

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

**IRRIGATION & HYDRAULIC STRUCTURES
(Civil Engineering)**

Time: 3 hours

Max. Marks: 60

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

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SECTION - I

- 1 (a) Explain different types of Irrigation efficiencies.
(b) What are the different types of irrigation? Discuss them in detail.

- 2 (a) What do you understand by crop rotation? What are its advantages?
(b) The gross commanded area for an irrigation canal is 30000 Hect, out of which 75% is cultivable command area. The intensity of irrigation is 30% for ragi and 20% for paddy. If kor period is 4 weeks for ragi and 3 weeks for paddy, determine the outlet discharge. Outlet factors for ragi and paddy may be assumed as 1800 hect/cumecs and 780 hect/cumecs. Also compute delta for each case.

SECTION - II

- 3 (a) Discuss the design principle of a channel using Lacey's theory.
(b) List out different types of canal outlets and discuss them.

- 4 (a) What is water logging? What are the causes and ill-effects of water logging?
(b) Design a concrete lined trapezoidal channel to carry a discharge of 220 cumecs at a slope of 1 in 5500. The side slopes of the channel are 1:1 and Manning's coefficient is 0.015. The limiting velocity in the channel is 2.1 m/s.

SECTION - III

- 5 (a) Discuss in brief various causes of failure of weirs and their remedies.
- (b) State the essential features of Khosla's theory of seepage flow underneath weir. How does it differ from Bligh's theory?
- 6 What are the components of a diversion head work? Draw the layout and show the components.

SECTION - IV

- 7 (a) Explain how you will select site for a reservoir.
- (b) What do you understand by the terms elementary profile and practical profile of a gravity dam?
- 8 (a) Describe in brief various modes of failure of a gravity dam.
- (b) Explain about drainage galleries and foundation treatment of gravity dam.

SECTION - V

- 9 (a) Discuss the merits and demerits of different types of spillway gates.
- (b) Explain the design procedure for the standard stilling basin type I.
- 10 How spillways are classified? Describe briefly the different types of spillways.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech I Semester

**ENVIRONMENTAL ENGINEERING - II
(Civil Engineering)**

Time : 3 hours

Max Marks: 60

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

SECTION-I

- 1 (a) Illustrate the factors affecting storm sewage. Give an account of determination of quantity of storm sewage
- (b) Encapsulate the purpose and functioning of automatic Flushing tank with neat sketch.
2. (a) Explain Systems of Plumbing with neat sketches.
- (b) Determine the size of a circular sewer for a discharge of 700lps running half full. Assume hydraulic gradient of 1 in 1000 and manning's constant = 0.013

SECTION-II

- 3 (a) Describe various types of decomposition of sewage? Explain Nitrogen cycle of decomposition.
- (b) 5 day BOD of a waste water sample at 20°C is 210 mg/l. What is its 3 day BOD at 37°C
- 4 (a) Describe primary treatment? Briefly explain various treatment units of it?
- (b) Design a circular clarifier to treat 5MLD of sewage. Allowable surface loading is 30,000 lt/sq m/day.

SECTION-III

- 5 Write short notes on the following
 - (a) Attached and Suspended Growth Systems
 - (b) Sludge Volume Index (SVI)
 - (c) Re-Circulation and its advantages.
- 6 (a) Write short notes on the following
 - (i) Algal –Bacterial symbiosis
 - (ii) Return Sludge
- (b) Explain the principle of action and working of Trickling Filter with neat diagram.

SECTION-IV

- 7 (a) What is Sludge digestion? Describe the factors affecting sludge digestion
(b) What are the de-watering techniques of sludge? Describe Vacuum filter with neat sketch.
- 8 (a) Differentiate Nitrification and De- Nitrification processes
(b) Explain the methods of removal of Phosphates from waste water.

SECTION-V

- 9 (a) Define self -purification process of water bodies ? Draw a neat sketch of Oxygen Sag curve with all salient components. What is its significance?
(b) What is sewage sickness of soils ? How is it rectified?
- 10 (a) What are the methods of disposal of septic tank effluents. Explain with neat sketches.
(b) Design a septic tank for 80 users for a sewage flow rate of 60 lpcd. Also check for minimum space requirement.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

QUANTITY SURVEYING & VALUATION
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

SECTION - I

1 Estimate the quantities of the following items of work for the residential building shown in the figure 1.

- a) Earth work in excavation for foundation
- b) PCC (1:5:10) in foundation
- c) Brick work in foundation and Plinth with 1:6 CM

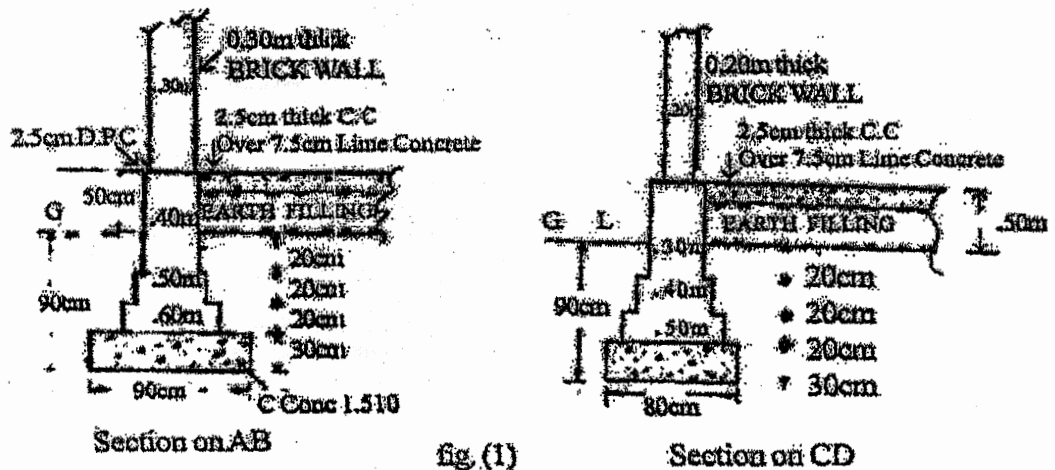
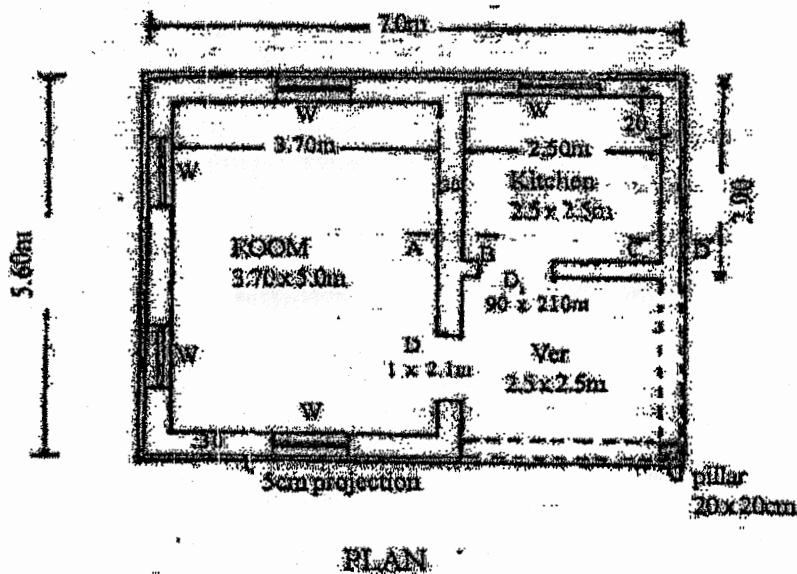


fig. (1)

- 2 a) What is approximate method of estimation and explain its significance?
b) Name the various types of estimation you know and under what circumstances each one of them is prepared?

SECTION - II

- 3 a) What are the advantages and disadvantages of open specifications?
b) Prepare a detailed specification for brick masonry in 1:8 C.M.
- 4 Write down the detailed specification for the following items.
a) Foundation Concrete
b) Damp Proof Course
c) Inside Plastering

SECTION - III

- 5 Prepare the rate analysis for the following items.
a) Brick work in super structure with cement mortar 1:6 for 1 cu.m.
b) 12 mm thick plastering to the brick work with cement mortar 1:4 for 1 cu.m.
- 6 Prepare a rate analysis for I class brick work in 1:6 cement mortar including supply of all materials, labour, T & P etc. Cost of bricks = Rs. 2000/- per 1000 No's, Cement = Rs. 250 per bag, Sand = Rs. 1000/- per cu.m., mason = Rs. 350/- per day, male mazdoor = Rs. 250/- per day, woman mazdoor Rs. 200/- per day, mixing charges = Rs. 100/- per day. Any other required data may be assumed suitably.

