Code No. 2084

FACULTY OF ENGINEERING

B. E. ¾ (Civil) I – Semester (Backlog) Examination, December 2019

Subject :Theory of Structures – I

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1. Determine the kinetic indeterminancy for the continuous beam shown in Fig. 1 2

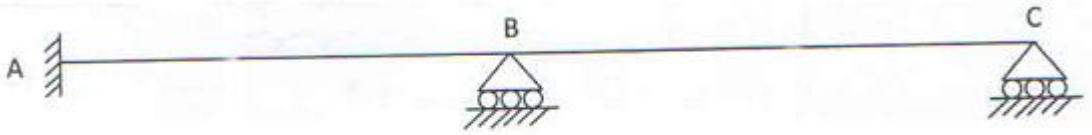

Fig. 1

2. What are the basic assumptions in slope deflection method? 3

3. Using moment distribution method. Compute BM at 'A' in the propped cantilever shown in Fig. 2. 3

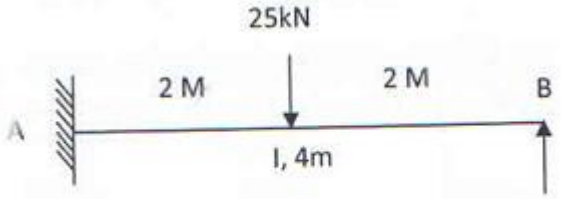

Fig.2.

4. The sum of distribution factors at a joint is ____. 2

5. What are the limitations of Kani's method? 2

6. Determine the rotation factors at the joint B of the frame ABC shown in Fig. 3 3

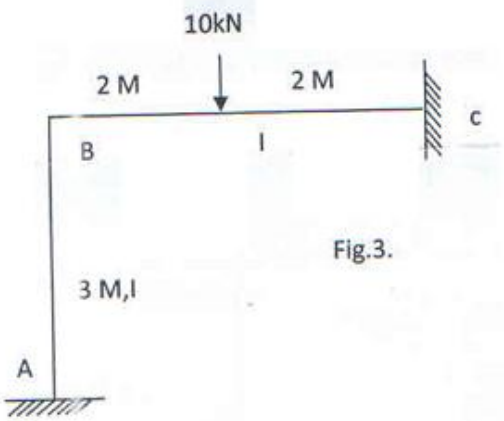

Fig.3.

7. Simply supported beam of span l carries a concentrated load P, at distance 'a' from the left support. Find the strain energy stored in the beam. 3

..2

8. State Castigliano's of theorem II. 2

9. State the static indeterminacy of a fixed semi-circular arch and a three hinged parabolic arch. 2

10. Prove that the three hinged parabolic arch loaded with an udl will have no moment throughout the arch. 3

PART – B (5 x 10 = 50 Marks)

11. Analyze the frame shown in Fig. 4 using slope deflection method. Draw BMD and SFD. Take EI as constant for all members. 10

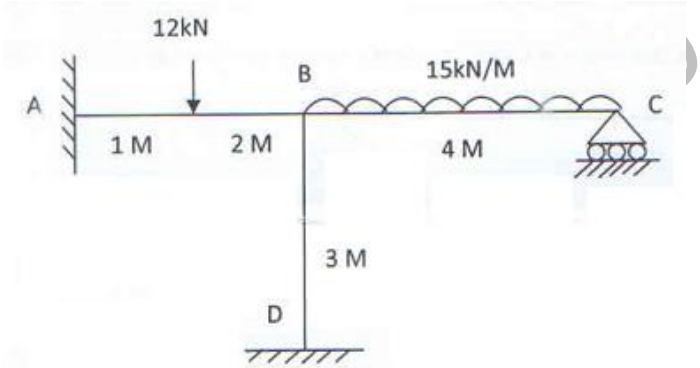

Fig. 4

12. Analyze the continuous beam continuous beam shown in Fig. 5 by moment distribution method and draw B.M.D. Support B sinks by 2.5 mm I = $3.5x10^7$ mm and E = 200 kN/mm^2 10

