.c. load line.
Assume VBE = 0.7 V.



4 What is meant by thermal runaway? Derive the condition for avoiding thermal runaway.

SECTION - III

5 (a) Derive the expressions for voltage gain and output impedance of a common drain FET amplifier.

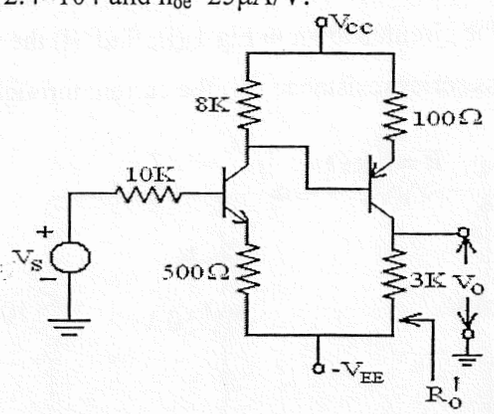
(b) Compare BJT and FET amplifiers.

6 (a) A JFET has a drain current of 5 mA. If I_{DSS} = 10 mA and $V_{GS\,(off)}$ = – 6 V, find the value of (i) V_{GS} and (ii) V_P.

(b) A JFET has a value of gmo = 4000 μS. Determine the value of gm at VGS = – 3V. Given that VGS (off) = – 8V.

SECTION - IV

7 For the circuit shown below, compute A_I , A_V , R_i and Ro transistor h-parameters are h_{ie}=1.1K, h_{fe}=50, h_{re}=2.4×104 and h_{oe}=25μA/V.



8 (a) Explain Darlington pair amplifier and Bootstrap Emitter Follower.

(b) A single stage CE amplifier has lower cutoff frequency of 10 Hz and upper cut off frequency of 245 KHz then find the bandwidth of 5 stage cascaded amplifier.

SECTION - V

9 (a) Draw the hybrid π common emitter transistor model and derive the expressions for g_m, $r_{b'e}$ and $C_{b'e}$

(b) At I_C= 1 mA and V_{CE}= 10 V, a certain transistor have C_c=3pF, h_{fe}= 200 and ω_T=500M rad/sec. Calculate g_m and $r_{b'e}$.

10 (a) Derive the relation between f_T and f_B.

(b) Explain high frequency model of FET.

SECTION - VI

11 (a) Derive the expressions for gain, input and output impedances of a voltage series feedback amplifier.

(b) The voltage gain of an amplifier without feedback is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit. Given that feedback fraction is 0.01.

12 Derive the expression for frequency of oscillations for Wien bridge oscillator.

R-17 **Code : 17CS2104**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

BASIC COMPUTER ORGANIZATION
(Common for CSE & IT)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) Find $(3250 - 72532)_{10}$ using 10's complement.

(b) Given that $(292)_{10} = (1204)_b$ determine `b'.

2 (a) Find 9's complement $(25.639)_{10}$.

(b) Obtain the complement of the following Boolean expressions.

i) AB'C+AB'D+A'B' ii) A'B'C+ABC'+A'B'C'D

SECTION - II

3. Simplify the Boolean function using K-map

$F = \sum(0, 1, 3, 4, 5, 6, 7, 8, 9) + d(10, 11, 12, 13, 14, 15)$

4. Given the following truth table:

Input			Output	
x	y	z	F1	F2
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

i. Express F1 and F2 in product of maxterms.

ii. Obtain the simplified functions in sum of products.

iii. Obtain the simplified functions in product of sums.

SECTION - III

5 (a) With a neat diagram, Explain master-slave J-K flip flop.

(b) Design and draw 3 bit up-down Synchronous Counter.

6. What are different types of Shift registers? Explain one of them in detail.

SECTION - IV

7 (a) Briefly explain the different instruction formats with suitable examples.

(b) What are addressing modes? Explain the various addressing modes with examples.

8 (a) Discuss about Memory Reference Instructions.

(b) Explain the Differences between CISC and RISC.

SECTION - V

9 (a) Explain Set Associative mapping for organizing cache memory.

(b) Distinguish RAM and ROM.

10 (a) Explain the memory hierarchy in computers.

(b) With neat sketch explain about Design of Control Unit.

SECTION - VI

11. Demonstrate the mechanism of DMA with neat sketch.

12 (a) Describe Interconnection Structures with neat diagram.

(b) Describe about Pipeline and vector processing.

R-17 Code: 17CS2103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

OPERATING SYSTEMS
(Common to CSE & IT)

Time: 3 hours Max. Marks: 60

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

SECTION - I

1 (a) What are the functionalities of Operating Systems? Explain in detail.

(b) Explain how Operating system services are provided by system calls.

2 (a) What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices?

(b) Discuss various challenges and issues that are to be considered while designing an operating system.