SECTION - IV

- 7 a) What are the different types of contract systems. Explain any two of them with their advantages and disadvantages.
b) Differentiate between Earnest Money and Security Money.
- 8 Write short notes on the following:
a) Advantages and disadvantages of cost-plus contracts
b) Measurement book
c) Tender notice
d) Factors affecting validity of a contract

SECTION - V

- 9 A three storied building has been constructed on a plot of land measuring 800 sq.m. The plinth area of each storey is 400 sq.m. The life of the building may be taken as 70 years. The building fetches a gross rent of Rs. 1500/- per month. Calculate the capitalized value of the property on the basis of 10% net yield. For sinking fund 3% compound interest may be assumed. Cost of land may be taken as Rs. 450/- per sq.m. Any other required data may be assumed suitably.
- 10 a) Explain any two methods of calculating depreciation of property.
b) Explain various factors affecting valuation of property.

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech I Semester**PRE-STRESSED CONCRETE STRUCTURES
(Civil Engineering)**

Time: 3 hours

Max. Marks: 60

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

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SECTION - I

- 1 (a) Explain the necessity of using high tensile steel and high strength concrete in prestressed concrete.
- (b) With the help of neat sketches describe the Freyssinet system of prestressing.
- 2 A pre-stressed concrete beam, 150mm wide and 300mm deep is pre-stressed by a cable which has an eccentricity of 100mm at the centre of the span section. The span of the beam is 6 m. If the beam supports two concentrated loads of 15 kN each at one-third span points, determine the magnitude of the pre-stressing force in the cable for load balancing for the following cases:
 - (a) Live loads only
 - (b) Both self weight of the beam + live loads

SECTION - II

- 3 A concrete beam is prestressed by a cable carrying an initial prestressing force of 300 kN. The cross sectional area of the wires in the cable is 300 mm². Calculate the % loss of stress in the cable only due to shrinkage of concrete using IS: 1343 recommendations assuming the beam to be
 - a) Pre-tensioned
 - b) Post tensioned
 Assume $E_s = 210 \text{ kN/m}^2$ $E_c = 32 \text{ kN/mm}^2$
and age of concrete at transfer = 8 days.
- 4 A post tensioned pre-stressed beam of rectangular section 250 mm wide is to be designed for an imposed load of 12 kN/m, uniformly distributed over a span of 12 m. The stress in the concrete must not exceed 17 N/mm² in compression and 1.5 N/mm² in tension at any time and the loss of prestress may be assumed to be 15%.
 - a) Calculate the minimum possible depth of the beam, and
 - b) Calculate the minimum prestressing force and the corresponding eccentricity.

SECTION - III

- 5 A PSC beam is of unsymmetrical I section having top flange width and thickness as 750 mm and 250 mm respectively. The bottom flange width and thickness are 500 mm and 250 mm respectively. The total depth is 1700 mm. Thickness of web is 200 mm. The area of prestressing steel is 1400 mm^2 . The prestressing steel is provided at a distance of 100 mm from the soffit of the beam. If $f_{ck} = 40 \text{ MPa}$ and $f_{pu} = 1700 \text{ Mpa}$, calculate the ultimate flexural strength using IS Code.
- 6 A PSC beam of 8m span of rectangular section, 130mm wide and 320mm deep is axially pre-stressed by a cable carrying an effective force of 190 kN. The beam supports a total uniformly distributed load of 6 kN/m, which includes the self weight of the member. Compare the magnitude of the principal tension developed in the beam with and without the axial prestress.

SECTION - IV

- 7 A precast pre-tensioned unit of rectangular section of size 120 mm x 240 mm is used as a part of a composite beam of span 6 m. This unit is prestressed by tendons with their centroid coinciding with the bottom kern point. The initial force in the tendon is 240 kN. The loss of prestress may be assumed to be 15%. The unit is incorporated as the web of a composite beam by casting a slab of flange width of 480 mm and thickness of 40 mm. On the top of the precast unit the composite beam supports a L.L of 4 kN/m^2 . Calculate the resultant stresses developed in the precast and cast-in-situ concrete assuming the pretensioned unit as unpropped while casting the in-situ slab. The ratio of Moduli of elasticity between the precast unit and cast-in-situ slab is 1.25.
- 8 Enumerate the differential shrinkage stresses in composite construction of PSC members. Explain clearly the procedure for evaluating resulting stresses in a composite member due to differential shrinkage.

SECTION - V

- 9 The deck slab of a road bridge of span 10 m is to be designed as a one-way pre-stressed concrete slab with parallel post-tensioned cables in each of which the force at transfer is 500 kN. If the deck slab is required to support a uniformly distributed live load of 25 kN/m^2 with the compressive and tensile stress in concrete at any stage not exceeding 15 and zero N/mm^2 respectively. Calculate the maximum horizontal spacing of the cables and their positions at the mid span section. Assume the loss ratio as 0.80.
- 10 Design a post-tensioned pre-stressed concrete two-way slab, 6 m by 8 m in size to support a live load of 3 kN/m^2 . If cables of four wires of 5 mm diameter stressed to 1000 N/mm^2 are available for use, determine the number of cables in the two principal directions. The stresses in concrete not to exceed 15 N/mm^2 in compression and tensile stresses are not permitted under service loads. The loss ratio is 0.8. Check for the limit states of serviceability and collapse.

IV B.Tech I Semester**CONSTRUCTION PLANNING & MANAGEMENT
(Civil Engineering)**

Time: 3 hours

Max. Marks: 60

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

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SECTION - I

- 1 Classify the construction works. Explain the resources needed for construction industry.
- 2 What is Construction Management? Explain the significance and objectives of construction Management.

SECTION - II

- 3 (a) Explain the classification of activities and events.
(b) Compare the PERT with CPM.
- 4 A construction project have the following data.

Activity	Preceding activity	Duration (Weeks)
A	None	5
B	A	2
C	A	6
D	B	12
E	D	10
F	D	9
G	D	5
H	B	9
I	C,E	1
J	G	2
K	F,I,J	3
L	K	9
M	H,G	7
N	M	9

- (i) Draw network (ii) Find the critical path
- (ii) Prepare an activity schedule showing ES, EF, LS, LF and FLOAT for each activity

SECTION - III

- 5 With outline diagram explain the operation of Jaw crusher and Impact crusher
- 6 (a) Describe the tower crane
(b) Describe the working and utility of Bull dozer.

SECTION - IV

- 7 Explain the principles of inspection.
- 8 (a) What are technical services required for inspection of construction work?
(b) What is quality control? Why it is needed? What are its objectives?

SECTION - V

- 9 Explain the principles of the organization.
- 10 (a) Explain Safety measure to be followed in blasting of hard rocks
(b) Prepare the typical job layout for a polytechnic building.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester**ECONOMICS & ACCOUNTANCY**
(Civil Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) Define Elasticity of Demand. Explain its significance.
- (b) The price of the product is Rs.1500 and the original quantity demanded is 8,000 units, When the price falls to Rs.1200 and the quantity demanded rises to 10,000 units, Simplify the price elasticity of demand.
- 2 “Every want supported by the willingness and ability to buy constitutes demand for a particular product of service”. Identify the determinants and function of the demand?

SECTION - II

- 3 “The technical relationship which reveals the maximum amount of output capable of being produced by each and every set of inputs”. Construct the production function with one variable input with graphically and illustrate.
- 4 You given the following information about two companies in 2000

Particulars	Company A	Company B
Sales	Rs.50,00,000	Rs.50,00,000
Fixed Expenses	Rs.12,00,000	Rs.17,00,000
Variable Expenses	Rs.35,00,000	Rs.30,00,000

You are required to Calculate and examine (for Both Companies)

- (i) BEP
- (ii) P/V ratio
- (iii) Margin of Safety
- (iv) Sales required to earn a profit of Rs.2,00,000

SECTION - III

- 5 (a) In monopoly, the marginal revenue is less than Average revenue. Examine.
(b) Show & Discuss the features of monopolistic competition markets.
- 6 Price for a given product or service at a given point of time is determined by intersection of demand and supply at that point. Elaborate. Also classify the other methods are available in pricing a product or service.

SECTION - IV

- 7 Examine the features of sole trader business. Discuss the merits and demerits of sole trader.
- 8 Explain the partnership form of business. Discuss the merits and demerits of partnership form of business

SECTION - V

- 9 During January 2013 Narayana transacted the following business. Construct the journal entries in the books of Narayana.