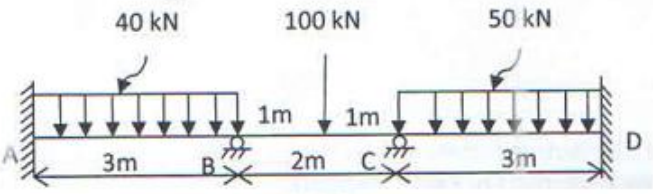

Fig. 5

13. Use Kani's method to analyze the frame shown in Fig. 6 Draw BMD. 10

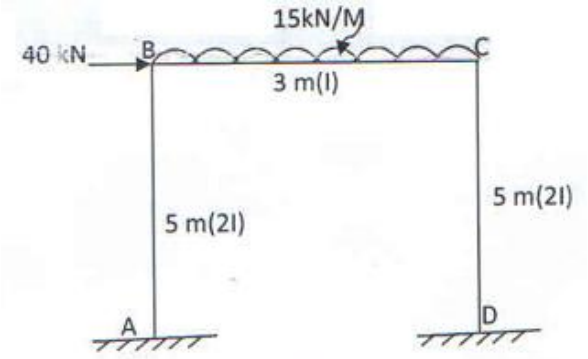

Fig.6.

....3

14. A braced cantilever is loaded as shown in Fig. 7. All members are of the same cross sectional area and Young's modulus. Find the axial force in the member BC. 10

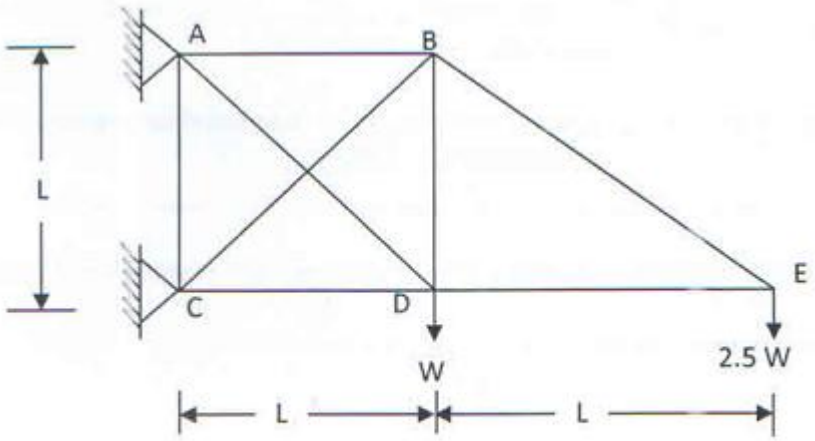

Fig. 7

15. Derive the expression for horizontal thrust at the hinge support in case of two hinged parabolic arch having supports at same level, subjected to a concentrated load 'W' acting at 'a' from left support of the arch. Take horizontal length of arch as L. 10
16. Analyze the frame shown in Fig.8, Method distribution method. Draw B.M.D. 10

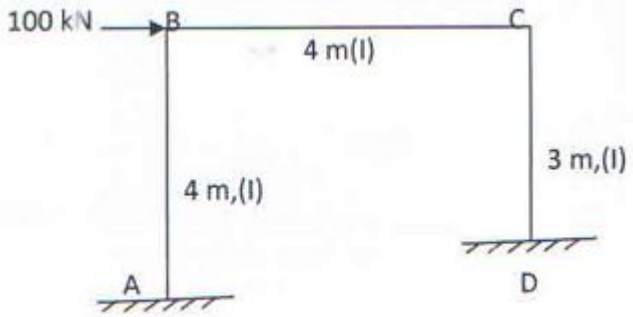

Fig. 8

17. Draw B.M.D. for the beam shown in Fig. 9, using Kani's method. 10

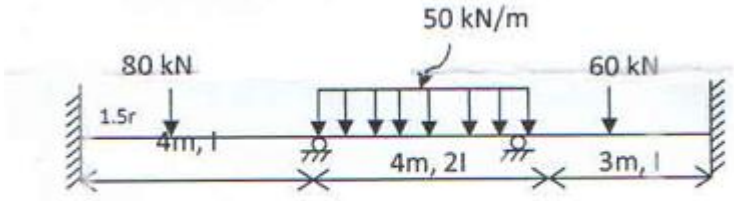

Fig.9.

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Code No. 2090

FACULTY OF ENGINEERING

BE 3/4 (EEE/Inst.) I – Semester (Backlog) Examination, December 2019

Subject: Power Electronics

Time: 3 Hours **Max. Marks:75**

Answer all questions from Part – A & any five questions from Part – B.

