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Code : 17CE4101

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester

DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(Civil Engineering)

Time : 3 hours

Max. Marks :60

Answer ONE Question
All Questions carry equal marks
Assume suitable data wherever required

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- 1 Design and draw Trapezoidal notch fall with the following hydraulic particulars.

<u>Description</u>	<u>Upstream</u>	<u>Downstream</u>
Full supply discharge	5 Cumec	5 Cumec
Bed width	6 m	6 m
Bed level	+10.00	+8.00
Full supply depth	1.50 m	1.50 m
Full supply level	+11.50	+9.50
Tank bund level	+12.50	+10.50
Half supply depth	1.00 m	1.00 m

Top width of bank is 2.00 m. Ground level at the site of work is +10.50. Good soil is available for foundations at +8.50.

- 2 Design and draw of a canal regulator cum road bridge with the following data. The right bank is 5 m wide and left bank is 2 m wide on both sides. Good foundations are available at +19.00. Assume the ground level at the site as +22.00.

<u>Description</u>	<u>Upstream</u>	<u>Downstream</u>
Full supply discharge	25 Cumec	20 Cumec
Bed width	16 m	16 m
Bed level	+20.00	+20.00
Full supply depth	2.5 m	2 m
Full supply level	+22.50	+22.00
Top level of bank	+23.50	+23.00

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**ENVIRONMENTAL ENGINEERING - II**
(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) Describe the various systems of sewerage with merits and demerits
 b) The drainage area of one sector of a town is 100 hectares and the living population is 100000. The classification of the surface of this area is as follows:

% Surface area	Type of surface area	Coefficient of runoff
30	Hard pavement	0.85
20	Roof surface	0.80
15	Un paved street	0.20
20	Garden and lawn	0.20
15	Wooden area	0.15

If the time of concentration for the area is 20 minutes, find the maximum quantity of combined sewage from the sector.

- 2 a) Determine the size of a circular sewer for a discharge of 800lps running half-full. Assume hydraulic gradient of 1 in 1000 and Manning's constant $n=0.012$.
 b) Explain the importance of manholes along the sewer line.

SECTION - II

- 3 a) Discuss in brief chemical characteristics of sewage.
 b) The 1 day BOD of sewage is 150 mg/lit at 20°C. Determine the 5 day BOD at 20°C. Assume K at 20°C as 0.23/day. Also calculate ultimate BOD
- 4 a) Write short notes on Population Equivalent.
 b) Explain the significance of relative stability

SECTION - III

- 5 a) Explain the lay-out and general outline of sewage treatment plant.
 b) Explain the working principles of screens and its type.
- 6 a) Design a circular sedimentation tank to treat 10 MLD of sewage.
 b) Explain the factors affecting biological treatment

SECTION - IV

- 7 a) Explain the working and constructional details of high rate trickling filter.
b) Distinguish between an oxidation ditch and an oxidation pond.
- 8 a) What are the various methods of sludge disposal? Discuss any one in detail.
b) Explain the nitrification method for removal of nitrogen from sewage.

SECTION - V

- 9 Define digestion. Differentiate between anaerobic and aerobic digestion. Explain the mechanism of anaerobic digestion.
- 10 (a) Discuss in brief biological nitrification-denitrification for the removal of nitrogen from wastewater.
(b) Describe the method of removal disinfection for the removal of pathogenic bacteria from wastewater.

SECTION - VI

- 11 a) Explain the self-purification of river streams.
b) Explain the significance of oxygen sag curve.
- 12 a) Explain the methods of various sewage farming.
b) Design a septic tank for 100 users. Assume required data

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**CONCRETE TECHNOLOGY
(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) Discuss the structure of hydrated Cement
(b) Explain how Bogue's compounds can be calculated
- 2 (a) Write short notes on a) Accelerators b) Retarders
(b) Mention various types of cement, indicating briefly the purpose of each type.

SECTION - II

- 3 (a) Explain the physical and mechanical properties of aggregate based in concrete.
(b) Explain the importance of aggregate in concrete.
- 4 (a) Differentiate between gap grading and well grading of aggregates.
(b) Bring out the detailed classification of aggregates and explain each one of them briefly

SECTION - III

- 5 (a) List out various tests to measure workability of concrete.
(b) Explain the methods of curing.
- 6 (a) Explain good and bad practices of making and using fresh concrete.
(b) Write short notes on Vibration of concrete.

SECTION - IV

- 7 (a) Explain about rebound hammer test.
(b) Discuss in detail the relation between compressive and tensile strength of concrete
- 8 (a) Explain the effect of water cement ratio on the strength of Concrete? Explain Mechanism.
(b) Explain the relation between compression and tensile strength.

SECTION - V

- 9 (a) Write short note on air entrained concrete.
(b) How do you determine the Dynamic modulus of elasticity?
- 10 (a) What is durability of concrete? Enlist factors affecting durability of concrete. Explain any one in detail.
(b) Explain measurement of creep in creep with loading diagram.

SECTION - VI

- 11 (a) List out a minimum of seven types of special concrete & describe lightweight aggregate concrete.
(b) Which are the basic requirements or property of the Self compacting concrete? Enlist various tests for measurement of each property
- 12 Design M25 grade concrete using IS 10262 method of mix design for the following data:
- (i) Size and shape of aggregate: 20 mm angular
 - (ii) Exposure condition: severe
 - (iii) Minimum cement content: 320 kg/m³
 - (iv) Maximum free water cement ratio: 0.55
 - (v) Degree of supervision: good
 - (vi) Maximum cement content : 450 kg/m³
 - (vii) Specific gravity of cement: 3.15, fine aggregate: 2.7, coarse aggregate: 2.74
 - (viii) Water absorption: Coarse aggregate: 1.0%, fine aggregate: 1.5%
 - (ix) Fine aggregate conforming to zone II

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester

ECONOMICS & ACCOUNTANCY

(Common to ME & CE)

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. Define Economics and explain the scope of economics and its relation with other subjects.
2. Explain different types of elasticity of demand.

SECTION - II

3. Explain the salient features and limitations of Break-even analysis.
4. Explain the law of returns to scale with appropriate examples.

SECTION - III

5. Explain the salient features of monopoly and how the price and output will be determined in the monopoly.
6. Explain the features of perfect competition market.

SECTION - IV

7. Define Sole trader and evaluate features of sole trader.
8. Differentiate sole trader and partnership form of business organization.

SECTION - V

9. Discuss different types of accounting principles .
10. Journalise the following transactions in the books of ABC firm
2003 January
 - 1 ABC firm commenced business with Rs 40,000/-
 - 2 Deposited into bank Rs 30,000/-
 - 3 Bought goods worth Rs 48,000/- from Kamal
 - 4 Sold goods worth Rs 60,000/-
 - 5 paid rent Rs 4,000/-; advertising Rs 3,000/-
 - 6 Sold goods worth Rs 50,000/- to Suresh
 - 7 Suresh pays Rs 48,600/- in full settlement of account
 - 10 Paid Rs 40,000/- to Kamal on account

SECTION - VI

11. Compare features merits and demerits of capital budgeting techniques.
12. Explain the factors affecting on working capital management.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**BRIDGE ENGINEERING**

(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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*Use of IRC:6-2014, IRC:112-2011, IRC:24-2001, IRC:22-2015, IS:800-2007, IS:456-2000 code books and steel tables are Permitted.**Assume any data, if required.***SECTION - I**

- 1 Explain the following :
a) Carriageway width b) Clearance c) linear waterway d) Impact factor
- 2 What are various categories of live loads as per IRC. Explain any 2 in detail with neat sketches?