Date	Particulars	Rs.
1.	Commenced business with cash	40,000
2.	Purchased goods on credit from shyam	30,000
3.	Received cash from Murthy	3,000
4.	Paid wages	500
5.	Goods returned to shyam	200
6.	Goods sold to Kamal	10,000
7.	Goods returned by Kamal	500
8.	Paid into bank	500
9.	Goods sold for cash	750
10.	Bought goods for cash	1,000
11.	Paid salaries	700
12.	Withdrew cash for personal use	1,000

- 10 ABC Co Ltd .Is proposing to mechanize their operations. Two proposals A and B in the form of quotations have been received from two different vendors. The proposal in each case Rs.5,00,000/- a discount factor of 14% is used to compare the proposals cash flow after tax are likely to be as under

Cash flows after Tax (CFAT) in Rs.		
Year	Proposal –A	Proposal –B
1.	1,50,000	50,000
2.	20,000	1,50,000
3.	2,50,000	2,00,000
4.	1,50,000	3,00,000
5.	1,00,000	2,00,000

Calculate and examine the Net present Value.

Code : 13EE4114

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

POWER SEMICONDUCTOR DRIVES
(Electrical & Electronics Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

1. (a) Explain the principle of closed-loop control of a DC drive using Suitable Block diagram.
(b) Explain the concept of constant torque control and constant power control.
2. (a) What are the various parts of Electric Drives? Explain in detail
(b) Explain the Speed-Torque characteristics of a DC series motor.

SECTION - II

- 3 Describe the relative merits and demerits of the following braking for the DC motors: Mechanical braking, Dynamic Braking and Regenerative Braking with neat diagram.
- 4 (a) Discuss in detail the draw backs of rectifier fed DC drives.
(b) Distinguish between circulating current and non-circulating current mode of operation.

SECTION - III

- 5 (a) A Class A Chopper, operating in Time-Ratio control is supplying the armature of a separately excited DC motor, Derive the speed-torque relationship.
(b) A dc Chopper controls the speed of a separately excited motor. The armature resistance is $R_a=0.05$ Ohms; The back emf constant is $K_v= 1.527$ v/A-rad/s. The rated field current is $I_f=2.5$ A. The dc input voltage to the chopper is $V_s=600$ V. If it is required to maintain a constant developed torque of $T_d=547$ N-m, plot the motor speed against the duty cycle k of the chopper.
- 6 A 230 V, 1200 rpm, 15A separately excited dc motor has an armature resistance of 1.2 Ohm. Motor is operated under dynamic braking with chopper control. Braking resistance has a value of 20 Ohm. (i) Calculate the duty ratio of chopper for motor speed of 1000 rpm and braking torque is equal to 1.5 times rated motor torque. (ii) What will be the motor speed for duty ratio of 0.5 and motor torque equal to its rated torque?

SECTION - IV

- 7 (a) Draw the speed –torque characteristics, Which are obtained by stator voltage variation of 3- Phase Induction motor.
- (b) A 3-Phase, 4 pole, 50 Hz Induction motor has rotor resistance of 0.2 Ohm and stand still reactance of 0.1 Ohm. At full load it operates at a slip of 4 %. If the voltage is reduced to 50 %, at What speed will the motor operates with full load torque applied?
- 8 (a) In variable frequency control of asynchronous motor, Why V/f ratio is maintained constant up to base speed and V constant above base speed ? Draw the relevant characteristics.
- (b) Compare the performance of VSI & CSI fed Induction motor drives. Mention advantages & Disadvantages.

SECTION - V

- 9 (a) Compare the performance of Static scherbius drive & Static Kramer drive.
- (b) Describe self-controlled and load-commutated inverter controlled synchronous motor drives in detail.
- 10 Describe the open loop and closed loop methods of speed control of synchronous motor using VSI.

IV B.Tech. I Semester**SWITCHGEAR AND PROTECTION**
(Electrical & Electronics Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 Explain the term insulation coordination. Describe the construction of volt-time curve and terminology associated with impulse testing.
- 2 (a) What are the causes of over voltages?
(b) How overhead transmission lines are protected from lightning?

SECTION - II

- 3 Discuss the rate of rise of restriking voltage and explain its importance in arc extinction.
- 4 (a) Explain the concept of resistance switching by deriving necessary expressions.
(b) In 220kV system, the reactance and capacitance up to the location of circuit breaker is 8Ω and $0.025 \mu\text{F}$, respectively. A resistance of 600 ohms is connected across the circuit breaker. Determine the following:
 - (i) Natural frequency of oscillation
 - (ii) Damped frequency of oscillation
 - (iii) Critical value of resistance which will give no transient oscillation

SECTION - III

- 5 (a) Write the operation of an oil circuit breaker with neat diagram also Lists its advantages and disadvantages.
(b) What are the ratings and specifications of a circuit breaker?
- 6 (a) Discuss in detail about the fundamental requirements of a protective relay.
(b) Write the operation of SF_6 circuit breaker with neat diagram also Lists its advantages and disadvantages.

SECTION - IV

- 7 (a) Discuss with necessary circuit diagram, the principle of operation of an induction disc relay. What are the advantages of induction cup relays over induction disc relays?
(b) Write a short note on Balance beam Relay.

8 Explain types of amplitude comparators.

SECTION - V

9 Describe the three zone distance relay protection of the line using impedance relays.

10 (a) Explain the differential pilot wire method of protection of feeders.

(b) Discuss in detail about the fault bus protection by using circuit diagram.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

ELECTRICAL DISTRIBUTION SYSTEMS

(Electrical & Electronics Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
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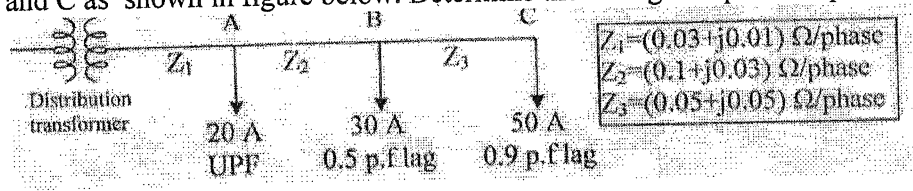
- 1 (a) Explain the characteristics of residential, Agricultural, industrial and commercial loads.
- (b) Explain briefly classification of loads? How is load modeling done in distribution Networks.
- 2 (a) Explain the following terms:
 - (i) Maximum demand. (ii) Coincident demand.
 - (iii) Contribution factor. (iv) Loss Factor
- (b) Assume that the annual peak load of a primary feeder is 2500 kW, at which the power is 70 kW per three phases. Assuming an annual loss factor of 0.15. Determine: (i) The average annual power loss. (ii) The total annual energy loss due to the copper losses of the feeder.

SECTION - II

- 3 (a) Discuss the various factors effecting the selection of the primary feeder rating.
- (b) Discuss the factors affecting the primary feeder voltage levels and primary feeder loading.
- 4 (a) How do you analyze a substation service area with 'n' primary feeders.
- (b) Compare the four and six feeder patterns of substation service area if they are thermally loaded.

SECTION - III

5 Consider a three phase, 3 wire, 240 V secondary system with balanced loads at A, B and C as shown in figure below. Determine the voltage drop in one phase of laterals.



6 A synchronous motor improves the power factor of a load of 300 kW from 0.8 lagging to 0.9 lagging. Simultaneously the motor carries a load of 150 kW. Determine: (i) The leading kVAR taken by the motor. (ii) kVA rating of the motor. (iii) Power factor at which the motor operates.

SECTION - IV

- 7 (a) Write the objectives of distribution system protection.
(b) Explain LG fault and LL fault in distribution systems.
- 8 (a) Explain principle of operation of circuit breaker.
(b) Explain coordination procedure of protective devices.