Part – A (25 Marks)

1. Show the symbol and structure of IGBT and P channel MOSFET. [3]
2. Differentiate between natural and forced commutation circuits? [2]
3. Draw the structure and V-I characteristics of SCR? [3]
4. Give complete classification of converters. [2]
5. Explain the differences between circulating current mode and non circulating current mode dual converters. [3]
6. Find out the average output voltage of 1-ϕ converter for a 230 V_{rms} supply and firing angle of 30^0. [2]
7. List out the control strategies of Chopper. [2]
8. Explain the working principle of Ac voltage control? [3]
9. Describe the working principle of multi level inverter. [3]
10. List out voltage control methods of inverters? [2]

Part – B (10x5 = 50 Marks)

11 a) Explain the switching characteristics of MOSFET with necessary diagrams. [5]
b) Explain the switching characteristics of BJT with necessary diagrams. [5]

12. a) Draw and explain class B commutation. [5]
b) Explain the driver circuit for power BJT? [5]

13. a) Explain the effect of source inductance on output voltage of converter. [4]
b) A three-phase fully controlled bridge converter is connected to 3-phase ac supply of 400v,50Hz and operates with a firing angle $\alpha=45^0$.the load current is maintained constant at 10A and the load voltage is 360V. Compute
(i) Source inductance L
(ii) Load resistance R
(iii) Overlap angle μ. [6]

14. a) A simple chopper is operating at a frequency of 2 kHz from a 100 V DC source to supply a load resistance of 10 Ω. The load time constant is 5 ms. If the average load voltage is 59 V. Find
(i) the Ton period of the chopper,
(ii) The average load current,
(iii) the magnitude of the ripple current and its RMS value. [6]
b) Draw and explain with neat output wave forms the operation of AC voltage controller with R-load. [4]

15. Explain in detail working of 3-phase voltage source inverter with neat waveforms. Also derive the phase and line voltages for 120º mode of operation. [10]

16. a) Derive average load voltage and load current of 1-ϕ full wave rectifier with RL-load. Assume continuous conduction. [5]
b) Explain the working of a step up converter. [5]

17. Write a short note on: [10]
a) Static characteristics of SCR.
b) Sinusoidal pulse width modulation technique.

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Code No. 2098

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I - Semester (Backlog) Examination, December 2019

Subject : Digital System Design with Verilog HDL

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any Five questions from Part-B.

PART – A (25 Marks)

1	What is procedural assignment statement? Give an example.	3
2	Give examples for $display and $monitor.	2
3	Draw state diagram for reaction timer.	3
4	Discuss generate blocks with an example.	2
5	Write Verilog code for T-FF using D-FF.	3
6	State the need for state minimization techniques.	2
7	Draw ASM chart for vending machine.	3
8	List out the elements of ASM chart and their operation.	2
9	Draw 6T SRAM cell and write its operation.	3
10	Draw FPGA architecture.	2

PART – B (50 Marks)

11	a)	Explain various simulation types.	3
	b)	Write Verilog code for BCD adder.	7
12	a)	Explain the basic concepts of Static Timing Analysis.	5
	b)	Write Verilog code for 4 : 1 Multiplexer using gate level modeling.	5
13		Design and Write Verilog code for Moore type FSM for “1010” sequence detector.	10
14		With neat ASM chart and Verilog code, explain Binary multiplier.	10
15	a)	Realise the function $f = \Sigma(4, 5, 7, 9, 13, 15)$ using PLA.	5
	b)	Draw and explain FPGA design flow.	5
16	a)	Explain data types used in verilog with examples.	5
	b)	Explain multi-way branching with examples for each.	5
17		Write short notes on :	
	a)	Moore Vs Mealy FSM	3
	b)	Hazards	4
	c)	PLDs	3

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Code No. 2106

FACULTY OF ENGINEERING

B.E. 3/4 (M/P/AE) I – Semester (Backlog) Examination, December 2019

Subject: Design of Machine Elements

Time: 3 hours **Max. Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B

Part-A (10 x 2.5 = 25 Marks)

1. Briefly write the General Procedure in Machine Design.
2. Illustrate how the Stress Concentration in a component can be reduced.
3. What type of stresses are subjected in cotter?
4. What is meant by design stress?
5. Distinguish between shaft and axle from the design point of view.
6. What is the effect of key way cut into the shaft?
7. What is the function knuckle joint?
8. Distinguish between differential and compound screw?
9. Discuss the function of a Caulking and Fullering with neat sketches.
10. What are the assumptions of the boiler joints?