SECTION - II

- 3 Design the reinforced concrete slab deck and sketch the details of reinforcement in the longitudinal and cross section of the slab a national highway crossing to suit the following data.
Carriage way - Two lane (7.5 m wide)
Foot paths – 0.8 m on either side
Clear span = 5 m
Wearing coat thickness = 75 mm
Width of bearing = 400 mm
Materials - M20 grade concrete and Fe415 HYSD bars
Loading – IRC class AA tracked vehicle
- 4 Explain the design procedure for RC box culvert.

SECTION - III

- 5 Design a T beam(Deck slab and Main girder) super structure for a bridge on a national highway with the following data: Clearwidth of roadway = 7.5m, width of the kerbs = 750mm, effective span = 22m, thickness of wearing coat = 80mm, number of main girders =4, spacing of main girders = 2.5m, Live load - IRC Class AA Tracked Vehicle, Materials - M-20 Grade and Fe 415 steel.
- 6 Explain how Pigeaud's Method and Courbon method are used for the design of slab and girder bridges.

SECTION - IV

- 7 Design a plate girder bridge for the following data broad gauge span = 25m, top level of railway embankment = 116m, beal level of the steam = 101m, ground level of the stream for foundation stability = 99m, stream bound top level = 102.5m, assume any data required.

- 8 Explain the design procedure for composite Bridges consisting of RCC slabs over steel girders including shear connectors.

SECTION - V

- 9 Explain in detail how to assess the stability of abutment.
- 10 Explain about the different types of foundation used in bridges.

SECTION - VI

- 11 List out the types of bridge bearings and explain any two elastomeric bearings with a neat sketch.
- 12 Explain with the help of neat sketches various types of expansion joints.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester
PYTHON PROGRAMMING
(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) Write a program to perform List Updation & Deleting the list Elements.
(b) State the importance of List comprehensions.
2. (a) Explain List Slicing with suitable programming examples.
(b) Importance of List Mutability and give a example.

SECTION - II

3. (a) Match Regular expressions verbose in brief.
(b) Express the usage of Unicode in Python.
4. (a) Summarize the String Methods.
(b) Write a program that reads in a string and returns letters of the alphabet in alphabetical Order which occur in the string together with the number of times each letter occurs using dictionary. Case should be ignored.

SECTION - III

5. (a) Describe the list of Functions.
(b) Demonstrate the working of built-in functions like all(), any(), len(), cmp(), sorted() with python dictionary through appropriate coding examples.
6. (a) Recall how to instantiating classes in Python.
(b) Explain different file operations with suitable programming examples.

SECTION - IV

7. (a) Label the Stream of Objects.
(b) Write a Python Program to Read a File and Capitalize the First Letter of Every Word in the File.
8. (a) Role of Standard Input, output and error in files.
(b) Write a Python Program to Read the Contents of a File in Reverse Order.

SECTION - V

9. (a) List the pros and cons of XML.
(b) Identify how Serializing objects happen in Python .
10. (a) Importance of Atom Feed.
(b) Discuss how Serializing to JSON occurs.

SECTION - VI

11. (a) Write short notes on Directory Structure.
(b) Design the need of classifying your Package.
12. (a) Explain briefly about the Checking Your Setup Script for Errors.
(b) Write short notes on the Many Possible Futures of Python Packaging.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**POWER SYSTEM ANALYSIS**
(Electrical & Electronics Engineering)

Time : 3 hours

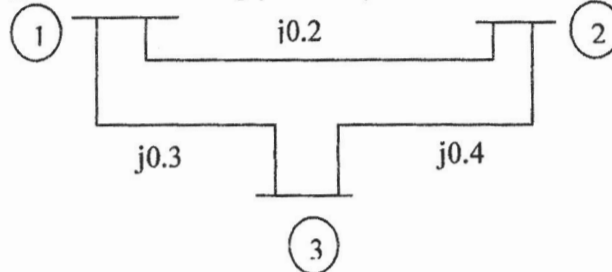
Max. Marks :60

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

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SECTION - I

- 1 Form
- Z_{BUS}
- for the following power system. Take bus-1 as reference bus.



- 2 (a) Explain selection of circuit breaker in power systems.
 (b) A phase acircuit breaker is rated at 1000 A, 1500 MVA, 33 kV sec, find the rated symmetrical breaking current, making current and short time rating.

SECTION - II

- 3 (a) The phase currents in a phase supply to an unbalanced load are $I_a = 10 + 20$, $I_b = 12 - j1.0$, $I_c = -3 - j5$ A. The phase sequence is abc. Determine sequence components of currents.
 (b) Derive an expression for the total power in a 3- phase system in terms of the sequence components of voltage and currents.
- 4 (a) The unbalance voltages across a 3-phase system are $V_a = 400 \angle 25^\circ$ V, $V_b = 360 \angle 90^\circ$ V, $V_c = 450 \angle -140^\circ$ V. Determine the symmetrical components of voltages.
 (b) Explain about the sequence impedance in the case of 3-phase transmission lines.

SECTION - III

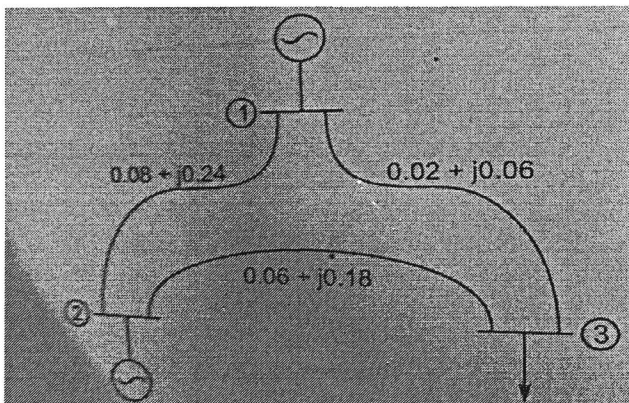
- 5 Derive the expression for the fault current when (a) LG fault (b) L-L-G fault occurs at the terminals of a unloaded alternator.
- 6 (a) What do you understand by sequence networks? What is their importance in unsymmetrical fault calculations?
 (b) Discuss the symmetrical component method to analyze an unbalanced system.

SECTION - IV

- 7 Explain G-S method with algorithm when PV bus is present and explain the importance of acceleration factor.
- 8 (a) Explain the necessity of Power flow studies. Explain the data required for power flow studies.
 (b) Derive the static load flow equations.

SECTION - V

- 9 For the power system network shown in figure obtain V_3 using N-R method after first iteration.