SECTION - V

- 9 (a) Explain the effect of shunt compensation on distribution system.
(b) Explain need of fixed capacitor and switched capacitor in distribution systems.
- 10 (a) Write the procedure to determine the best location of the capacitor in distribution system.
(b) A synchronous motor improves the power factor of a load of 300 kW from 0.8 lagging to 0.9 lagging. Simultaneously the motor carries a load of 150 kW. Determine: (i) The leading kVAR taken by the motor. (ii) kVA rating of the motor. (iii) Power factor at which the motor operates.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

POWER SYSTEM ANALYSIS
(Electrical & Electronics Engineering)

Time: 3 hours

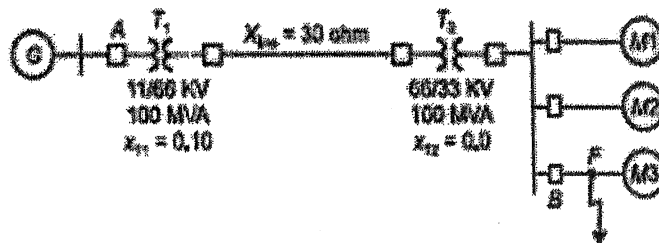
Max. Marks :60

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

1 A 100MVA,11KV generator with $X''=0.20$ p.u is connected through a transformer and line to a bus bar that supplies three identical motor as shown in fig. and each motor has $X''=0.20$ p.u and $X'=0.25$ p.u on a base of 20MVA,33KV.the bus voltage at the motors is 33KV when a three phase balanced fault occurs at the point F. Calculate

- (a) subtransient current in the fault
- (b) subtransient current in the circuit breaker B
- (c) Momentary current in the circuit breaker B
- (d) The current to be interrupted by CB B in (i) 2 cycles (ii) 3 cycles (iii) 5 cycles (iv) 8 cycles



- 2 (a) Explain about the transients due to short circuit in 3 phase alternators under loaded conditions.
- (b) Explain Z-Bus formation using Step by step method.

SECTION - II

- 3 (a) Show that symmetrical component transformation is power invariant.
- (b) Explain phase shift in a star delta transformer.
- 4 (a) Explain the sequence impedance and sequence network of a synchronous machine.
- (b) Explain the construction of sequence network of power system.

SECTION - III

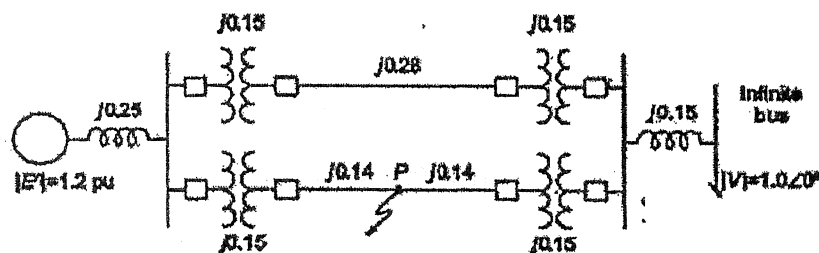
- 5 (a) Derive the expression for fault current for a LG fault at the terminals of an unloaded alternator. Show the interconnection of sequence network.
- (b) The line to ground voltages on the High voltage side of a step-up transformer are 100 kV, 33kV and 38 kV on phases a, b and c respectively. The voltage of phase 'a' leads that of phase 'b' by 100° and lags that of phase 'c' by 176.5° .
 $V_a = 100 \angle 0^\circ$; $V_b = 33 \angle -100^\circ$; $V_c = 38 \angle 176.5^\circ$
- 6 (a) Discuss the symmetrical component method to analyze an unbalanced three phase system.
- (b) Derive the expression for three phase power in terms of Symmetrical components.

SECTION - IV

- 7 (a) Derive the basic equations for Load flow studies and also write the assumptions and approximations to get the simple equations.
- (b) Draw the flowchart for load flow solution by using Gauss seidel iterative method using Y_{BUS} .
- 8 (a) Derive necessary expressions for off diagonal and diagonal elements of the sub matrices J_1, J_2, J_3, J_4 for carrying out a Load flow study on power system by using N-R method in polar form.
- (b) Explain decoupled Load flow method to find solution of system with the help of flow chart.

SECTION - V

- 9 (a) What is Equal area criterion? Interpret this for a case when there is sudden short circuit at one end of the line of parallel lines.
- (b) What are the factors influencing Transient stability?
- 10 Find the critical clearing angle for the system shown in figure for a 3-phase fault at the point "P". The generator is delivering 1.0 pu power under pre-fault conditions



IV B.Tech. I Semester

MICRO CONTROLLERS AND EMBEDDED SYSTEMS
(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) With a neat internal architecture, explain the features of 8051 microcontroller.
(b) Define addressing modes. Give the list of different addressing mode that are used in 8051 microcontroller with considering an example.
- 2 (a) Give the bit descriptions of the PSW, TCON and SCON registers of 8051 microcontroller.
(b) Write an assemble language program for LED blinking in 8051 microcontroller.

SECTION - II

- 3 (a) Illustrate the features of PIC microcontrollers with considering architectural changes as compared to general purpose microcontroller.
(b) Discuss how the pipelining and parallelism will improve the performance of microcontrollers.
- 4 (a) Give the list of PIC microcontroller register and instruction set.
(b) Explain the addressing modes of PIC microcontrollers with considering an example to each addressing mode.

SECTION - III

- 5 (a) Define embedded system and discuss the applicability of embedded system to real time applications.
(b) Give the classifications of embedded systems.
- 6 (a) Discuss how software is embedded in to embedded a system to suit for a typical application.
(b) Explain the functionality of hardware units involved in embedded system.

SECTION - IV

- 7 (a) Illustrate the process of selection of processor in design of embedded system.
(b) Define the term hardware and software partitioning in embedded system.
- 8 (a) Explain the cycles of embedded system software development tools.
(b) Give the list of procedural steps to load the software into target system for testing.

SECTION - V

- 9 (a) Give the differences between normal and real time operating system.
(b) Describe the basic methodology of interrupt service routine.
- 10 (a) Explain use of the mail boxes in an embedded system with its real time operations.
(b) Write short notes on priority inversion problem.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech I Semester

MANAGEMENT SCIENCE
(Common for EEE, ECE & CSE)

Time: 3 hours

Max. Marks: 60

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

* * *

SECTION-I

1. (a) Define Management. Examine the functions of management.
(b) Distinguish between Line organization and Staff Organization.
2. What is the contribution of Henry Fayol to the Management process? Are his administrative principles strictly enforceable in the current trends towards participative management process? Examine.

SECTION-II

3. (a) Identify the factors that influence the selection of plant location.
(b) Explain about production control in detail.
4. What do you understand by corporate planning? Examine its mission and objectives.

SECTION-III

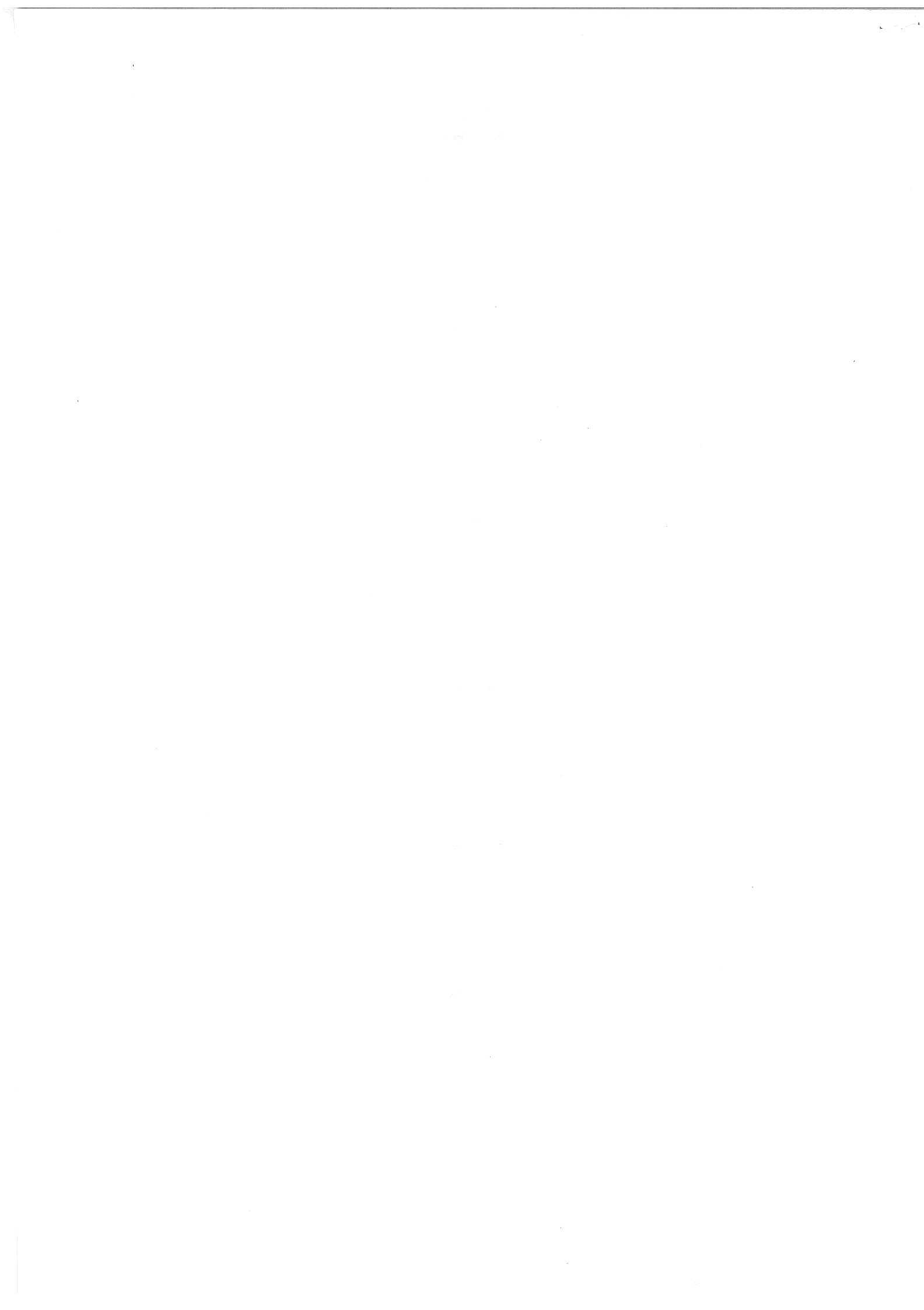
5. Define merit rating? Examine the methods of the merit rating adopted in the organization.
6. Define Personnel management. Examine basic functions of Personnel management.