Part-B (5 x 10 = 50 Marks)

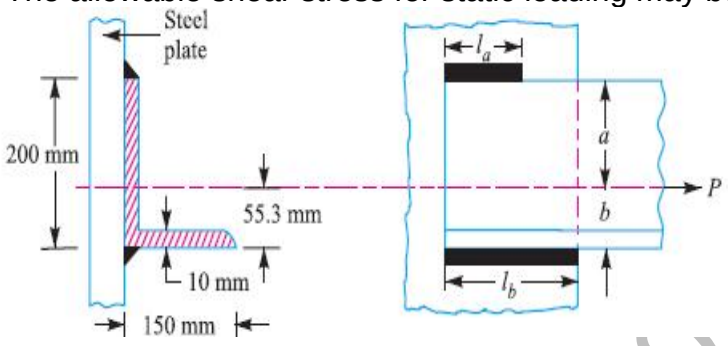
11. A shaft is made of mild steel of yield strength 700MPa is subjected to static loads consisting of bending moment 10kN-m and a torsional moment 30kN-m. Find the diameter of the shaft using the following theories.
    a) Maximum principal stress theory b) Maximum shear stress theory
    c) Maximum principal strain theory d) Maximum strain energy theory
    e) Maximum distortion energy theory
    Assuming a factor of safety of 2. Take E = 210GPa and Poisson's ratio = 0.25

12. Find the diameter of a solid steel shaft to transmit 20kW at 200r.p.m. The ultimate shear stress for the steel may be taken as 360MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5.

13. A double riveted butt joint with double strap zigzag riveting is to be designed for 13mm thick plates Assume σ_t = 80MPa; τ = 60MPa; and σ_c = 120MPa State how the joint will fail and find the efficiency of the joint.

…..2

14. A 200 × 150 × 10 mm angle is to be welded to a steel plate by fillet welds as shown in figure. If the angle is subjected to a static load of 200kN, find the length of weld at the top and bottom. The allowable shear stress for static loading may be taken as 75MPa.



15 Design a sleeve and cotter joint to resist a tensile load of 60kN. All parts of the joint are made of the same material with the following allowable stresses:

σ_t = 60MPa; τ = 70MPa; and σ_c = 125MPa.

16. Design an unprotective type of flange coupling to connect two shafts in order to transmit 10kW at 1440r.p.m. The following permissible stresses may be used:

Permissible shear stress for shaft, bolt and key material = 40MPa

Permissible crushing stress for bolt and key material = 80MPa

Permissible shear stress for the cast iron = 14MPa

17. Write short notes on

a) Type of pulleys flat belts

b) Advantages of chain drives over belt drive

c) Soderberg's equation.

d) Notch sensitivity

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Code No. 2407

FACULTY OF ENGINEERING

B.E.3/4 (A.E.) I-Semester Examinations, December 2019

Subject: Design of Machine Components

Time: 3 hours **Max. Marks: 75**

NOTE: Answer all questions in Part-A. Answer any FIVE questions from Part-B

PART – A (10 X 2.5 =25 Marks)

1 What are the various theories of failures?
2 Write about Preferred numbers.
3 Explain the following terms subjected to variable loads:
i) Stress concentration factor ii) selection of Factor of safety
4 Derive Goodman's equation.
5 Design the shaft for transmitting a power of 20000w at 1000r.p.m. The allowable shear stress for the shaft material is 40MPa.
6 What are the types of Keys? Explain with neat sketches.
7 Discuss on bolts of uniform strength.
8 Explain briefly eccentrically loaded bolted joints with neat diagram.
9 What kinds of failure will occur in a riveted joint?
10 Explain briefly axially loaded unsymmetrical welded section with neat diagram.

PART – B (5 x 10 = 50 Marks)

11 A rod made of cast steel of yield strength 700MPa is subjected to static loads consisting of torsional moment 30kN-m and bending moment 10kN-m. Determine the diameter of the shaft using two different theories of failure, and assuming a factor of safety of 2.
Take E = 210GPa and poisson's ratio = 0.25.

12 A rod of 500mm length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20kN and a maximum value of 50kN. Find the diameter of rod by taking a factor of safety of 1.5, size effect of 0.85, surface finish factor of 0.9, stress concentration factor of 1. The material properties of rod are given by: ultimate strength of 650MPa, yield strength of 500MPa and endurance strength of 350MPa.

13 i) Determine the diameter of the shaft which is rotating at 200r.p.m. and transmit 20kW. The shaft may be assumed to be made of cast steel with an allowable shear stress of 42MPa, neglecting the bending moment on the shaft.
ii) Compare the weight, strength and stiffness of a hollow shaft of the same external diameter as that of solid shaft. The inside diameter of the hollow shaft being half the external diameter. Both the shafts have the same material and length.