Bus code	Assumed bus voltages	Generation		load	
		MW	MVAR	MW	MVAR
1	$1.05+j0$	0	0	0	0
2	$1.0+j0$	20	0	30	20
3	$1.0+j0$	0	0	60	25

- 10 Derive the power balance equation in a power system and explain the N-R method of load flow analysis with flow chart.

SECTION - VI

- 11 (a) Explain the methods to improve steady state stability.
 (b) The sending end and the receiving end voltages of overhead line at 120MW load are equal at 110 k. The line impedance per phase is 5 ohms. Determine
 (a) The maximum steady state power that can be transmitted over the line
 (b) The electrical output power for a torque angle of 45°
- 12 (a) A balanced 3-phase fault occurs at middle point of line 2 when the power transfer is 1.5 pu in the system of Figure. $E=1.2$, $V=1$, $X'_d = 0.2$, $X_1 = X_2 = 0.4 pu$. Determine whether the system is stable for a sustained fault. The fault is cleared at $\delta=60^\circ$. Is the system stable? If so, find the maximum rotor swing. Also find the critical clearing angle

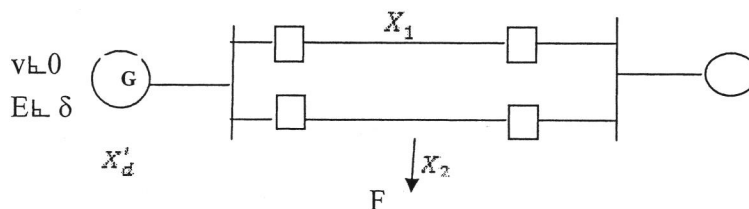


Figure A machine connected to an infinite bus through an inter-connector

- (b) Explain point by point method of solving swing equation.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**POWER SEMICONDUCTOR DRIVES**

(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 are the different types of electrical drives
(a) What are the advantages of electric drives
- 2 (a) Brief about the Block diagram of Electrical Drive with various parts
(b) Describe the function of power electronic converter in an Electric Drive

SECTION - II

- 3 (a) Derive Expression for in Continuous mode of DC Separately Excited motor fed from a Single phase fully controlled Rectifier?
(b) A 100 KW, 500 V, 2000 rpm separately excited dc motor is controlled by a three-phase fully controlled converter and is fed from a 400 V, 50 Hz supply. The voltage drop in conducting the thyristor is 2 V. Motor parameters are $R_a = 0.1 \Omega$, $L_a = 8 \text{ mH}$, $K_m = 1.6$. Rated armature current = 210 A. No load current is 10% of rated current. i) Find no load speed at firing angle of 300° . ii) Find the firing angle to obtain 2000 rpm at rated armature current. Also find supply power factor.
- 4 (a) Explain with neat diagram and wave forms about the operation in Continuous mode of DC Separately Excited motor fed from a Single phase Half controlled Rectifier?
(b) A single phase semi converter controlling a separately excited DC motor field being controlled by the semi converter, its current is set to maximum possible value. The field circuit inductance is enough to maintain the armature and field current continuous. Following data are furnished for the system.
 - i. Field resistance = 190Ω
 - ii. Armature resistance = 0.5Ω
 - iii. Motor voltage constant = 0.8 V/A -rad/sec
 - iv. The load torque = 50 N-m
 - v. Speed = 1400 rpm
 - vi. Input AC supply = $230\text{V}, 50\text{Hz}$Obtain field current and triggering angle of the converter in the armature circuit.

SECTION - III

- 5 (a) Explain the basic operational aspects of three phase fully controlled converters with neat sketches of the waveforms and the circuit diagram.
(b) Distinguish between circulating current and non-circulating current mode of operation.

- 6 (a) What is a Chopper? Explain the Chopper control of a D.C series motor in (a) Motoring Mode (b) regenerative braking mode and also draw the Speed-Torque curves in each mode.
- (b) A dc supply of 220 V supplied power to separately excited dc motor via a class A thyristors chopper. The motor has an armature circuit resistance of 0.03Ω and inductance of 3 mH. The chopper is fully on at the rated motor speed 1200 rpm when the armature current is 50 A. If the speed is to be reduced to 1000 rpm with the load torque constant, calculate the necessary duty cycle.

SECTION - IV

- 7 (a) Derive the Expression in Static Resistance control method for the speed control of Induction Motor?
- (b) A 440V ,50Hz ,6pole Star connected wound rotor motor has following parameters:
 $R_1 = 0.5\Omega$, $R'_2 = 0.4 \Omega$, $X_1 = X'_2 = 1.20\Omega$, $X_m = 50 \Omega$,Stator to rotor turns ratio is 3.5. Motor is controlled by Static rotor resistance control method .External resistance is chosen such that the break down torque is produced at stand still for a duty ratio of zero. Calculate the value of external resistance. How duty ratio should be varied with speed so that motor accelerates at max. Torque.
- 8 (a) What is frequency control of induction motor? Explain the operation of VSI fed induction motor drive.
- (b) Draw various configuration diagrams for variable voltage and variable control Induction motor drive

SECTION - V

- 9 A 440V, 50Hz, 970 rpm, 6-pole, Y-connected, 3-phase wound rotor induction motor has following parameters referred to the stator:
 The stator to rotor turns ratio is 2.
 Motor speed is controlled by Static Scherbius Drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 1650° . Calculate
 (i) Transformer turns ratio. (ii) Torque for a speed of 780rpm and $\alpha=140^\circ$
 (iii) Firing angle for half the rated motor torque and speed of 800rpm
- 10 (a) Brief about the concepts of slip power recovery
- (b) Explain with neat diagram about the characteristics and working operation of Static Krammers Drive

SECTION - VI

- 11 (a) Explain about Self and Separate control of Synchronous Motor?
- (b) A 6 MW, 3-phase, 11 kV, Y-connected, 6-pole, 50Hz, 0.9(leading) power factor synchronous motor has $X_s=9\Omega$ and $R_s=0$. Rated field current is 50A.
 Machine is controlled by variable frequency control at constant v/f ratio up to the base speed and at constant V above based speed. Determine
 (i) Torque and field current for the rated armature current, 750rpm and 0.8 leading power factor
 (ii) Armature current and power factor for half the rated motor torque, 1500rpm and rated field current.
- 12 (a) Explain with neat diagram about Load Commutated Inverter fed Synchronous motor speed control?
- (b) Derive the torque expression for Synchronous motor.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**POWER SYSTEM OPERATION AND CONTROL**
(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 Explain in detail the terms Heat rate curve, Fuel cost curve, Incremental fuel cost curve and incremental production cost curve with respect to a thermal power plant.
- 2 Derive the conditions for optimal power allocation between generators in a thermal power plant neglecting losses. Disuses demerits of this method.

SECTION - II

- 3 What are B-coefficients? Derive them.
- 4 Derive the transmission loss formula and state the assumptions made in it.

SECTION - III

- 5 Derive mathematical formulation for short term hydro thermal scheduling.
- 6 What is unit commitment? Explain the constraints in solving the unit commitment problem.