SECTION-IV

7. (a) What is depreciation? Examine any two methods of depreciation.
(b) Distinguish between batch production and mass production.
8. Define method study? Examine the basic procedure involved in method study.

SECTION-V

9. (a) What are the advantages of Network techniques? Where these techniques can be applied? Explain.
(b) Examine the importance of 'crashing' in the network analysis
10. (a) Distinguish between PERT & CPM.
(b) Identify the rules for drawing network diagram.



B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester
COMPUTER NETWORKS
(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

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

* * *

SECTION - I

- 1 Describe the mathematical model of data signal using Fourier series. Also, explain how to determine the maximum data rate of a channel.
- 2 What is multiplexing? Explain the role of multiplexing in computer communications.

SECTION - II

- 3 Explain in detail about static and dynamic channel allocation algorithms
- 4 Computer Ethernet, Token Bus and Token Ring technologies to point out similarities and differences among them

SECTION - III

- 5 What are the issues that the designers of the network layer must grapple with? Describe them in detail by using suitable example.
- 6 Describe how connections are created and managed by transport layer protocols

SECTION - IV

- 7 What are the functionalities of presentation layer? Explain them in detail.
- 8 Discuss about the support provided by UNIX operating system for computer communications.

SECTION - V

- 9 Describe in detail about world wide web concept used in Internet.
- 10 What is GGI script? How it is helpful in computer networks?



B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

VLSI DESIGN

(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

SECTION – I

1. (a) What are the CMOS technologies?
(b) Explain different types of pull ups for an inverter and compare its relative merits and demerits.
2. (a) Compare CMOS and BiCMOS.
(b) Derive an equation for I_{ds} of an n-channel enhancement MOSFET operating in non-saturation and Saturation region.

SECTION – II

3. Explain the Stick diagram rules and draw the stick diagram for two input CMOS NAND & OR gates.
4. (a) Explain Sheet resistance, Standard unit of capacitance $\square c_g$ with suitable examples.
(b) Write notes on (i) Writing capacitances (ii) Driving large Capacitive loads

SECTION – III

5. Write notes on: (i) Switch logic (ii) and gate logic
6. Explain briefly Power delay estimation, Clock and Power routing

SECTION – IV

7. Explain the process of design of 4x4 barrel shifter and its regularity in design process.
8. (a) How are the ALU functions are implemented with adders?
(b) Explain high density Memory Elements.

SECTION – V

9. (a) Write a short note on circuit synthesis.
(b) Give comparison of design capture tools and design verification tools.
10. (a) Write about different fault models.
(b) List out all the possible stuck at faults for three input NAND gate and thus generate the minimum test vectors that detect all the faults.



IV B.Tech. I Semester**DIGITAL SIGNAL PROCESSING**

(Common for EEE & ECE)

Time : 3 hours

Max. Marks :60

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

* * *

SECTION - I

- 1 (a) State and prove the convolution property of Z-transform.
(b) Find the z-transform of the sequence $x(n) = r^n \sin(n\theta)u(n)$.
- 2 (a) Find the impulse response of the following difference equation
 $y(n) - 5y(n-1) + 6y(n-2) = x(n)$
(b) Find the DTFS for $x(n) = \sin(0.2\pi n) + 2\cos(0.4\pi n)$.

SECTION - II

- 3 (a) Find the DFT of the sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using DIT algorithm.
(b) State and prove circular frequency shifting property of DFT.
- 4 If $x(n)$ is an even length sequence with an N-point DFT $X(k)$, then determine the N-point DFT of the following in terms of $X(k)$.

$$(i) \quad y(n) = x(n) - x\left(n - \frac{N}{2}\right)$$

$$(ii) \quad y(n) = x(n) + x\left(n - \frac{N}{2}\right)$$

SECTION - III

- 5 Determine the cascade and parallel realization for the system function

$$H(z) = \frac{(1 - 0.5z^{-1})(1 - 0.66z^{-1})}{(1 - 0.75z^{-1})(1 - 0.125z^{-1})}$$

- 6 (a) Find the linear phase realization for FIR system with system function
 $1 + 0.2z^{-1} + 3z^{-2} - 0.43z^{-3} + 0.9z^{-4} - 0.43z^{-5} + 3z^{-6} + 0.2z^{-7} + z^{-8}$
(b) Find the state space representation of the discrete-time system
 $y(n) - 2y(n-1) + 6y(n-2) + 9y(n-3) = x(n) + 2x(n-1) + 0.8x(n-2)$

SECTION - IV

- 7 Determine the system function $H(z)$ of Chebyshev filter with the following specification
3db ripple in the passband $0 \leq \omega \leq 0.2\pi$
25db attenuation in stopband $0.45\pi \leq \omega \leq \pi$
- 8 (a) Derive the equation for the order N of Butterworth filter.
(b) Derive the Butterworth polynomial for 3rd order Butterworth filter.

SECTION - V

- 9 Using frequency sampling method, design a band reject filter with the following specifications.
Sampling frequency $F=12\text{kHz}$, cutoff frequency $f_{c1} = 3000\text{kHz}$, $f_{c2} = 6000\text{kHz}$, $N = 13$
- 10 Explain the applications of DSP in speech and radar signal processing.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

RADAR ENGINEERING

(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

* * *

SECTION - I

- 1 (a) Derive the Radar equation.
(b) Summarize about the different Radar System Losses.
- 2 (a) A certain Radar is operating operates at a frequency of 10GHz, Peak pulse power of 600 kW. The antenna Effective area is 5m^2 and the cross sectional area of the Target is 20m^2 , Minimum receivable power is 10^{-13} Watts. Determine the Maximum range of the Radar.
(b) Discuss the applications of the Radar.

SECTION - II

- 3 (a) Describe the principle of operation for a normal circular magnetron and list its characteristics.
- 4 (a) What is Noise Figure and Noise Temperature of Radar Receivers.
(b) Solve the equation for Noise Figure and Noise Temperature of cascaded N Two ports.

SECTION - III

- 5 (a) Discuss the Radiation patterns for Circular aperture antenna.
(b) State the concept of Beam Steering.
- 6 (a) Explain the architecture for phased arrays.
(b) List the advantages and limitations of phased array antennas.

SECTION - IV

- 7 (a) Draw the block diagram of the FM Altimeter. Explain about its operation.
- (b) Describe the method of Staggering PRFs to reduce the effect of Blind Speeds in MTI radar.
- 8 Interpret the Two co-ordinate Amplitude Comparison Monopulse Tracking Radar.

SECTION - V

- 9 (a) Recall clutter, derive the radar equation for surface clutter.
- (b) Brief out some of sources that affect the Atmospheric echoes in detail.
- 10 (a) Obtain the Radar equation for weather clutter.
- (b) Explain sea clutter and list the applications of Radar.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

**CAD / CAM
(Mechanical Engineering)**

Time: 3 hours

Max. Marks: 60

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

* * *

SECTION - I

- 1 How CAD/CAM system are evaluated? Explain in detail by categorizing different evaluation parameter during selection.
- 2 What is automation? Explain the various categories of automation.