SECTION - II

3 (a) Define a Process. Explain Process states and Process schedulers.

(b) Explain FIFO and Round Robbin CPU scheduling algorithm. Why do we need?

4 (a) What is synchronization? What are the different synchronization mechanisms? Explain in detail.

(b) Distinguish between pre-emptive and non-pre-emptive scheduling with examples.

SECTION - III

5 (a) Describe Semaphores in detail.

(b) Explain the Banker's algorithm for deadlock avoidance.

6 (a) Define a Critical Section problem. Give the conditions that a solution to the critical section problem must satisfy.

(b) What are the different methods of handling deadlock?

SECTION - IV

7 (a) Discuss in detail about contiguous memory allocation.

(b) Explain paging concept with neat diagram.

8 (a) Distinguish between paging and segmentation.

(b) Explain the use of a Translation Look aside Buffer with neat diagram.

SECTION - V

9 (a) Explain about single-level, two-level and Tree-Structured directories.

(b) Describe issues involved in file allocation.

10 (a) Describe the file system architecture with diagram.

(b) Discuss in detail about file protection mechanisms.

SECTION - VI

11 Explain the different Disk scheduling algorithms with their comparisons.

12 (a) Explain the features and functionality of RAID in detail.

(b) What are the various schemes for implementation of access matrix?

R-17 **Code : 17ME2102**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

STRENGTH OF MATERIALS

(Mechanical Engineering)

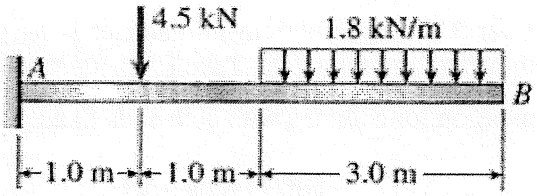
Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) A cantilever beam is loaded as shown in the figure. Plot the shear force and bending moment diagrams. Also, find the reactions at the fixed support. What is the bending moment at a distance of 0.5 m from the fixed support?



(b) Distinguish between the roller support and the hinged support.

2 (a) A simply supported beam of length L is applied by a moment M at the midspan. Draw the shear force and bending moment diagram.

(b) A horizontal beam, with equal overhangs 'a' on both sides, is simply supported over two supports at a distance 'L'. The beam carries a uniformly distributed load. What should be the ratio between 'a' and 'L' so that magnitude of the maximum moment is minimum?

SECTION - II

3 (a) Write the equation describing the shear stress distribution over the cross-section of a beam and explain the terms involved in it.

(b) A 120 mm wide and 10 mm thick steel strip is bent into an 8 m radius circular arc. Determine the stress-induced if Young's modulus of the strip is 200 GPa.

4 The tension flange of a cast iron I section beam is 240 mm wide and 50 mm deep, the compression flange is 100 mm wide and 20 mm deep whereas the web is 300 mm deep and 30 mm thick. Find the load per unit run which can be carried over a 4 m span of a simply supported beam if the maximum permissible stresses are 90 MPa in compression and 24 MPa in tension.

SECTION - III

5 (a) What is the importance of the deflection of beams? What causes a beam to deflect?

(b) Derive the deflection equation of the beam subjected to uniformly distributed load over the entire span of a simple beam.

6 (a) Illustrate Moment Area Method.

(b) Derive the deflection equation of the beam subjected to triangular load with zero at each support and full at the midspan of a simple beam.

SECTION - IV

7 (a) The ratio of diameters of two shafts joined in series is 2. If two shafts have the same material and the same length, what would be the ratio of their angle of twist?

(b) How is the shaft designed for maximum twisting?

8 (a) Derive a formula for the hoop stress in a thin spherical shell subjected to internal pressure.

(b) A spherical shell of 1 m diameter is subjected to a pressure of 2.4 Mpa. What is the stress induced in the vessel plate, if its thickness is 15 mm?

SECTION - V

9 (a) Define column and strut with examples. Differentiate between column and strut.

(b) A strut 2.5m long is 60mm in diameter. One end of the strut is fixed while its other end is hinged. Find the safe compressive load with FOS=3.5. Take $E=2.1 \times 10^5 N/mm^2$.

10 (a) A solid round bar 3 m long and 5cm in diameter is used as a strut with both ends hinged. Determine the crippling load. Take $E=2 \times 10^5 N/mm^2$.

(b) Derive the expression for columns with both ends fixed.

SECTION - VI

11 (a) Derive the expression for normal and tangential stresses on an oblique plane subjected to biaxial stresses.

(b) Brief out maximum principle stress theory.

12 Draw "Mohr's stress circle" for principal stress of 80 N/mm^2 tensile and 50 N/mm^2 compressive and find the resultant stresses on planes making 22^0 and 64^0 with the major principal plane. Find also the normal and tangential stresses on these planes. And check analytically.