SECTION - IV

- 7 Explain the static performance of the Automatic Voltage Regulator (AVR) loop.
- 8 Explain briefly the component equipments of power system that can generate and/or absorb reactive power.

SECTION - V

- 9 What is Automatic Load Frequency Control (ALFC)? Explain proportional plus integral load frequency control of a single area system with neat block diagram.
- 10 Draw the block diagram of load frequency control in two area control system and explain.

SECTION - VI

- 11 With a neat diagram describe the major components of SCADA system. Also State the applications of SCADA.
- 12 Explain the 'Energy Management System'.

B.TECH. DEGREE EXAMINATION, MARCH 2021**IV B.Tech. I Semester****MANAGEMENT SCIENCE
(Common to EEE, ECE & CSE)**

Time : 3 hours

Max. Marks :60

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

SECTION - I

1. (a) Define management. Explain its nature and features.
(b) Explain the principles of management as outlined by the Henry Fayol.
2. (a) Discuss two factor theory of motivation. How is it relevant today?
(b) Managers today also make use of theory Hierarchy of Human needs. Do you agree? Explain different needs as given in this theory with examples.

SECTION - II

3. (a) Explain Line & Staff Organization structures with merits and demerits.
(b) Differentiate between Flat Organisation and lean Organisation.
4. (a) Evaluate committee type Organisation and Matrix Organisation.
(b) Discuss the utility of Organisation structures in an Organisation

SECTION - III

5. (a) Explain the concepts of corporate planning. Discuss the essentials steps in corporate planning.
(b) Discuss How SWOT analysis can be carried out for Universities in general?
6. (a) Identify the briefly discuss the functions of Marketing.
(b) Explain the different stages of Product life Cycle.

SECTION - IV

7. (a) Differentiate personnel management and HRM.
(b) What are the principles of manpower planning?
8. (a) Discuss various incentives plans offered by the employer to their employees.
(b) What is Job evaluation? Discuss different methods of Job evaluation.

SECTION - V

9. (a) Discuss the Factors influencing plant location decision.
(b) Briefly describe various types of plant layouts.
10. (a) Define method study how do you carry it out?
(b) Explain the objectives of good production planning and control systems.

SECTION - VI

11. (a) Briefly explain the steps in program evaluation and review techniques.
(b) Enumerate the steps involved in project crashing.
12. (a) Discuss the rules for drawing network diagram.
(b) A small engineering project consists of six activities namely ABCDE & F with duration of 4,6,5,4,3 & 3 days respectively. Draw the network diagram and calculate EST, LST, EFT, LFT and Floats. Mark the critical path and find total project duration.

Activity	A	B	C	D	E	R
Proceeding Activity	-	A	B	A	D	C,E
Duration	4	6	5	4	3	3

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**ELECTRICAL AND HYBRID VEHICLES**
(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 Compare the battery electric vehicle(BEV), hybrid electric vehicle(HEV) and plug in hybrid electric vehicle(PHEV) technologies
- 2 (a) What are the environmental impacts of hybrid electric vehicles
(b) Why hybrid electric vehicles are fuel efficient than other vehicles

SECTION - II

- 3 Explain the following
 - (a) fuel cell based energy storage system
 - (b) flywheel based energy storage system
- 4 (a) Why do we need super capacitors? Explain its applications
(b) What are the main benefits of hydrogen fuel cells

SECTION - III

- 5 Classify the batteries and explain working principle of lead acid battery with neat diagram
- 6 (a) Explain the following terms
 - (i) specific energy
 - (ii) energy density
(b) How we diagnose the faults in lead-acid battery

SECTION - IV

- 7 Discuss about fast charging technologies and its impacts on battery systems
- 8 (a) Explain working principle of Charging System
(b) How do you rectify charging system problem

SECTION - V

- 9 (a) Explain the Series Configurations of Hybrid Drive Train with neat diagram?
(b) Explain the Power Flow Analysis of Hybrid Drive Trains?
- 10 (a) Explain the Parallel Configurations of Hybrid Drive Train with neat diagram?
(b) Explain about Speed coupling of Parallel Hybrid train?

SECTION - VI

- 11 (a) How will electric vehicles contribute to the smart grid
(b) Discuss current trends and challenges of smart vehicles in smart grid
- 12 (a) Explain the requirements of electrical equipment in electrical vehicle
(b) Discuss the smart grid technologies for Electric vehicles

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**DATA BASE MANAGEMENT SYSTEM**

(Common to EEE & ECE)

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) List four significant differences between a file-processing system and a DBMS.
- (b) List and explain various components of a database system and the connections among them.
- 2 (a) Explain the concept of physical data independence, and its importance in database systems.
- (b) What is a data model? Explain different types of data models.

SECTION - II

- 3 Consider the following bank database:
branch (branchname, branchcity, assets)
customer (customername, customerstreet, customercity)
loan (loannumber, branchname, amount)
borrower (customername, loannumber)
account (accountnumber, branchname, balance)
depositor (customername, accountnumber)
 - a. What are the appropriate primary keys and foreign keys for each relation?
 - b. Give an expression in relational algebra to find the names of all branches located in "Chicago".
 - c. Give an expression in relational algebra to find the names of all borrowers who have a loan in branch "Down-town".
 - d. Give an expression in relational algebra to find the names of all depositors who have an account with a value greater than \$6,000 at the "Uptown" branch.
- 4 (a) What is Relational Algebra? Explain the following relational algebra operators: SELECT, PROJECT, UNION, CARTESIAN PRODUCT and RENAME.
- (b) Describe the extended relational algebra operations.

SECTION - III

- 5 Design an E-R diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match, and individual player statistics for each match. Summary statistics should be modeled as derived attributes.
- 6 (a) Explain mapping cardinalities with the aid of suitable examples.
- (b) Describe various types of attributes.

SECTION – IV

- 7 Course(courseid, title, deptname, credits)
instructor(ID, name, deptname, salary)
section(courseid, secid, semester, year, building, roomnumber, timeslotid)
teaches(ID, courseid, secid, semester, year)
student(ID, name, deptname, totcred)
takes(ID, courseid, secid, semester, year, grade)
Consider the above schema and answer the following:
- Find the names of all students who have taken at least one Comp. Sci.course; make sure there are no duplicate names in the result.
 - Find the IDs and names of all students who have not taken any course offering before Spring 2009.
 - For each department, find the maximum salary of instructors in that department. You may assume that every department has at least one instructor.
 - Find the lowest, across all departments, of the per-department maximum salary computed by the preceding query.
 - Define a view totcredits(year, numcredits), giving the total number of credits taken by students in each year.
- 8 (a) Explain how integrity constraints in SQL guard against accidental damage to the database?
(b) By considering suitable examples, explain various SQL DML statements.