SECTION - II

- 3 Describe at least two editing and solid modeling commands.
- 4 What are the various curve representation methods?

SECTION - III

- 5 What are the major components of NC machine? Explain in detail.
- 6 Discuss the CNC and manual part programming methods.

SECTION - IV

7. Describe the scheduling and dispatching issues related to Flexible Manufacturing System.
- 8 Discuss the layout design of FMS (i) Circular layer (ii) Liner layer (iii) Loop layer (iv) Free layout.

SECTION - V

- 9 Define computer aided quality control. Explain how it is implemented.
- 10 State the advantages of CIM in manufacture industry in detail.



B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech I Semester

**PRODUCTION SYSTEMS
(Mechanical Engineering)**

Time : 3 hours

Max Marks: 60

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

SECTION-I

- 1 Differentiate between product and process layout. Also discuss the significance of each type.
2. (a) Define agile manufacturing. Mention the feature of agility.
(b) Explain the conceptual framework of agile manufacturing.

SECTION-II

- 3 (a) Briefly describe the steps involved in Squared Euclidean distance location problem.
(b) List out the various Multi facility location models with suitable examples.
- 4 Find the optimum location of the new facility such that the total cost of material Consider the location of a new plant which will supply raw materials to a set of existing Plants in a group of companies, let there are 5 existing plants which have a materials movement relationship with the new plant. Let the existing plants have locations of (400,200),(800,500),(1100,800),(200,900)and(1300,300). Furthermore suppose that the number of tons of materials transported per year from the new plant to various existing plants are 450,1200,300,800 and 1500, respectively the objective is to determine optimum location for the new plant such that the distance moved(cost)is minimized

SECTION-III

- 5 (a) What is Material Requirements Planning? Explain the classification of MRP
(b) What are the main objectives of value engineering?
- 6 List and elaborate the advantages of line balancing technique

SECTION-IV

- 7 Explain the concept of manufacturing for competitive advantage framework.
- 8 What are the main differences between the aggregate planning strategies?

SECTION-V

- 9 (a) A project has the following times schedule

Activity	Times in weeks	Activity	Times in weeks
(1 - 2)	4	(5 - 7)	8
(1 - 3)	1	(6 - 8)	1
(2 - 4)	1	(7 - 8)	2
(3 - 4)	1	(8 - 9)	1
(3 - 5)	6	(8 - 10)	8
(4 - 9)	5	(9 - 10)	7
(5 - 6)	4		

Construct the network and compute

1. Earliest and latest times for each activity
2. Float for each activity
3. Critical path and its duration

- 10 (a) Distinguish between CPM and PERT

A project has the following characteristics

Activity	(a)	(b)	(m)
(1 - 2)	1	5	1.5
(2 - 3)	1	3	2
(2 - 4)	1	5	3
(3 - 5)	3	5	4
(4 - 5)	2	4	3
(4 - 6)	3	7	5
(5 - 7)	4	6	5
(6 - 7)	6	8	7
(7 - 8)	2	6	4
(7 - 9)	5	8	6
(8 - 10)	1	3	2
(9 - 10)	3	7	5

Construct a PERT network. Find the critical path and variance for each event.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech I Semester**DESIGN OF MACHINE ELEMENTS****(Mechanical Engineering)**

Time : 3 hours

Max Marks : 60

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

- 1 (a) Name any three types of rigid shaft coupling. State why they are called rigid coupling?
- (b) Design a split muff coupling to transmit 25kW at 200RPM. The allowable shear stress for the shaft and key is 10MPa and number of bolts connecting two halves are six. The permissible stress for the bolt is 70MPa. The coefficient of friction between the muff and shaft surface is 0.3.
- 2 (a) What are the various types of keys? Discuss their merits and demerits.
- (b) A rectangular sunk key of size 14x10x90mm is used on a shaft of 50mm diameter and transmits 60kW at 480RPM. The maximum overload may be taken as 30% of full load. Determine the stress induced in the shaft and key. Take stress concentration factor due to the keyway as 1.4.

SECTION-II

- 3 (a) Differentiate between hydro static and hydro dynamic lubrication.
- (b) Design a journal bearing for a centrifugal pump to the following specifications.
Diameter of journal = 75mm, Speed of journal = 1140 rpm, load on each journal = 11500N.
- 4 (a) Differentiate between static and dynamic load carrying capacity of rolling contact bearing.
- (b) Select a single row deep groove ball bearing for a radial load of 4500N and an axial load of 5500N, operating at a speed of 1600 rpm for an average life of 5 years at 10 hours per day. Assume uniform and steady load.

SECTION-III

- 5 (a) What is the function of a spring?
- (b) At the bottom of a main shaft a group of 10 identical helical springs are set in parallel to absorb the shock caused by the falling of the cage in the case of failure. The loaded cage weighs 75kN. If the loaded cage falls through a height of 50m from rest. Find the maximum stress induced in each spring if it is made of 50mm diameter steel rod. The spring index is 6 and the no. of active turns in each spring is 20, modulus of rigidity $G=80\text{kN/mm}^2$.

- 6 A Truck spring has 12 number of leaves, two of which are full length leaves. The spring supports are 1.05m apart and the central band is 85mm wide. The central load is to be 5.4kN with a permissible stress of 280Mpa. Determine the thickness and width of the steel spring leaves. The ratio of total depth to width of the spring is 3. Also determine the deflection of the spring.

SECTION-IV

- 7 (a) Define the terms (i) Pitch circle (ii) Pressure and (iii) Module as applicable to gear drives.
- (b) Design a Spur gear drive to transmit 40kW from a shaft running at 1500 rpm to another shaft with a speed reduction of 4. Assume load factor of 1.75.
- 8 A Helical gear of cast steel of required transmit 37.5kW at 1800 rpm. The helix angle is 30° . If the gear has 24 teeth. Determine the necessary diametral pitch and width for 20° full depth teeth. The allowable static stress for the gear material may be taken as 50N/mm^2 . The width of the face parallel to the axis may be taken 4 times the circular pitch. Estimate the end thrust on the gear.

SECTION-V

- 9 Design a connecting rod of an I-section for the following data.
Crank radius = 300mm
Diameter of the piston = 130mm
Connecting rod length = 1800mm
Speed = 400 rpm
Density of the material = 7.2 gm/cc
Explosion pressure = 2.5N/mm^2 , Factor of safety = 6
Neglect the weight of the reciprocating parts.
- 10 Design an aluminium alloy piston for a single acting four stroke engine for the following data.
Cylinder bore = 400mm
Stroke = 375mm
Maximum Gas pressure = 9Mpa
Fuel consumption = 0.22 kg/kW. Hr
Speed = 50 rpm.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester
REFRIGERATION & AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

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

* * *

SECTION - I

- 1 (a) In a vapor compression refrigerator the working fluid is superheated at end of compression and is under cooled in the condenser before throttling. Show a working cycle on T-S diagram and also derive an expression of COP from that diagram.
- (b) A 20 ton capacity NH₃ vapor compression refrigeration system is working on a theoretical cycle without any losses between pressure limits of 12 bar and 1.2 bar. The liquid leaves the condenser at 15^oC and the vapor leaves the evaporator at -15^oC. Determine the
(i) COP and (ii) power required.
- 2 (a) What are the environmental effects with CFC refrigerants and what are the substitutes for CFC refrigerants?
- (b) How are refrigerants designated?

SECTION - II

- 3 (a) Explain the working of evaporative condenser with neat sketch
- (b) Explain the working of shell and tube evaporator with neat sketch
- 4 (a) How do you classify the compressors used in the refrigeration system and also explain the working of any one compressor with neat sketch.
- (b) What are different types of cooling towers? Explain Mechanical draft cooling tower with neat sketch.

SECTION - III

- 5 (a) With the help of neat sketch explain the working of thermostatic expansion valve.
- (b) Explain how the refrigerant is charged also explain any one method of measuring refrigeration charge.
- 6 What are the applications of cryogenics? Explain the process of liquefaction of air.