R-17 **Code: 17EC2101**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

SIGNALS & SYSTEMS

(Common to ECE & EEE)

Time: 3 hours Max. Marks: 60

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

* * *

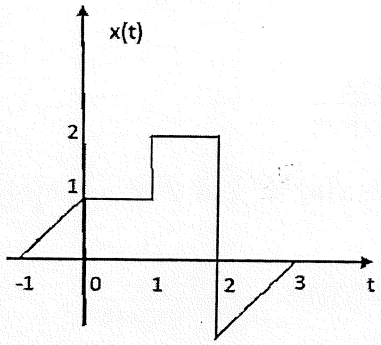
SECTION - I

1 (a) (i) Examine the given signal is periodic or not $x(t) = \cos\sqrt{2}\,\pi t$ and find its fundamental periodic

(ii) Determine the signal is Energy or Power

$x[n] = (-0.5)^n\, u[n]$

(b)



Perform the following operations for the above given signal

i) x(t-2) ii) x(2t+1) iii) x(-t-1) iv) x(-t/2) v) 2x(t+2)

2 (a) Determine whether the given signals are energy or power signal.

(*i*) $x[n] = \left(\frac{1}{4}\right)^n$ and $x[n] = cos\left[\frac{\pi}{3}n\right]$

(b) Discuss the condition of orthogonality and expression for mean square error of signals.

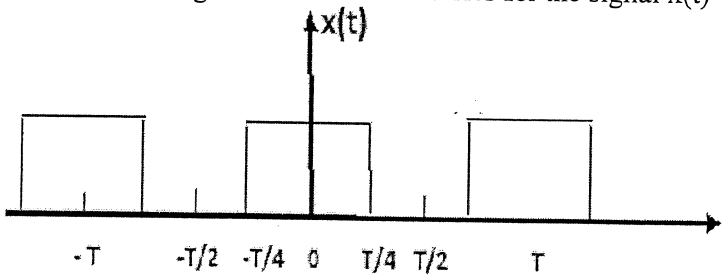
SECTION - II

3 (a) Evaluate the cosine representation Fourier series for the signal $x(t) = {}^{t}/_{2\pi}$, $0 < t < T$

(b)

Find the trigonometric Fourier Series of $x(t) = \frac{2A}{T}t$ for t = 0 to T/2.

4 (a) Determine the trigonometric Fourier series for the signal x(t)



(b) Discuss the development of Fourier Transform from Fourier Series.

SECTION - III

5 (a) (i) State and prove Parsevals Theorem property of Fourier Transform

(ii) Find the Fourier transform of

$$x(t) = \begin{cases} 2, & -1 < t < 1 \\ 1, & -2 < t < -1 \\ 1, & 1 < t < 2 \end{cases}$$

(b) Obtain the inverse Fourier transform of

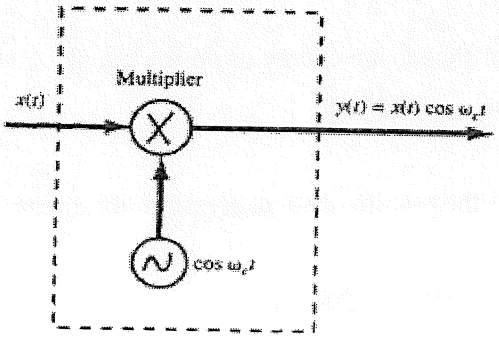
(i) $X(j\Omega)=\frac{j\Omega+3}{(j\Omega+1)^2}$ (ii) $X(j\Omega)=\frac{5j\Omega+12}{(j\Omega)^2+5j\Omega+6}$

6 (a) Find the cross correlation of given signals $x[n] = [2\ 4\ 7\ 8]$ and $h[n] = [3\ 7\ 1]$

(b) Find the inverse Fourier Transform of $X(j\Omega) = \frac{3(j\Omega)+14}{(j\Omega)^2+7(j\Omega)+12}$

SECTION - IV

7 (a)



Find whether the above system is a) memoryless b) Causal c) Linear d) Time Variant and stable.

(b) Evaluate using Convolution the response of a system for the input

$x(t) = 2e^{-5t}\,u(t)$ using Fourier Transform. The impulse response of a LTI system is $h(t) = 2e^{-3t}\,u(t)$.

8 (a) State and prove Frequency Convolution Theorem based on Fourier Transform.

(b) Find the Fourier Transform of a Constant.

SECTION - V

9 (a) Determine the system $y[n] = \frac{\sin x[n]}{n}$ is linear, memory, causal, Time variant and stable

(b) For the given signals x[n] = {1, 2, 1, 2} and h[n] = {3, 2, 1}, perform linear convolution using tabular method and circular convolution using concentric circle method. Also, validate the results are same.