SECTION – V

- 9 (a) Compute the canonical cover F_c of the following set F of functional dependencies for relation schema $r(A,B,C,D,E)$.
 $A \rightarrow BC$
 $CD \rightarrow E$
 $B \rightarrow D$
 $E \rightarrow A$
- (b) State and describe the following normal forms: 1NF, 2NF and 3NF.
- 10 (a) State BCNF and 4NF. Give an example of a relation schema R and a set of dependencies such that R is in BCNF but is not in 4NF.
(b) Describe BCNF decomposition algorithm.

SECTION – VI

- 11 (a) Explain the timestamp-ordering protocol.
(b) Describe various forms two phase locking protocol.
- 12 (a) Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed?
(b) Explain buffer management in the context of database recovery.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**FINITE ELEMENTS METHOD
(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) Write the advantages, disadvantages, and applications of FEM.
- (b) In a plane strain problem, $\sigma_x=1400\text{MPa}$, $\sigma_y=-100\text{MPa}$, Young's Modulus $E=200\text{GPa}$ and Poisson's ratio $\mu=0.3$. Determine the value of σ_z .
- 2 (a) Derive the solution for the differential equation given below using simple residual method.

$$AE \frac{d^2 u}{dx^2} + q_0 = 0$$

$$\text{with the boundary conditions } u(0) = 0, \left. \frac{du}{dx} \right|_{x=L} = 0.$$

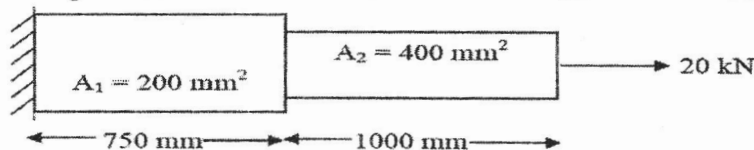
- (b) Discuss the methodology to solve the basic procedural steps in finite element method.

SECTION - II

- 3 (a) What are the industrial applications of a one-dimensional heat conduction element and state advantages of applying finite element approach?
- (b) Obtain weak form weighted residual statement for a simple supported beam with point load at center.
- 4 (a) Brief out the principle of Stationary Total potential (PSTP). State the advantages and limitations of this approach.
- (b) Derive the finite element equations for 1-D bar element using PSTP technique.

SECTION - III

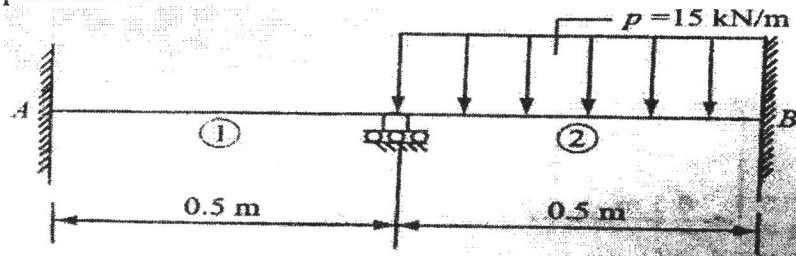
- 5 (a) Derive the stiffness matrix of one-dimensional bar element.
- (b) Figure illustrates an assembly of two bar elements made of different materials has Young's Modulus $E_1=220\text{GPa}$ & $E_2=150\text{GPa}$. Estimate the nodal displacements.



- 6 (a) How do you represent locally and globally a plane truss with reference to Finite Elements Analysis?
 (b) Where do you use trusses? How do you analyze trusses by applying FEM? Illustrate.

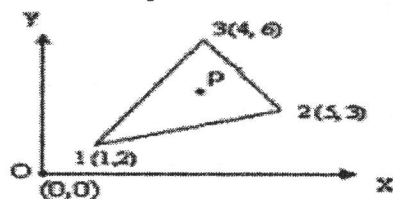
SECTION - IV

- 7 (a) Deduce element stiffness matrix of a linear spring by treating it as a finite element.
 (b) One side of the brick wall of width 5 m, height 4 m and thickness 0.5 m is exposed to a temperature of -25°C while the other surface is maintained at 32°C . If the thermal conductivity is 0.75 W/m K and the heat transfer coefficient on the colder side is $50\text{ W/m}^2\text{ K}$. verify a) The temperature distribution in the wall and b) Heat loss from the wall.
- 8 Evaluate the nodal displacements and slope at the mid-point of element-2 of the shaft as shown in figure. assume that the shaft to be supported in bearings regarded as fixed supports at A and B.



SECTION - V

- 9 (a) Derive shape functions for a 4-noded rectangular element in natural coordinate system.
 (b) The nodal coordinates of the triangular element are shown in figure. At the interior Point P, the x coordinate is 3.3 and the shape function at node 1 is N_1 is 0.3. Estimate the shape functions at nodes 2 and 3 and the y coordinate of the point P.



- 10 (a) What is the physical significance of shape function?
 (b) What is an Axi-symmetric element? Mention its characteristics.

SECTION - VI

- 11 (a) From first principles, derive the general equation for elemental mass matrix for beam and bar elements
 (b) Explain one dimensional gauss rules for numerical integration.
- 12 Find the natural frequencies of vibrations of a simple cantilever beam of length l.



B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**REFRIGERATION & AIR CONDITIONING
(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) With a neat sketch, explain the working principle of vapour compression refrigeration system.
(b) Discuss the working principle of Vapour absorption with a neat sketch
- 2 (a) State the Need and Applications of Refrigeration
(b) An air refrigerator used for food storage provides 50 tons of refrigeration. The temperature of air entering the compressor is 7°C and the temperature before entering into expander is 27°C. Assuming 30 % more power is required than theoretical. Find (a).Actual C.O.P of the cycle (b).KW capacity required to run the compressor.

SECTION - II

- 3 (a) Refrigerant selection plays a key role in the design of an Air conditioning system. Justify
(b) Write a short notes on the following
(i) Ozone Depletion potential (ii) Global Warming Potential
- 4 (a) Derive an expression for economical water flow rate through condenser
(b) Describe the working of forced draft cooling tower with its merits over Natural draft cooling tower.

SECTION - III

- 5 (a) Explain the merits of defrosting in refrigeration systems
(b) List out various methods of defrosting in domestic refrigeration systems and Explain anyone in detail with a neat figure
- 6 (a) Elaborate the method of charging an Air conditioning system
(b) What is the function of an Expansion device in refrigeration system and Describe the working of any one in detail

SECTION - IV

- 7 Illustrate the method of construction of psychrometric chart.
- 8 (a) Explain the procedure to draw a grand sensible heat factor line on a psychrometric chart.
- (b) A room $7\text{m} \times 4\text{m} \times 4\text{m}$ is occupied by an air-water vapour mixture at 38°C . The atmospheric pressure is 1 bar and the relative humidity is 70%. Determine the humidity ratio, dew point, mass of dry air and mass of water vapour. If the mixture of air-water vapour is further cooled at constant pressure until the temperature is 10°C . Find the amount of water vapour condensed

SECTION - V

- 9 (a) Discuss the functioning of year round air conditioning system with a neat sketch
- (b) Distinguish between winter air conditioning and summer air conditioning
- 10 (a) State and Explicate the factors which govern Optimum Effective Temperature
- (b) What is the function of ducts in Air conditioning systems and also mention the favorable materials used for the manufacturing of ducts

SECTION - VI

- 11 (a) With the help of a neat sketch describe the working of Hydrogen liquefaction
- (b) List out the applications of refrigeration in food preservation.
- 12 (a) Draw and Explain the cooling circuit of water cooler.
- (b) Name the major controls used in transport refrigeration systems and also explain its functioning in brief

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**CAD / CAM**
(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) Give the difference between CAD/CAM and conventional method of product cycle
(b) Briefly explain the input devices of CAD?
- 2 Explain how 3-D transformations are performed?