SECTION - IV

- 7 Prove that the relation between degree of saturation and relative humidity is given by an expression

$$\phi = \mu P_t / P_t(1-\mu)P_{vs}$$

Where P_t = Total pressure of moist air

P_{vs} = Partial pressure of water vapor when air is fully saturated

ϕ = Relative humidity

μ = degree of saturation

- 8 An air conditioning system is designed for industrial process for hot and wet summer conditions:

Outdoor conditions 30 DBT and 75% RH

Required conditions 22 DBT and 70% RH

Amount of free air calculated 200 m³/min

Coil dew point temperature 14⁰C

The required condition is achieved first by cooling, dehumidifying and then by heating

Find the following:

i) capacity of cooling coil in KW

ii) capacity of heating coil in KW and surface temperature of the heating coil if B.F.P is 0.2

iii) mass of water vapor removed by eliminator per hour

SECTION - V

- 9 (a) Explain the factors affecting the optimum effective temperature.
(b) Explain summer air conditioning process with the help of psychrometric chart and locate SHF in the chart
- 10 (a) Explain cooling with dehumidification on psychrometric chart.
(b) Write short note on comfort chart

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

**TOOL DESIGN
(Mechanical Engineering)**

Time: 3 hours

Max. Marks: 60

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

* * *

SECTION – I

1. Show the conversion of rake angles from ASA to ORS. Also write the benefits of using ORS system over ASA system.
2. Derive the Modified Merchant Theory and write the assumptions used in it. Also derive the relation for Kronerberg shear angle Reaction.

SECTION – II

3. What are the types of Cutting Fluids? Write the suitable types of cutting fluid that can be used for different tool material and work material along with their characteristics under those conditions.
4. What are the types of Wear? Discuss about each type of wear with the help of Rate of Wear vs Temperature curve. Also discuss the curve “total wear vs Cutting Temperature”.

SECTION – III

5. Discuss the Carbide tool and Coated Carbide tool in detail. Write the Advantages and disadvantages of using these tools. Explain the methods of coating used in its manufacturing.
6. Explain Steady Rest and Follower Rest. Discuss the Cutting tool Geometry associated with Lathe. What are the type of single point cutting tool used in Lathe operation?

SECTION – IV

7. Derive the equation for Velocity and Time using Taylor tool life equation for
 - a. Minimum cost of production
 - b. Maximum rate of production

Also explain the Rate of production curve and Time curve for above two conditions and also correlate them with each other for showing the working range of cutting velocity.

8. Explain the types of Dies used in Press working with the help of suitable diagram. Also write the Operational steps and Limitations of them.

SECTION – V

9. A key way of 16 mm width, 6 mm depth and 45 mm long is to be milled on a 50 mm diameter shaft 150 mm long, at the middle of its length. Sketch a suitable fixture and indicate all the parts, if the operation is to be done using a vertical milling machine.
10. Answer the following questions :
- c. When is a diamond-pin used for locations?
 - d. Sketch a quick acting clamp.
 - e. What is the difference between a jig and a fixture?
 - f. What is meant by fool proofing in the design of a jig?
 - g. What is the purpose of a setting block in a fixture?
 - h. What are modular fixtures?

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

MACHINE DYNAMICS AND VIBRATIONS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

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

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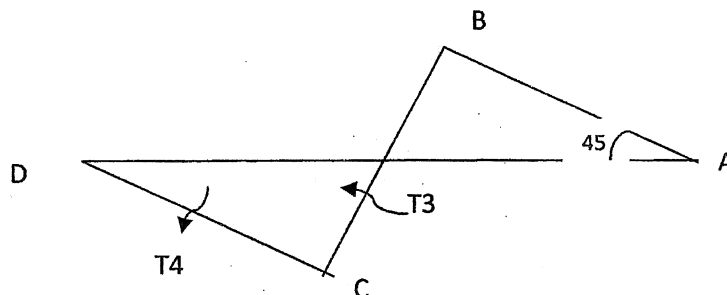
SECTION - I

- 1 (a) What is free body diagram and explain it with an example
(b) A four bar mechanism is subjected to the following external forces. The input link AB makes an angle 60° with horizontal.

Link (Link No)	Length (mm)	Force	Magnitude(N)	Point of application force
AB (2)	550	F2	88N at 73.5°	358 mm from A
BC(3)	726	F3	158N at 58°	327 mm from B
CD(4)	616	F4	66 N at 42°	410 mm from D
AD(1)	1100	--	(Fixed Link)	---

Determine the shaft torque T2 and its direction on the input link AB for static equilibrium of the mechanism. Also find the forces on the bearings A,B,C and D

- 2 In four bar link mechanism torque T3 and T4 have magnitudes of 40 Nm and 30 Nm respectively. The link lengths of AB=250mm, BC= 600 mm, CD=350mm and AD=700mm. For static equilibrium position find the required torque T2.



SECTION - II

- 3 (a) Explain various types of follower motions used in cam mechanisms.
(b) Draw and explain the displacement, velocity and acceleration diagrams for a follower when it moves with SHM.

- 4 Use the following data in drawing the profile of a cam in which a knife-edged follower is raised with uniform acceleration and deceleration and is lowered with simple harmonic motion: Least radius of cam = 60 mm Lift of follower = 45 mm Angle of ascent = 60° Angle of dwell between ascent and descent = 40° Angle of descent = 75° If the cam rotates at 180 rpm. Determine the maximum velocity and acceleration during ascent and descent.

SECTION – III

- 5 (a) Write a short notes on Balancing of Machines and Balancing of Linkages
(b) Derive an expression for unbalanced reciprocating primary and secondary forces in a single cylinder engine.
- 6 A four cylinder vertical engine has cranks 300mm long. The plane of rotation of the first, third and fourth cranks are 75°, 105° and 165° respectively from that of the second crank and their reciprocating masses are 10kg, 400kg and 250kg respectively. Find the mass of the reciprocating parts for the second cylinder and relative angular position of the cranks in order that the engine may be in complete balance.

SECTION – IV

- 7 (a) Derive an expression for natural frequency of free transverse vibrations by considering inertia of a disc.
(b) A steel bar 25 mm wide, 45 mm deep and 900 mm long is fixed at one end and at other end it carries a load of mass 800 kg. Find the natural frequency of transverse vibrations. Consider the Young's modulus for the shaft material as 210 GN/m^2 . If an additional mass of 200 kg is distributed uniformly over the length of the shaft, what will be the frequency of transverse vibrations?
- 8 A rotor of mass of 12kg and is mounted midway on a 24mm diameter horizontal shaft supported at the ends by bearings. The bearings are 1 m apart. The shaft rotates at 2400 rpm. If the center of the rotor is 0.11 mm away from the geometric centre of the rotor due to certain manufacturing defects. Find the amplitude of the steady state vibration and the dynamic force transmitted to the bearings. Take $E=210 \text{ GN/m}^2$.

SECTION – V

- 9 (a) Define and derive an expression for logarithmic decrement of viscous vibrations
(b) A vibrating system consists of a mass of 70Kg, a spring stiffness 40KN/m and a damper. The damping provided is 25% of critical value. Determine
(i) Damping factor
(ii) Critical damping coefficient
(iii) The natural frequency of damped vibrations
(iv) The logarithmic decrement
(v) The ratio of two successive amplitudes
- 10 Mass of a single degree damped vibration system measures 6 Kg and makes 25 free oscillations in 11 sec. The amplitude of vibration reduces by 30% of its initial value after 5 oscillations. Determine
(i) Stiffness of spring (ii) Logarithmic decrement (iii) Damping factor (iv) Critical damping coefficient (v) Actual damping coefficient

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Code : 13CS4102

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester

**ARTIFICIAL INTELLIGENCE
(Computer Science & Engineering)**

Time : 3 hours

Max. Marks :60

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

* * *

SECTION - I

- 1
- a) What is Artificial Intelligence? Discuss the four approaches to AI have been followed.
 - b) What AI can do today? List the few applications of AI.
- 2
- a) By giving neat diagram, explain how agents interact with environments through sensors and actuators.
 - b) Write pseudocode agent programs for the goal-based and utility-based agents.

SECTION - II

- 3
- a) Summarize the five components needed for a simple problem solving agent with prototype.
 - b) List the four components required for each node of n of the tree with a neat diagram by giving CHILD-NODE function.
- 4
- a) Prove Breadth-first search is a special case of uniform-cost search.
 - b) Construct Hill-Climbing search algorithm with the help of 8-queens problem.

SECTION - III

- 5
- a) Justify how alpha-beta pruning can be applied to trees of any depth.
 - b) Examine how to extend the minimax idea to multiplayer games with neat diagram.
- 6
- a) By defining constraint satisfaction problem, illustrate map coloring problem.
 - b) What are the ways in which the structure of the problem can be examined, to find solutions quickly? Explain.