10 (a) Test the following systems for linearity: $a)\ y[n] = x[n^2]$ $b)\ y[n] = x^2[n]$.

(b) Determine the impulse response for the cascade of two LTI systems having impulse responses

$$h_1[n] = \left(\frac{1}{2}\right)^n u[n] \ \text{and}\ h_1[n] = \left(\frac{1}{4}\right)^n u[n]$$

SECTION – VI

11 (a) Prove the DTFT property energy density spectrum of a signal using Parseval's. Theorem.

(b) Compute the DTFT of a given signal and sketch the magnitude and phase spectrum

$$x[n] = \frac{1}{3};\ 0 \le n \le 2$$
$$= 0$$

12 (a) The impulse response of an LTI system is described by $h[n] = [1\ \ 2\ \ 1\ \ -1]$. Find the response of the system for the input given by $x[n] = [1\ \ 2\ \ 3\ \ 1]$.

(b) Summarize the concept of Hilbert Transform and discuss its properties.

R-17

Code: 17CE2102

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

FLUID MECHANICS - I

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

* * *

SECTION - I

1 (a) Explain the phenomenon of capillarity, obtain an expression for capillary rise of liquid with the usual notations.

(b) The surface tension of water in contact with air at 20^0C is 0.0725 N\m. The pressure inside a droplet of water is to be 0.02 N\cm^2 greater than the outside pressure. Calculate the diameter of the droplet of water.

2 (a) Explain the phenomenon of viscosity. Derive the Newton's equation of viscosity.

(b) A differential manometer connected at the two points A and B at the same level in a pipe containing an oil of specific gravity 0.8, shows a difference in mercury level as 100 mm. Determine the difference in pressure between the two points.

SECTION - II

3 (a) Derive an equation for hydrostatic force and centre of pressure for a vertically immersed plane surface.

(b) A ship of weight 32000 kN is floating in sea water. The centre of buoyancy is 1.6 m below its centre of gravity. The moment of inertia of the ship area at the water level is 8320 m^4. If the radius of gyration of the ship is 3.2 m, find its time period of transverse oscillation.

4 (a) A circular plate of 4m diameter is immersed in water with its plane making an angle of 30^0 with water surface. The top edge of the plate touches the water surface. Determine the total pressure and the centre of pressure.

(b) Define the terms Centre of buoyancy and Metacentre. Give the conditions of equilibrium for floating and submerged bodies.

SECTION - III

5 (a) A stream function and velocity potential function for a flow are given by $\psi = 2xy$; $\phi = x^2 - y^2$. Show that the conditions of continuity and irrotational flow are satisfied

(b) State and derive the impulse momentum equation. Also explain momentum correction factor.

6 (a) With examples discuss local, convective, tangential and normal accelerations.

(b) Explain the principle of venturimeter with neat sketch. Derive the expression for the rate of flow through it.

SECTION - IV

7 (a) What are the different laws on which models are designed for dynamic similarity? Explain.

(b) A 7.2 m high and 15 m long spillway discharges 94 m^3/s under a head of 2 m. If a 1: 9 scale model of this spillway is to be constructed, find the model dimensions, head over the model and model discharge.

8 (a) State and explain Rayleigh method of dimensional analysis.

(b) Find the form of the equation for discharge Q through a sharp edged triangular notch assuming Q depends on the central angle α of the notch, head H, gravitational acceleration g, density ρ, viscosity μ and surface tension σ of the fluid.

SECTION - V

9 (a) Explain the different types of flows in open channel.

(b) A trapezoidal channel has a bottom width of 6 m and side slopes of 2 horizontal to 1 vertical. If the depth of flow is 1.2 m at a discharge of 10 m^3/s, compute the specific energy and the critical depth.

10 (a) Find the discharge though a circular pipe of diameter 3 m , if the depth of water in the pipe is 1m and the pipe is laid at the slope of 1 in 1000 . Take C=70.

(b) Derive an expression for the discharge through a channel by Chezy's formula.

SECTION - VI

11 (a) Differentiate between Gradually Varied Flow (G.V.F) and Rapidly Varied Flow (R.V.F).

(b) A sluice gate discharges water into a horizontal rectangular channel with a velocity of 10 m/s and the depth of flow of 1m. Determine the depth of flow after jump and consequent loss in total head.

12 (a) Explain in detail, the characteristics of surface profiles for Gradually Varied Flow.

(b) Derive an expression for loss of energy due to hydraulic jump.

R-17 **Code : 17CS2102**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

JAVA PROGRAMMING
(Common to CSE & IT)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 Discuss Java buzz words.

2 (a) Discuss various iterative or looping control statements in Java.