14 Design and draw bushed pin type of flexible coupling to transmit 160kN. The design stresses may be taken as 100MPa in tension, 75MPa in shear and 150MPa in compression.

.....2

15) Design a knuckle joint to transmit 140kN. The design stresses may be taken as 80MPa in tension, 60MPa in shear and 140MPa in compression. Draw a neat diagram.

16) Design a steam boiler for a working pressure of 2.5N/mm^2 with its inside diameter 1.6m. Give the calculations for the longitudinal and circumferential joints for the following working stresses for plates and rivets:
In tension = 75MPa; In shear = 60MPa; In crushing = 125MPa

17) Write short notes on
i) "Principal Stress" and "Principal Planes".
ii) Various types of clutches.
iii) Internal expanding brake.
iv) Eccentric loaded welded joint.

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Code No: 2118

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I Semester (Backlog) Examination, December 2019

Subject: Automata Languages and Computation

Time: 3 Hours **Max. Marks: 75**

Note: Answer All Questions from Part-A, & Any five Questions from Part-B

PART – A (25 Marks)

1. Design a DFA for the Lang L over the alphabet ∑ = {a, b} in which each string w ends with ab. [3]
2. Differentiate between NFA and DFA? [2]
3. State the decision properties of regular languages. [3]
4. What do you mean by a derivation tree? [2]
5. What is Chomsky Normal form? [2]
6. State Church's hypothesis? [2]
7. What is undecidability? [3]
8. State pumping lemma for CFL? [3]
9. What is halting problem of a turning machine? [3]
10. Define P and NP classes? [2]

PART – B (50 Marks)

11. Minimize the following DFA [10]

	0	1
A	B	E
B	C	F
*C	D	H
D	E	H
E	F	I
*F	G	B
G	H	B
H	I	C
*I	A	E

12. a) State pumping lemma for Regular Languages? [3]
    b) Prove that the language L= $\{a^n b^n, n >= 1\}$ is not regular? [7]

13. Illustrate the simplification steps needed to generate Chomsky Normal form of CFL. [10]

14. Design a TM to accept L = $\{a^n b^n c^n | n >= 1\}$, and also draw the transition diagram. [10]

15 a) Prove that PCP is undecidable? [5]
    b) State PCP and find whether given instances of PCP has solution or not. [5]

	LIST A	LIST B
1	10	101
2	011	11
3	101	011

16. Write in detail about Chomsky hierarchy of languages? [10]

17. Write notes on any two of the following: [5x2=10]
    a) Recursive and recursively enumerable languages.
    b) LBA
    c) Left most Derivation and Right most Derivation

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Code No. 2126 / O

FACULTY OF ENGINEERING

B.E.3/4 (I.T) I – Semester (Old) Examination, December 2019

Subject: Digital Signal Processing

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part-A and any five questions from Part-B

PART – A (25 Marks)

1	State Parseval's relation in DFT and Z-transform.	3
2	How is FFT faster? Explain	2
3	What are the advantages of disadvantages of FIR filter?	3
4	When a discrete time signal is said to be symmetric (or) anti-symmetric?	2
5	Mention the general form of the z-transform of the IIR system	2
6	What is the importance of poles in filter design?	3
7	Write the features of TMS320C54 x DSP processor	3
8	What is the role of ARAU0 and ARAU1 in the architecture of TMS320C54 x processor?	3
9	How interrupts are handled by C54 x DSP processor?	2
10	What are the different buses of TMS320C54 x processor?	2

PART – B (5x10 = 50 Marks)

11 a) Compute the FFT for the sequence $x[n] = n^2+1$ where N=8 using DIF FFT algorithm. 5

b) State and prove any two properties of DFT. 5

12 a) Design a band pass filter which approximates the ideal filter with cut-off frequencies at 0.2 rad/sec and 0.3 rad/sec. The filter order is N=7. Use the Hamming window function. 6

b) Compare IIR and FIR filters. 4

13 a) Explain S-plane to Z-plane mapping for Bilinear Transformation Technique. 4

b) Design a digital Chebyshev filter to meet the following specifications: 6

$$0.8 \le |H(e^{jw})| \le 1, \quad 0 \le |\mu| \le 0.2®$$

$$|H(e^{jw})| \le 0.2, \quad 0.6® \le |\mu| \le ®$$

Using impulse invariant technique. Assume T=1 sec.