SECTION - IV

- 7
- a) Outline the knowledge-based agent program with a sample wumpus world by the PEAS description.
 - b) Construct a resolution algorithm for propositional logic.
- 8
- By giving semantics of various elements of the language, list first-order logic reflects the ontological commitment to objects and relations.

SECTION - V

- 9
- a) Explain the different forms of learning.
 - b) Discuss about decision tree representation and list the attributes that we will consider as part of the input for a table at restaurant.
- 10
- a) Elaborate Current-best-hypothesis search for positive and negative will wait example.
 - b) Explain learning using relevance information in detail.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester**DATA WAREHOUSING AND DATA MINING****(Computer Science & Engineering)**

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) What is Data Warehouse? Write notes on data warehouse architecture.
(b) Discuss in detail about the business driven approach of data warehouse.
- 2 (c) Explain in detail the data warehouse development life cycle.

SECTION – II

- 3 (a) Define dimensions. Elaborate on their relationship & hierarchies.
(b) Discuss the slowly changing and rapidly changing dimension types.
- 4 (a) Write short notes on granularity and additives of facts.
(b) Explain functional dependency of the data.

SECTION - III

- 5 Define each of the following data mining functionalities: characterization, classification, clustering, and outlier analysis. Give examples of each data mining functionality, using a real-life database that you are familiar with.
- 6 (a) What is the importance of data reduction during data analysis? Write in detail about any two data reduction strategies.
(b) Write short notes on Min-max and z-score normalization methods.

SECTION – IV

- 7 With the aid of suitable examples, explain the following:
 - a) Support
 - b) Confidence
 - c) Frequent itemset
 - d) Closed itemset
 - e) Maximal frequent itemset
 - f) Association Rule
- 8 (a) Discuss the possible enhancements to Apriori algorithm.
(b) Consider suitable examples and show how to generate Association Rules from Frequent Itemsets.

SECTION – V

- 9 (a) Outline the major steps of decision tree classification.
(b) Write in detail about linear regression.

- 10 (a) Discuss the working of K-means clustering technique.
(b) Briefly explain density-based Local outlier detection techniques.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester
C# AND. NET FRAME WORK
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) Discuss about the characteristics of C#.
- (b) What is CLR? Explain the components of CLR.
- 2 (a) What are Name spaces in C# ? Explain the importance of Name spaces?
- (b) Explain about Boxing and Un- Boxing with suitable examples?

SECTION - II

- 3 (a) Explain about Operator over loading in C#.
- (b) What is a Delegate? Explain about Delegate invocation with an example.
- 4 (a) Explain the importance of this keyword in C#.
- (b) What is Inheritance? Explain multi –level inheritance with examples.

SECTION - III

- 5 (a) Explain the procedure of building a Windows Application in C#.
- (b) What is cab project in Visual Studio? Discuss how a window application can be deployed.
6. (a) What is ADO.NET? Explain the ADO.NET object model.
- (b) Explain the use of Data adapter in customizing the data sets.

SECTION - IV

- 7 (a) Explain the life cycle of a web application in Visual Studio .NET.
- (b) Discuss the steps involved in the design of a web application for connecting with the data base.
- 8 (a) What is SOAP? Explain the purpose of WSDL in developing Web services.
- (b) Discuss the procedure for building a web service using Visual Studio. NET.

SECTION - V

- 9 (a) What is a shared Assembly? Explain the steps involved in creating a shared assembly.
- (b) What are attributes? Explain about the custom attributes in detail.
- 10 (a) What are contexts? Discuss about context-bound and context- agile objects.
- (b) Explain the concept of Thread. Explain how to create, manage and kill threads.

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019
IV B.Tech. I Semester

SOFT COMPUTING
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) Define a neural network and explain the characteristics of neural network.
(b) Explain the various architectures of neural networks.
- 2 (a) Describe about the effect of Tuning parameters of the back propagation network.
(b) Explain the architecture of a Back propagation network.

SECTION - II

- 3 (a) Briefly explain about Heterocorrelators with an example.
(b) Distinguish between Crisp sets and Fuzzy sets.
- 4 (a) Explain the ART2 network model in detail.
(b) Discuss about Defuzzification methods.

SECTION - III

- 5 (a) Give and explain some real-time examples where Genetic Algorithm is used.
(b) Explain how offsprings are created in genetic algorithm.
- 6 (a) Explain generation cycle in genetic modeling.
(b) Discuss about mutation and bit-wise operator in genetic modeling.

SECTION - IV

- 7 (a) Explain about Fuzzy logic and Genetic Algorithm Hybrids.
(b) Describe GA based Weight determination.
- 8 (a) Explain LR-Type Fuzzy numbers.
(b) Explain Fuzzy Back Propagation Networks.

SECTION - V

- 9 (a) Explain about the working of Simplified Fuzzy ARTMAP.
(b) Define ARTMAP and explain the FAM rules with Multiple Antecedents/Consequents.
- 10 (a) Explain about the FLC-GA Based Structural Optimization.
(b) Write a short note on Fuzzy controllers.

Code : 13CS41E3

B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester
WIRELESS NETWORKS
(Computer Science & Engineering)

Time : 3 hours

Max. Marks : 60

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

SECTION - I

- 1 (a) Define Wireless networks? Explain about Digital Cellular Telephony system.
- (b) Summarize the challenges in wireless networks
- 2 (a) Briefly explain about Fixed Wireless Links
- (b) Outline the satellite communications.

SECTION - II

- 3 Express the Modulation Techniques for Wireless Systems
- 4 Illustrate the Multiple Access for Wireless Systems.

SECTION - III

- 5 (a) Explain the Satellite Communications Characteristics
- (b) Illustrate VSAT systems.
- 6 Write short notes on a)MMDS b)LMDS.

SECTION - IV

- 7 (a) Discuss the benefits of Wireless LANs.
- (b) Mention the Wireless LAN Requirements.
- 8 Describe The IEEE 802.11 MAC Sublayer.

SECTION - V

- 9 Simplify the Destination-Sequenced Distance-Vector (DSDV) Routing Protocol .
- 10 (a) Elaborate the attacks on wireless networks.
- (b) Discuss the WATM Protocol architecture.



B.TECH. DEGREE EXAMINATION, NOVEMBER 2019

IV B.Tech. I Semester**SOFTWARE ARCHITECTURE
(Computer Science & Engineering)**

Time : 3 hours

Max. Marks :60

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

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SECTION - I

- 1 (a) Discuss about the status of software architecture.
- (b) What is software architecture? This architecture was influenced by whom and explain.
- 2 (a) Who are the Stake holders? Explain the influence of Stake holders on software Architecture.
- (b) Define architectural style. Explain any five commonly used styles.

SECTION - II

- 3 Explain interpretation in software development environments in detail.
- 4 What are shared information systems? Explain the evolution of shared information system in business data processing

SECTION - III

- 5 (a) How will you define a inter operability ? Give an example.
- (b) What is the need of a design space?
- 6 (a) Explain the Design Rules of User interface Architecture.
- (b) Brief the validation experiment.

SECTION - IV

- 7 Discuss briefly and explain CORBA – a case study on computing infrastructure.
- 8 (a) Differentiate between software architecture and software design.
- (b) Describe, why system based analysis is important if you have already completed component and connector level analysis.

SECTION - V

- 9 Describe about ADL. Explain the application of ADL's in system development.
- 10 Write short note on the following
 - (a) Reconstructing software architecture
 - (b) Evolution of a product line.
 - (c) Architectural reengineering

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Code: 13CS4104

B.TECH, DEGREE EXAMINATION, NOVEMBER 2019
IV B.Tech. I Semester

WEB TECHNOLOGIES
(Computer Science & Engineering)

Time: 3 hours

Max. Marks: 60

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

SECTION-I

1. What is web page? List difference between Static and Dynamic web pages.
2. Write a script that inputs an encrypted four-digit integer and decrypts it to from the original number.

SECTION-I

3. What is DOM? Write a structure for a simple document.
4. What is XML? Explain how to create XML document.

SECTION-III

5. Explain the life cycle of a Servlet.
6. Discuss how you handle HTTP Requests and HTTP Responses by using Java Servlets.

SECTION-IV

7. Draw and Explain the Block diagram of Client-Server architecture.
8. Explain briefly about the role of the client in Client-Server Environment.

SECTION-V

9. What is Cookie? How to store and retrieve values in cookie in PHP.
10. Explain Regular Expressions in PHP.