SECTION - II

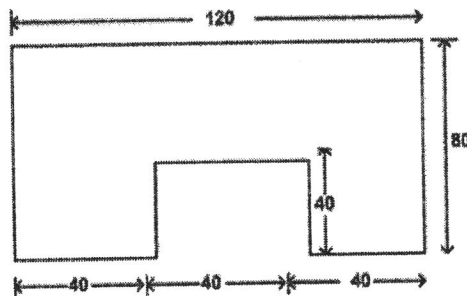
- 3 Explain how a Bezier curve is defined and What are the advantages of Bezier curves over cubic spline?
- 4 Define Geometric model. Explain how a 3-D object is represented by a wire frame model.

SECTION - III

- 5 Describe with the help of neat sketches the major surface entities provided by CAD/CAM systems?
- 6 Describe various commonly used primitives for solid modeling and explain the Boolean operations.

SECTION - IV

- 7 Discuss the function of CNC system of machine tools.
- 8 Write an APT Program to cut the profile shown in the figure. Assume suitable parameters.



SECTION - V

- 9 Compare a process type layout and group technology layout for batch production of a simple component.
- 10 (a) What are the functions performed by FMS computer control system..
- (b) Discuss the differences between Retrieval CAPP system and Generative CAPP System.

SECTION - VI

- 11 Explain the shop floor control system with neat sketch?
- 12 Discuss principles of material handling. Name and describe the five types of material handling devices.

R-17

Code : 17ME41E1

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester

PRODUCTION 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) Differentiate assembly lines and process production systems.
Explain adaptation of JIT in mobile manufacturing.
2. (a) Differentiate Lean and Agile manufacturing with suitable examples.
(b) Explain different types of intermittent production systems with suitable examples.

SECTION - II

3. What are the techniques for improving productivity? Explain with suitable examples.
4. What are the responsibilities of process planning engineer in mass production.

SECTION - III

5. Explain about Multi plant location problem with suitable example.
6. There are five existing facilities which are to be served by a single new facility. The details of the existing facilities are shown in the following table:

Existing facility	1	2	3	4	5
Coordinates of centroid	(5, 10)	(20, 5)	(15, 20)	(30, 25)	(25, 5)
No. of trips of loads /year (ω_i)	200	300	100	300	100

Find the optimum location of the new facility based on gravity location concept.

SECTION - IV

7. Explain COMSOAL method with suitable example. What are the advantages of this method.
8. (a) Describe in detail about the inputs of MRP.
(b) What are the various lot sizes used for MRP? Explain.

SECTION - V

9. Discuss different techniques used in value analysis.
10. Explain the transportation models for aggregate planning in detail.

SECTION - VI

11. With the help of the following data:
(i) Draw the Network diagram
(ii) Identify the critical path and its length

Activity	1-2	1-3	2-4	3-4	4-5	5-6	3-5	5-7	6-7
Duration (in days)	4	8	7	12	4	5	7	9	10

12. Find the project whose data are given below. Construct a Network diagram and determine the critical path.

Activity	A	B	C	D	E	F	G	H	I
Immediate predecessor	--	--	A	B	C, D	B	E	E	E, G
Duration	4	7	2	9	6	5	2	10	4

R_17

Code : 17EC-

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester

CELLULAR MOBILE COMMUNICATION
(Electronics & Communication Engineering)

Max. Marks :60

Time : 3 hours

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

SECTION - I

- 1 (a) Draw and explain the structure of basic cellular systems
(b) Illustrate how performance criteria are measured in mobile cellular communication.
- 2 (a) Briefly discuss the effect of noise level in cell and amplifier noise in a mobile radio environment.
(b) Demonstrate the operation of a cellular system.

SECTION - II

- 3 (a) Derive the co-channel interference reduction factor.
(b) What are the advantages and disadvantages of frequency reuse?
- 4 (a) Explain the concept of frequency reuse with an example.
(b) Define cell splitting. Explain the two kinds of cell splitting techniques.

SECTION - III

- 5 (a) Discuss the steps involved in the mobile phone model.
(b) Explain the effect of cell site antenna height on coverage and signal traffic.
- 6 (a) Elaborate the characteristics of foliage effects.
(b) Explain the propagation in Near-in-Distance.

SECTION - IV

- 7 (a) Explain the co-channel interference at a cell site with neat diagram.
(b) What is the impact on co channel interference by reducing the antenna height? How co-channel interference is reduced by lowering the antenna height for following cases
(i) On a high hill (ii) In a valley region
- 8 (a) Determine C/I in worst case of Omnidirectional system?
(b) Differentiate the types of non-co-channel interference.

SECTION - V

- 9 (a) Explain about the Non-fixed channel assignment algorithms.
(b) How the dropped call rates are evaluated?
- 10 Describe about the process of Initiating a Handoff. Classify different types of Handoff mechanisms in cellular systems.

SECTION - VI

- 11 (a) With neat block diagram explain the basic architecture of GSM system.
(b) What is the need of multiple access technique in cellular system? Mention different types of multiple access techniques used in cellular system.
- 12 (a) Summarise the digital mobile telephony.
(b) Difference between CDMA and TDMA multiple access techniques

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**CELLULAR MOBILE COMMUNICATION**
(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) Draw and explain the structure of basic cellular systems
(b) Illustrate how performance criteria are measured for mobile cellular communication.
- 2 (a) Briefly discuss the effect of noise level in cellular band and amplifier noise in a mobile radio environment.
(b) Demonstrate the operation of a cellular system.

SECTION - II

- 3 (a) Derive the co-channel interferences reduction factor.
(b) What are the advantages and disadvantages of cell sectoring?
- 4 (a) Explain the concept of frequency reuse channels with an example.
(b) Define cell splitting. Explain the two kinds of cell splitting techniques.

SECTION - III

- 5 (a) Discuss the steps involved in the mobile point-to-point model.
(b) Explain the effect of cell site antenna heights in cell coverage and signal traffic.
- 6 (a) Elaborate the characteristics of foliage environment loss.
(b) Explain the propagation in Near-in-Distance.

SECTION - IV

- 7 (a) Explain the co-channel interference at the mobile unit and cell site with neat diagram.
(b) What is the impact on co channel interference by reducing the antenna height? How co-channel interference is affected by lowering the antenna height for following cases
(i) On a high hill (ii) In a valley region (iii) In a forest area
- 8 (a) Determine C/I in worst case of Omni-directional antenna system?
(b) Differentiate the types of non-co-channel interferences.