..2

14 a) Identify the addressing modes of the operands in each of the following instructions and their operation. 5

1) ADD B
2) ADD # 1234h
3) ADD 5678h
4) ADD+* addrreg.

b) What are the architectural features of 54XX processor? Explain with a block diagram. 5

15 a) Write a MATLAB program to implement FFT calculation. 5

b) Write the magnitude and phase function of FIR filters when impulse response is anti-symmetric and N is even. 5

16 a) Obtain H(Z) for H(s) = S3 / {(s+1) (s^2 + s + 1) using impulse invariant technique when T = 1 sec. 5

b) With a neat block diagram explain the functions of address generation unit of DSP architecture. 5

17 Write short notes on:

a) Encoding and Decoding using TMS320C54 x x processor. 5

b) Speed issues in programmable DSP processors. 5

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Code No.2123

FACULTY OF ENGINEERING

B.E. ¾ (I.T.) I – Semester (Backlog) Examination, December 2019

Subject: Design & Analysis of Algorithms

Time: 3 Hours **Max. Marks: 75**

PART – A (25 Marks)

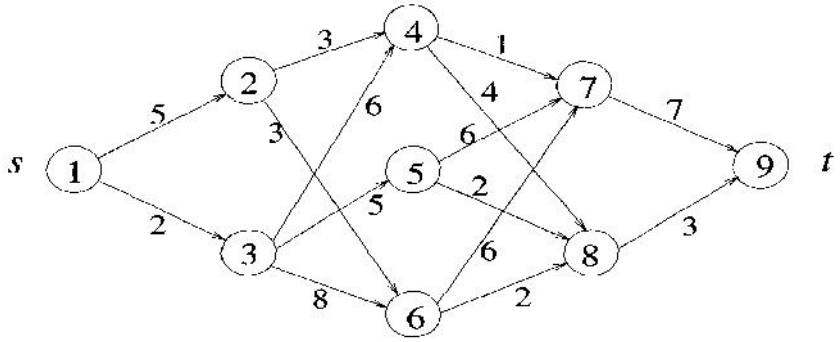
1. Differentiate between feasible and optimal solution. 2
2. Define Bi-connected components. 2
3. Define Big oh, Omega and Theta. 3
4. Write the control abstraction for LC search. 3
5. Write about max-heap with an example. 3
6. State the principal of optimality. 3
7. Write the control abstraction for Greedy Method. 3
8. State the n-Queens problem. 2
9. Define NP-Hard and NP-Complete. Give example. 2
10. State Cook's Theorem? 2

PART – B (5 x 10 = 50 Marks)

11. a) Derive the Min heap for (40, 80, 35, 90, 45, 50, 70). 5
    b) Write the algorithm for weighted union and explain with an example. 5

12. Write an algorithm for merge sort and explain with an example. 10

13. Find a minimum cost path from s to t for the following graph using forward approach. 10



14. a) Give LCBB solution for the following knapsack instance. n = 4, m = 15
    (p1, p2, p3, p4) = (10,10,12,18) (w1, w2, w3, w4) = (2,4,6,9) 6
    b) Explain the Hamiltonian cycle with an example. 4

15. a) Explain node cover decision problem with an example. 5
    b) Explain the max clique decision problem with an example. 5

16. a) State the optimal storage on tapes problem with an example. 5
    b) Explain the graph coloring problem with an example. 5

17. Write short notes on 5+5
    a) DFS graph traversal
    b) Minimum cost spanning tree.

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Code No: 2599/CBCS

FACULTY OF ENGINEERING

B.E. V - Semester (CBCS)(Civil) (Main & Backlog) Examinations, December 2019

Subject : Concrete Technology

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A, & Answer any FIVE Questions from Part-B

PART- A (20 Marks)

1. Define workability of concrete.
2. Differentiate between Segregation and Bleeding.
3. Draw stress-strain curve of concrete and explain the same for the High and Low strength of concrete.
4. Give the relationship between compressive strength, flexural strength and Young's modulus.
5. How are durability aspects considered in various methods of design.
6. What is target strength? Explain.
7. Give any three advantages of mineral and chemical admixtures.
8. List out the various functions of admixtures.
9. Define Recycled aggregate concrete.
10. What are the applications of Ferro cement.