(b) Write a Java program to find biggest among 3 numbers.

SECTION - II

3 (a) Write a Java program to perform matrix multiplication.

(b) What is a Jagged array? Give an example.

4 (a) Differentiate between String and StringBuffer classes.

(b) Write a Java Program to check whether the given string is Palindrome or not.

SECTION - III

5 (a) What is Multi-level inheritance? Explain with suitable example.

(b) Write a Java Program to demonstrate method overloading.

6 (a) What is a package? How do you create and access package? Give an example.

(b) Write a Java program to implement method overriding.

SECTION - IV

7 (a) How do you implement multiple-inheritance in Java? Write an example program.

(b) Differentiate between **throw** and **throws** clauses.

8 (a) Discuss various methods offers by Thread class.

(b) Write a java program to handle multiple exceptions.

SECTION - V

9 (a) What is demon thread? Explain with an example program.

(b) Discuss the following:

i) setPriority()
ii) sleep()
iii) wait()
iv) notifyAll()

10 (a) Explain about life cycle of an applet.

(b) Write a program to draw oval, rectangle, and line in an applet.

SECTION - VI

11 Write a Java program to handle mouse events.

12 (a) Discuss the steps to connect with database.

(b) Write a java program to validate login page using JDBC.

R-17 **Code : 17ME2101**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech I Semester

FLUID MECHANICS
(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) What is vapor pressure? How can water boil at room temperature? Discuss the significance of vapor pressure in problems related to liquids in motion.

(b) State and explain Newton's law of viscosity and distinguish between Newtonian and non-Newtonian fluid.

2 (a) Find the kinematic viscosity in stokes of a liquid whose specific gravity is 0.87 and viscosity is 0.012 poise.

(b) Caluculate the maximum capillary rise of water to be expected between two vertcal clean glass plates spaced 1.2 mm 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.

SECTION - II

3 (a) A diver is working at a depth of 32m below the surface of sea water. (Sp. Wt.=10000 kN/m^3). Calculate the pressure intensity at this depth. What would be the absolute pressure if barometer reads 760mm of mercury column at the sea level.

(b) Explain the terms centre of buoyancy, metacentre and metacentric height.

4 (a) A cylindrical buoy 2.2m in diameter,2.7m height, weighs 20kN. Examine whether the buoy will or will not float with its axis vertical in sea water of specific gravity 1.03.

(b) The fuel gauge for a gasoline tank in a car reads proportional to the bottom gauge. The tank is 30cm deep and accidentally contains 2cm of water in addition to the gasoline. Estimate the height of air remaining at the top when gauge erroneously reads $1.67kN/m^2$. The specific weight of gasoline= $6.5kN/m^3$ and specific weight of air=$0.0118kN/m^3$.

SECTION - III

5 (a) Differentiate between the Eulerian and Lagarangian method of representing fluid motion.

(b) Which of the following velocity fields pertain to the motion of steady, two-dimensional flow of an incompressible fluid? i) $u= 2x^2-xy$; $v=x^2-4xy+y^2$ ii) $u=-A\ x/y$; $v=A\ \log_e(xy)$ where A is a numerical constant.

6 (a) Differentiate between laminar and turbulent flows. Identify the following as laminar and turbulent flows
i)atmospheric winds ii) flow in a river iii) flow of lubricating oil from an oil can.

(b) Is the motion $u = x^2y$; $v=2yz - xy^2$; $w=x^2 - z^2$ kinematically possible for steady flow of an incompressible fluid?

SECTION - IV

7 (a) A pipe contains an oil of sp.gr.0.92. A differential manometer connected at the two points A and B shows a difference in mercury level as 160mm. Find the difference of pressure head at the two points.

(b) Explain the working of differential manometer with a neat sketch and list its applications.

8 (a) Sketch and describe a pitot-static probe and explain how it is used to measure the fluid flow through a pipeline.

(b) A tube differential manometer connects two pressure pipes A and B. Pipe A contains carbon tetrachloride having a specific gravity 1.6 under a pressure of 1.3bar and pipe B contains oil of sp.gr.0.8 under a pressure of 1.3bar. The pipe A lies 3m above pipe B. Find the difference of pressure measured by mercury as fluid filling U-tube.

SECTION - V

9 (a) Deduce a formula for computing discharge through an orifice.

(b) A venturimeter with 220mm diameter at inlet and 120mm throat is laid with axis horizontal, and is used for measuring the flow of oil of specific gravity of 0.82. The difference of levels in the U-tube differential manometer reads 170mm of mercury and 10,000kg of oil is collected in 5 minutes. Determine the discharge coefficient for the meter. Take specific gravity of mercury as 13.6.

10 (a) Write the classification of Notches and Weirs.