SECTION - V

- 9 (a) Explain about the Non-fixed channel assignment algorithms.
(b) How the dropped call rates are evaluated?
- 10 Describe about the process of Initiating a Handoff. Classify different types of Handoff mechanisms in cellular systems.

SECTION - VI

- 11 (a) With neat block diagram explain the basic architecture of GSM system.
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- 12 (a) Summarize the digital mobile telephony.
(b) Differentiate between CDMA and TDMA multiple access techniques

R_17

Code : 17EC4102

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester

DIGITAL DESIGN WITH FPGA
(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) Classify the basic families that belong to the bipolar families and to the MOS families.
- (b) Draw the basic circuit of the ECL AND gate. Explain the operation.
- 2 (a) Explain in detail about TTL with open collector output configuration.
- (b) Explain the following terms with reference to ECL logic:
 - (i) Logic '0' and logic '1'.
 - (ii) DC noise margin.
 - (iii) Fan out.
 - (iv) Propagation delay.

SECTION - II

- 3 (a) Write the VHDL program for fixed point to floating point conversion.
- (b) Explain implicit and explicit visibility of a library in VHDL.
- 4 (a) Explain the behavioural design model of VHDL.
- (b) Explain the use of packages. Give the syntax and structure of a package in VHDL.

SECTION - III

- 5 (a) Design a 4×4 combinational multiplier and write the VHDL program data flow model.
- (b) Write a data flow style VHDL program for a simple 8 bit multiplexer..
- 6 (a) Design a priority encoder for 16 inputs using two 74×148 encoders.
- (b) Design a combinational logic circuit that counts the number of ones in a 24-bit register. Write a VHDL program for the same using structural style of modeling.

SECTION - IV

- 7 (a) Explain the operation of a master slave JK Flipflop.
(b) Illustrate the analysis procedure of asynchronous sequential circuit with an example.
- 8 (a) Distinguish between latch and flip flop. Show the logic diagram for both. Explain the operation with the help of function table.
(b) Write a behavioral style VHDL Code for an JK Flip Flop

SECTION - V

- 9 (a) Design a 4-bit binary synchronous counter using 74×74. Write VHDL program for this logic.
(b) Design a 8 bit parallel-in and serial-out shift register. Explain the operation of the above shift register with the help of timing waveforms
- 10 (a) Design a 3 bit LFSR counter using 74×194. List out the sequence assuming that the initial state is 111.
(b) Design an Excess-3 decimal counter using 74 x 163 and explain the operation with the help of timing waveforms.

SECTION - VI

- 11 (a) Implement the following functions using PLA.
 $A(x,y,k,z) = \sum m (2,3,5,7,8,9,10,11,13,15)$
 $B(x,y,k,z) = \sum m (6,7,8,9,13,14,15)$
(b) What are the types of PLD, explain any one in detail?.
- 12 (a) Compare PLA and PAL with respect to various performance features.
(b) Discuss about merits and demerits of FPGA?

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**DIGITAL IMAGE PROCESSING**
(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 Explain the fundamental steps in digital image processing with the help of a block diagram.
- 2 (a) Define 4-connectivity, 8-connectivity and m-connectivity.
(b) Write about various applications of digital image processing.

SECTION - II

- 3 Explain in detail various properties of 2D Fourier Transforms.
- 4 (a) Compare and contrast Walsh and Hadamard Transforms.
(b) Compute the 2D Haar Transform of the signal
 $f(m,n) = \begin{pmatrix} 4 & -1 \\ 2 & 3 \end{pmatrix}$

SECTION - III

- 5 Explain the procedure involved in enhancing the image using Histogram specification.
- 6 Explain various spatial domain filter approaches for image enhancement.

SECTION - IV

- 7 (a) Differentiate between constrained and unconstrained restoration.
(b) Explain the image restoration technique to remove the blur caused by uniform linear motion.
- 8 State the basic rules used for region-oriented segmentation. Explain in detail the basic principle used in region growing by pixel aggregation with an illustrative example.

SECTION - V

- 9 With a neat block diagram, explain the lossless predictive coding approach for image compression.
- 10 Explain in detail three different types of redundancies encountered in an image with suitable illustrative examples.

SECTION - VI

- 11 What is meant by term colour? How do human beings perceive colour? Explain in detail the various colour models which are more significant in colour image processing.
- 12 Differentiate between Pseudo color image processing and Full color image processing. Explain HSI color model.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**OPTICAL COMMUNICATION**
(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) Draw the structure and refractive index profile of Step index fiber.
(b) Estimate the Critical angle, NA and Acceptance angle of the fiber at the Core Refractive index profile 1.50 and Cladding refractive index profile 1.48
- 2 (a) Develop the expression for Numerical aperture of a Step Index Fiber from Snell's law
(b) Construct the elements of an optical fiber transmission link and discuss the same in detail.

SECTION - II

- 3 (a) Elaborate the concept of inter modal dispersion of Multi-mode step index fiber with necessary mathematical relations
(b) Discuss different types of non-linear scattering losses
- 4 (a) Interpret the Effective number of modes a fiber can support by considering Critical radius of curvature
(b) Summarize Micro and Macro bending losses

SECTION - III

- 5 (a) Interpret direct and indirect band gap materials used in light sources with diagrams
(b) Derive the relationship between internal quantum efficiency and internal power
- 6 (a) Interpret principle of LASER diode, modes and threshold conditions
(b) Outline the Laser Diode Modes in Fabry-Perot Resonator Cavity.

SECTION - IV

- 7 (a) Determine the Quantum efficiency and Responsivity of photo diode at an incident of 3×10^{11} photons with wavelength of $0.85\mu\text{m}$ and 1.2×10^{11} electrons collected at the terminals of the device
(b) Analyze the SNR of the photo detector with mathematical expressions
- 8 (a) Draw the Reach-through avalanche photodiode structure and explain the operation.
(b) Compare PiN and Avalanche Photo diode

SECTION - V

- 9 (a) Discusses about operation of Erbium –Doped fiber Amplifier with diagram
(b) Write about operational principles of WDM
- 10 (a) Extrapolate the group velocity dispersion
(b) List out the features of WDM and discuss them in detail

SECTION - VI

- 11 (a) Identify the applications of optical fibers in telephony and telemetry
(b) Explain Fiber diameter measurement using diagram.
- 12 (a) Develop a procedure to measure the Numerical Aperture of the fiber
(b) Model the Fiber Attenuation measurement and explain.

B.TECH. DEGREE EXAMINATION, MARCH 2021
IV B.Tech. I Semester

MOBILE APPLICATION & DEVELOPMENT
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

- 1 What is Accessibility? What are the different business cases for Accessibility? Explain.
- 2 List and explain the principles of Universal Design and Inclusive Design.

SECTION - II

- 3 Write short notes on
(a) Users (b) Empathy (c) Digital Inclusion.
- 4 Discuss in detail about the different layers of WCAG.

SECTION - III

- 5 Explain the Data Security and Privacy Protection in Mobile Systems?
- 6 Discuss Big Data Application in Mobile Systems.