PART- B (5x10 = 50 Marks)

11. (a) Write a note on mixing and batching. (5M)
    (b) Write the relationship between various types of mechanical strength of concrete. (5M)

12. (a) What is curing of concrete? Explain its methods. (5M)
    (b) Explain the maturity concept and factors affecting it. (5M)

13. (a) Explain about types of mix. (5M)
    (b) Design a mix for M_{40} grade concrete using IS code method. (5M)
    Standard Deviation=5
    Specific gravity of cement=3.15
    Specific gravity of fine aggregate=2.60
    Specific gravity of coarse aggregate=2.75
    Water absorption for Fine aggregate and coarse aggregate=0.55% and 0.80%
    Assume any data if required.

14. (a) Discuss the advantages and disadvantages of Ready mix concrete. (5M)
    (b) Explain the quality control aspects of Self compacting concrete. (5M)

15. (a) Discuss the properties of structural light weight concrete and its applications. (5M)
    (b) Discuss the mechanism of fiber reinforced concrete with various applications. (5M)

16. (a) Discuss the practical applications of high performance concrete. (5M)
    (b) How do you control the quality in fiber reinforce and self compacting concrete. (5M)

17. Write a short notes of the following. (10M)
    (a) Curing of concrete.
    (b) Alkali aggregate reaction.
    (c) Fly ash concrete.

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Code No.2610/CBCS

FACULTY OF ENGINEERING

B. E. V – Semester (EEE/Inst.)(CBCS)(Main & Backlog) Examination, Dec. 2019

Subject: Electrical Measurements and Instrumentation

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (2x10=20 Marks)

1 Classify the instruments based on functions of instruments and give examples.

2 The reading '100' of a 120V electrostatic voltmeter is to represent 10,000 volts when its range is extended using a capacitor in series. If the capacitance of the voltmeter at the above reading is 70pF, find the capacitance of the capacitor multiplier required.

3 A 5A, 230V meter on full load unity power factor test makes 60 revolutions in 360 seconds. If the normal disc speed is 520 rev/kWh. What is the percentage error.

4 List indicating instrument which does not require any control torque. Explain why?

5 Explain, how the effect of leakage current is eliminated in measurement of high resistance?

6 Determine the insulation resistance of a short length of cable in which voltage falls from 150 to 100 volts in 40 seconds. The capacity of the condenser is 600pF.

7 List the advantages and disadvantages of instrument transformers.

8 Define the following
a) Magnetic Potential
b) Remanence

9 What are the problems associated with an A.C. Potentiometer?

10 A standard cell of 1.0185 V used with a simple potentiometer balances at 50 cm.
a) Calculate the emf of the cell that balances at 72 cm
b) the percentage error in voltmeter which balances at 64.6 cm when reading 1.33 V.

PART – B (5x10=50 Marks)

11 a) A 50 Volt range spring controlled, electro dynamic voltmeter having a square law scale response takes 0.05A on DC for full deflection of 900. The control constant is 0.5 x 106 N-m/degree and the initial mutual inductance of the instrument is 0.25H. Find the true potential difference across the instrument when it reads 50V at 50Hz. 5

b) Describe the constructional details and working of a sing iron type instrument. 5

12. a) Explain the working of a frequency meter which works based on electrical resonance. 5

b) A correctly adjusted, 1- , 240V induction watthour meter has a meter constant of 600 rev/kWh. Determine the speed of the disc, for a current of 10A at a power factor of 0.8 lagging. If the lag adjustment is altered so that the phase angle between voltage coil flux and applied voltage is 86^{o}C. Calculate the error introduced at 0.5 of lagging. 5

….2

13. A 4-arm bridge network, adjust to balance conditions of: 10
    Arm AB: a standard resistor known to be of 100Ω
    Arm BC: a variable capacitor adjusted to 0.362 μf in parallel with a variable resistor adjusted to 2380Ω.
    Arm CD: a standard resistor known to be of 1000Ω
    Arm DA: a coil of inductance L and series loss resistance R.
    Evaluate L and R deriving the equations used. Draw the phasor diagram

14. Describe the method for determination of B-H curve of a magnetic material using: 10
    i) Method of Reversals and
    ii) Step by Step method

15. a) With a neat sketch explain the construction and working principle of Drysdale potentiometer. 6
    b) Explain how to calibrate wattmetr by using DC potentiometer. 4