(b) Determine the height of a rectangular weir of length 8m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 2m and discharge is 2500litres/sec. Consider Cd=0.64 and neglect end contractions.

SECTION - VI

11 (a) Water is flowing through a 16cm diameter pipe with a co-efficient of friction f=0.05. The shear stress at a point 4cm from the pipe wall is 0.002bar. Calculate the shear stress at the pipe wall.

(b) What is Hagen Poiseuille's Formula? Derive an expression for Hagen Poiseuille's Formula.

12 (a) What do you understand by the terms: Major energy loss and minor energy losses in pipes?

(b) The discharge through a pipe is 250 litres per second. Estimate the loss of head when the pipe is suddenly enlarged from 200mm to 300mm.

R-17 **Code : 17EC2102**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

SWITCHING THEORY & LOGIC DESIGN
(Common for EEE & ECE)

Time: 3 hours Max. Marks: 60

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

SECTION - I

1 (a) Convert the number $(17.125)_{16}$ to base 10, base 4, base 5 and base 2.

(b) Perform the binary arithmetic operations on (-14)-(-2) using signed 2's complement representation.

2 (a) State and Prove De Morgan's theorem of Boolean Algebra.

(b) Realize the basic gates using NAND and NOR gates only.

SECTION - II

3 (a) Simplify the following function and realize using universal gates.
F(A,B,C) = A'BC' + ABC + B'C' + A'B'

(b) Use the tabulation procedure to generate the set of prime implicants and to obtain all minimal expressions for the following function.
F(a,b,c,d) = Σ (1,5,6,12,13,14) + Σd(2,4)

4 (a) Simplify the following function using K-map. F(A,B,C,D) = Σ(1,3,4,5,6,11,13,14,15)

(b) Simplify the following using Tabular method.
F(A,B,C,D) = Σ(3,7,8,12,13,15)+ Σd (9,14) .

SECTION - III

5 (a) Discuss in detail, the working of full adder logic circuit and extend your discussion to explain a binary adder, which can be used to add two binary numbers.

(b) Design a 2-bit comparator which compares the magnitude of two numbers X and Y and generates three output f1,f2, and f3.

6 (a) Draw the logic circuit of a 3 to 8 decoder and explain its working.

(b) Design a 64:1 MUX using 8:1 MUXs.

SECTION - IV

7 (a) What is race around condition? How does it get eliminated in a Master–slave JK flip-flop?

(b) Write short note on Triggering of Flip-Flops.

8 (a) Obtain the characteristic equations of JK, SR, D and T flip-flops. Also explain excitation tables of all these flip-flops.

(b) Convert SR flip – flop to T flip – flop.

SECTION - V

9 (a) Design and explain a synchronous MOD-12 down-counter using JK-flipflop.

(b) Design and implement 3-bit ripple counter using J-K flip flop. Draw the state diagram, logic diagram and timing diagram for the same.

10 (a) Design a counter that counter that counter that counts 0-2-4-6 and repeat.

(b) Draw the Logic diagrams of Ring and Johnson Counter and explain their operation .

SECTION - VI

11 (a) What is PAL? How does it differ from PROM and PLA.

(b) Design a switching circuit that converts a 4 bit binary code into a 4 bit Gray code using ROM array.

12 (a) Explain the difference between static and dynamic RAM. Draw the circuits of one cell of each and explain its working.

(b) Is the ROM a volatile memory? Explain. Also draw the logic diagram of 16-bit ROM Array and explain its principle of operation.

R-17 **Code : 17CE2101**

B.TECH.DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

STRENGTH OF MATERIALS

(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

* * *

SECTION - I

1 (a) Sketch and explain stress-strain diagram for mild steel.

(b) Derive relation between three elastic constants.

2 A steel rail is 12 m long and is laid at a temperature of 18°C. The maximum temperature expected is 40°C. (i) Estimate the minimum gap between two rails to be left so that the temperature stresses do not develop. (ii) Calculate the temperature stresses developed in the rails, if: (a) No expansion joint is provided. (b) If a 1.5 mm gap is provided for expansion. (iii) If the stress developed is 20 N/mm^2, what is the gap provided between the rails?

SECTION - II

3 A plane element is subjected to stresses as shown in figure 1. Determine principal stresses, maximum shear stress and their planes. Also verify these values with Mohr's circle.

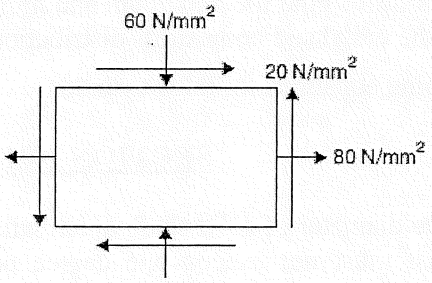


Figure 1

4 A bolt is required to resist an axial tension of 30 kN and a transverse shear force of 25 kN. Find the safe size of the bolt using

(a) Maximum principal stress theory
(b) Maximum shear stress theory
(c) Maximum distortion energy theory

The elastic limit of the material is 310 N/mm^2 , Poisson's ratio = 0.29, factor of safety =3.5.