SECTION - IV

- 7 Explain the steps in creation of Android Application in Android Studio with example.
- 8 What are the App Components of Android?

SECTION - V

- 9 List and explain 2D Graphics Techniques.
- 10 How to implement Audio and Executing Video in Android?

SECTION - VI

- 11 Define SQLITE database. List and explain different types of CRUD Operations.
- 12 Differentiate between Wireless Local Area Network and Wireless Fidelity.

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**R PROGRAMMING**
(Computer Science & 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 about Operators of R
(b) Write an R-Script for print only even numbers from one to Hundred
- 2 (a) Explain iterative statements in R with One example program for each statement.
(b) Write R program to create and data frame with five attributes and five records.

SECTION - II

- 3 (a) Explain the concept of Loading Packages in R.
(b) Write a short note about any ten packages?
- 4 (a) Explain about Running and Manipulating packages in R with one example.
(b) Explain about window – specific package commands.

SECTION - III

- 5 Explain about how to find missing values in a data frame and write the various methods for handling missing values with suitable example.
- 6 Write the syntax of read.csv(), write.csv(), read.table(), read.delim() and its uses. With suitable example for each.

SECTION - IV

- 7 Write any five data manipulation function with example.
- 8 (a) Explain about merge function and its Various methods.
(b) Describe the different operations to be performed on objects.

SECTION - V

- 9 (a) Explain about Paired t – and U-Tests on simple dataset and how it is helpful for data analysis and write R-code?
(b) Write short notes on Correlation and Covariance in R
- 10 Explain Student's t- test, Two – Sample t-Test with Unequal Variance, Two – sample t- Test with Equal Variance with example.

SECTION - VI

- 11 Create Box- whisker plots, Scatter plots using R code by mentioning all parameters with visualization charts.
- 12 Explain the following with suitable examples.
(a) Line Charts (b) Pie Charts (c) Bar Plots (d) Dot plots

IV B.Tech. I Semester**BIG DATA AND HADOOP
(Computer Science & 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) Discuss the State of the practices in data analytics
(b) Explain the Model building and planning in data analytics
- 2 (a) Discuss Big data in terms of three dimensions, volume, variety and velocity
(b) Explain Key Roles for the New Big Data Ecosystem

SECTION - II

- 3 (a) Differentiate Hadoop and Apache Hadoop
(b) What are the Unix tools used to Analyze the data?
- 4 How google file system differs from the hadoop file system and explains the google file system architecture with a neat sketch.

SECTION - III

- 5 How can you Configure Hadoop cluster in Local mode?
- 6 (a) Explain the uses of Name node, Data node and Secondary Name node in Hadoop Distributed File system.
(b) How can you Configure XML files?

SECTION - IV

- 7 What is Map Reduce? Write a map reduce program for weather?
- 8 Discuss on the different types and formats of Map-reduce with an example each one.

SECTION - V

- 9 Discuss how Pig data model will help in effective data flow
- 10 (a) What are views in HIVE? What is the difference between internal and external tables in HIVE?
(b) How can you create and manage the data bases in Hive?

SECTION - VI

- 11 (a) Explain the architecture of Hbase with neat sketch.
(b) Discuss different types of filters used in Hbase.
- 12 (a) Write a short note on Hadoop ecosystem Tools.
(b) What is Hbase? Differentiate Hbase with HDFS.



B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester**INDUSTRIAL ROBOTICS**

(Common to ME & CSE)

Time : 3 hours

Max. Marks :60

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

* * *

SECTION - I

- 1 a) Define a robot and explain the basic components of a robotic system with neat sketch.
b) Differentiate between repeatability, accuracy and precision in robotics.
- 2 a) Sketch and explain various types of joints used in robots.
b) Briefly explain the following terms:
(i) Payload (ii) Work volume (iii) Speed of response (iv) Reach

SECTION - II

- 3 a) Explain the working of DC servo motors used in robots.
b) List different types of sensors used in robotics. Explain position sensors in detail.
- 4 a) Describe the types of end effectors.
b) Explain the principle and applications of i) velocity sensor and ii) range sensor.

SECTION - III

- 5 a) Explain the robot classification based on control system.
b) Enumerate the Joint space trajectory using cubic polynomial.
- 6 a) Distinguish between cartesian and joint space trajectory planning.
b) Explain types of motion used while trajectory planning.

SECTION - IV

- 7 a) Derive the forward and reverse transformation of 2-degree of freedom robot manipulator.
b) List out the steps involved in D-H convention.
- 8 a) Determine the translated vector for the given vector $v = 25i+10j+20k$ perform a translation by a distance of 8 units in 'x' direction, 5 units in 'y' direction and 0 units in 'z' direction.
b) Briefly explain Newton-Euler dynamic formulation of robots.

SECTION - V

- 9 Explain in detail different types of Robot Programming Languages.
- 10 a) Explain the manual lead through programming in robot application.
b) Briefly discuss the elementary commands used in RAPID programming.

SECTION - VI

- 11 Explain the robot applications in i) Material transfer ii) Machine loading and unloading.
- 12 a) What is meant by a robot cell? Explain different robot cell layouts.
b) Illustrate the economics of robot implementation with help of pay back method.

R-17

Code : 17CS41E4

B.TECH. DEGREE EXAMINATION, MARCH 2021

IV B.Tech. I Semester
MACHINE LEARNING
(Computer Science & 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) Express Vapnik - Chervonenkis (VC) Dimension concepts of Machine learning.
- (b) Interpret Probably Approximately Correct (PAC) Learning theory with necessary mathematical formulation .
- 2 (a) Explain the Utility theory with an example.
- (b) Evaluate an estimator with Bias and Variance.

SECTION - II

- 3 Elaborate on Parameter Estimation with mathematical modeling.
- 4 (a) Illustrate with an example Multivariate Normal Distribution with Isoprobability contour plot .
- (b) Identify some discrete Features with respect to document categorization .

SECTION - III

- 5 Describe Expectation-Maximization Algorithm with necessary steps.
- 6 (a) Explain Hierarchical clustering with an example.
- (b) Elaborate on Mixtures of Latent Variable Models with respect to probabilistic principal component analyzers.

SECTION - IV

- 7 (a) Explain the classification trees with Entropy function for a two-class problem.
- (b) Compare the omnivariate decision tree with nonlinear decision tree .
- 8 (a) Discuss the pruning techniques and its types.
- (b) Describe the Ripper algorithm for learning rules from data .

SECTION - V

- 9 (a) Evaluate MLP as a Universal Approximator with respect to universal approximation and piecewise constant approximation .
- 10 (a) Specify the role of Multilayer perceptron with an example in Machine learning
(b) List and explain the applications of Artificial neural networks .

SECTION - VI

- 11 (a) Interpret the boundary and margins found by Gaussian kernel with necessary graphs
(b) Elaborate on the Nonseparable Case: Soft Margin Hyperplane for classification .
- 12 (a) Discuss the following terms: Empirical Kernel Learning & Diffusion Kernel Learning and Fisher Kernel Learning .
(b) How can we use one-class SVM for classification?.