SECTION - III

5 (a) Define shear force diagram and bending moment diagram.

(b) A cantilever beam of length 2 m carries a uniformly distributed load of 1.5 kN/m run over the whole length and a point load of 2 kN at a distance of 0.6 m from the free end. Draw shear force and bending moment diagrams.

6 An overhanging beam is shown in figure 2 . Draw S.F and B.M diagrams.

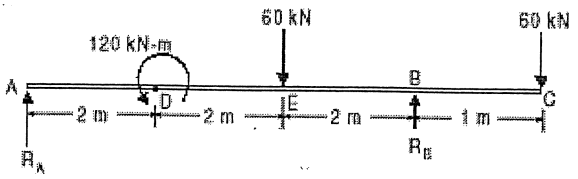


Figure 2

SECTION - IV

7 A beam is having a T-shaped cross section with flange width 125 mm, flange thickness 25 mm, depth of web 175 mm and thickness of web 25 mm. If a bending moment of 2500 N-m is acting at the section, determine the bending stress at the extreme fibers.

8 A cast-iron bracket of I-section has its top flange as 200 mm x 40 mm, bottom flange as 120 mm x 40 mm and web as 300 mm x 40 mm. The overall depth of the section is 380 mm. If the beam is subjected to a shear force of 150 kN, sketch the shear stress distribution over the depth of the section.

SECTION - V

9 (a) Derive an expressions for hoop stress and longitudinal stress of a thin cylinder.

(b) A cylindrical shell is 3 m long, and is having 1 m internal diameter and 15 mm thickness. Calculate the hoop stress and longitudinal stress induced if it is subjected to an internal fluid pressure of 1.8 N/mm^2. Also find changes in dimensions of the shell.

10 (a) A pipe of 400 mm internal diameter and 100 mm thickness contains a fluid at a pressure 90 N/mm^2. Find the maximum and minimum hoop stress across the section. Also sketch the radial and hoop stress distribution across the section.

(b) Write governing equations for thick cylinder.

SECTION - VI

11 (a) Determine the diameter of solid shaft which will transmit 440 kW at 280 r.p.m. The angle of twist must not exceed one degree per metre length and the maximum torsional shear stress is to be limited to 40 N/mm^2. Assume G = 84 kN/mm^2.

(b) List out assumptions in theory of pure torsion.

12 A mass is suspended from a spring system as shown in figure 3. Determine the equivalent stiffness of the system. Take $k_1 = 5000$ N/m, $k_2 = k_3 = 8000$ N/m and m = 25 kg.

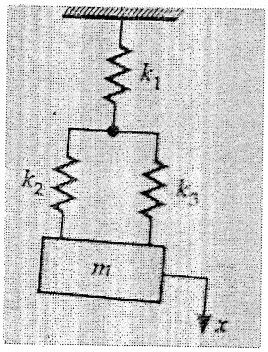


Figure 3

R-17 Code : 17CS2101

B.TECH. DEGREE SUPPLYMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

(Common to CSE & IT)

Time : 3 hours Max. Marks : 60

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

* * *

SECTION-I

1. (a) Show that R is logically derived from P → Q, Q → R, and P

   (b) Prove $(P \rightarrow Q) \Leftrightarrow (\neg P \vee Q)$.

2. Write the negation of each statement.

   (i). I want a car and worth a cycle.
   (ii). My cat stays outside or it makes a mess.
   (iii). I've fallen and I can't get up.
   (iv). You study or you don't get a good grade

SECTION-II

3. If A,B,C are any three sets, then prove that
   A-(B∪C) = (A-B) ∩ (A-C)

4. Explain different types of functions with examples? Find inverse of 2x+3/4x-5.

SECTION-III

5 A bag contains coins of seven different denominations, with at least one dozen coins in each denomination.In how many ways can we select a dozen coins from the bag?

6. (a) Let's say you have four friends, but only need to text there of them when order matters. Find the number of ways to text your friends.

   (b) A bag contains 12 pairs of socks (each pair in different color). If a person draws the socks one by one at random, determine at most how many draws are required to get at least one pair of matched socks.

SECTION-IV

7 Let A={1,2,3}. Determine the nature of the following relations.

(i) R1={(1,2),(2,1),(1,3),(3,1)}
(ii) R2={(1,1),(2,2),(3,3),(2,3)}
(iii) R3={(1,1),(2,2),(3,3)}

8 R inT as R= {(a, b) / (a, b ∈ Tanda is similar to b}.Show that relation R is an Equivalence relation.

SECTION-V

9 (a) Explain Hamiltonian cycle and Hamiltonian path with suitable example. Also draw

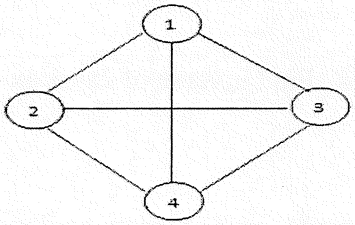
(i) A graph which has an Euler circuit but no Hamiltonian cycle

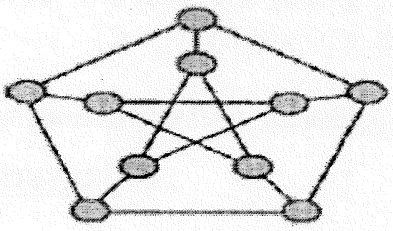
(ii) A graph with Hamiltonian cycle but no Euler circuit

(b) Explain isomorphism of two graphs with suitable example.

10 (a) Write short notes on
(i) Adjacency matrix of graphs with example.
(ii) Incidence matrix of graphs with example.

(b) What is chromatic number? Find the chromatic numbers of the following graphs.





SECTION VI

11 If $f : G \to H$ and $g : H \to K$ are homomorphisms, prove that $gof : G \to K$ defined by $gof(x) = g\{f(x)\}$ is a homomorphism.

12 Prove that the intersection of two submonoids of a monoid is a monoid.

R-17 **Code : 17SH2101**

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, FEBRUARY 2023

II B.Tech. I Semester

ENGINEERING MATHEMATICS - II

(Common to CE, EEE, ECE & ME)

Time: 3 hours Max. Marks: 60

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

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SECTION - I

1 (a) Find (i) $L(3\cos 3t\cos 4t)$ (ii) $L\left[e^{-t}(3\sin 2t-5\cosh 2t)\right]$

(b) Find $L(te^{-t}\cosh t)$

2 (a) Find $L\left(\frac{e^{-at}-e^{-bt}}{t}\right)$. Hence evaluate $\int_0^\infty \frac{e^{-at}-e^{-bt}}{t}dt$

(b) Find $L\left(e^{-3t}\int_0^t \frac{\sin t}{t}dt\right)$.

SECTION - II

3 (a) Find $L^{-1}\left[\frac{5s-2}{s^2(s+2)(s-1)}\right]$.

(b) Using the Convolution theorem find $L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right]$.

4 Solve by the method of transforms, the equation $\frac{d^2y}{dt^2}+2\frac{dy}{dt}+5y=e^{-t}\sin t$, given $y(0)=0,\ y'(0)=1$.

SECTION - III

5 Expand $f(x)=x\sin x$ as a Fourier series in the interval $0<x<2\pi$.

6 Obtain Fourier series for the function $f(x)=\begin{cases}\pi x, & 0\le x\le 1\\ \pi(2-x), & 1\le x\le 2\end{cases}$ Deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+---=\frac{\pi^2}{8}$

SECTION - IV

7 (a) Express the function $f(x)=\begin{cases}1 & for\ |x|\le 1\\ 0 & for\ |x|>1\end{cases}$ as a Fourier integral. Hence evaluate $\int_0^\infty \frac{\sin\lambda\cos\lambda x}{\lambda}d\lambda$.

(b) Find the Fourier transform of $e^{-a^2x^2}, a>0$. Hence deduce that $e^{-x^2/2}$ is self-reciprocal in respect of Fourier transform.

8 Find the Fourier sine transform of $f(x)=\frac{e^{-ax}}{x}$ and deduce that $\int_0^\infty \frac{e^{-ax}-e^{-bx}}{x}\sin sx\,dx=\tan^{-1}\left(\frac{s}{a}\right)-\tan^{-1}\left(\frac{s}{b}\right)$

SECTION - V

9 (a) Find (i) $z(an^2+bn+c)$ (ii) $z[(n-1)^2]$

(b) Find $z(2.3^n+5.n)$ and deduce $z(2.3^{n+3}+5(n+3))$ using shifting theorem

10 (a) Find $z\left[\frac{1}{(n+2)(n+1)}\right]$

(b) If $U(Z)=\left(\frac{2z^2+3z+4}{(z-3)^3}\right), |z|>3$ then find the values of u_1, u_2 and u_3.

SECTION - VI

11 (a) Find $Z^{-1}\left(\frac{z^3}{(z+1)(z-1)^2}\right)$

(b) Using convolution theorem, find $Z^{-1}\left(\frac{z^2}{z^2-4z+3}\right)$

12 Solve $u_{n+2}-2u_{n+1}+u_n=3n+5$ using z - transform.