16.a) An 8/1 current transformer has an accurate current ratio when the secondary is short circuited. The inductance of secondary is 60mH and its resistance, is 0.5Ω and the frequency is 50Hz. Estimate the current ratio and phase angle error when the instrument load resistance is 0.4Ω and inductance is 0.7mH. Assume no iron loss and magnetizing current equal to 1 percent of primary current. The permeability remains constant. 6

    b) Define the following terms as used for instrument transformers
    i) Turns ratio
    ii) Burden 4

17. Explain any two from the following: 10
    a) Extension range of PMMC voltmeters
    b) Lissajous Figures
    c) Strain Gauges

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Code No. 2624/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) V – Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject: Digital Signal Processing

Time: 3 hours **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. Compare and Contrast DFT and DTFT.
2. State symmetry and conjugate properties of DFT.
3. How many multiplications and additions are involved in direct computation of DFT and FFT? Compare.
4. What is warping effect and how it can be eliminated?
5. Compare IIR and FIR filters in terms of Designing characteristics.
6. Compare various window functions based on width of the main lobe and where first side lobe exists.
7. What is sampling rate conversion and mention its applications?
8. Write a short note on multi-stage implementation of sampling rate conversion.
9. Compare and contrast General purpose Microprocessors with Digital signal processors.
10. What are Guard bits in DSP processors?

PART – B (50 Marks)

11. (a) Compare Linear convolution and circular convolution.

    (b) Determine the response of an LTI system whose impulse response h(n) and input response x(n) are given by using circular convolution method.

    H(n) = {1, 4, 1, -2, 1}; x(n) = {1, 3, 5, -1, -2}.

12. (a) Compute Linear/Circular convolution of the following g sequences using DFT-IDFT method.

    Sequences: x(n) = {1, 2, 0, 1} (h/n) = {1, 1, 1, 1}

    (b) Compute 8-point DFT of the discrete time signal x(n) = {1, 2, 3, 2, 1, 2, 3, 2} using DIF-FFT algorithm.

13. The desired frequency response of a HPF is given by

$$Hd(e^{jw}) = e^{-j3w}; \quad Wc \le |W| \le \pi$$

$$= 0 \; ; \; |W| < Wc$$

Design a linear phase FIR filter using Hamming window for N = 7 and Wc = 2 rad/sample. Realize the filter structure.

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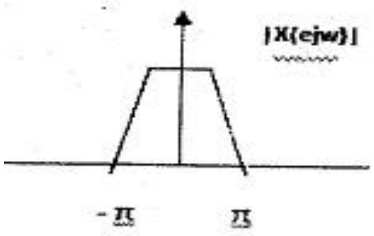
14. Design a Butterworth digital IIR lowpass filter using Bilinear transformation technique by taking T = 0.6 sec, to satisfy the following specifications. Draw direct-form II structure.

$0.6 \leq |H(e^{jw})| \leq 1.0$, for $0 \leq w \leq 0.3\pi$

$|H(e^{jw})| \leq 0.02$, $0.575\pi \leq w \leq \pi$.

15. (a) Derive the expression for the spectrum of output signal of a Decimator.

    (b) Draw the spectrum of the up sampled signal for the sampling rate factor I = 2 and I = 3



16. (a) Write a short notes on various on-chip peripherals of TMS320C5x.

    (b) Explain any four addressing modes of TMS320C5x processor with examples.

17. (a) For the analog transfer, H(s) = (S + 1)/(S + 2)(S + 4), determine H(Z) using impulse invariant technique for T = 1 sec.

    (b) Write a detailed note on Quadrature Mirror Filter bank.

    (c) Write Short notes on properties of Twiddle factor.

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Code No. 2630/CBCS

FACULTY OF ENGINEERING

B.E. (M/AE) V – Semester (CBCS)(Main & Backlog) Examination, December 2019

Subject: Heat Transfer

Time: 3 hours **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. Explain the Physical mechanism of heat conduction in solids.
2. What do you mean by critical radius of insulation? Show that it is given by k/h, where k is the thermal conductivity of insulation and h is the heat transfer coefficient.
3. Explain the effect of extended surface on heat transfer and also the importance of insulated tip solution of the fins used in practice.
4. What is a semi-infinite body? Explain their significance in solving transient conduction problems.
5. What is hydraulic diameter, when it is used?
6. Explain the criterion for deciding the type of convection (free or forced) in any given situation.
7. State and explain the Reciprocity theorem.
8. Define irradiation and radiosity.
9. Define effectiveness and NTU. Explain the physical significance of NTU.
10. Explain why condenser tubes are horizontal.

PART – B (50 Marks)

11. (a) Compute the heat loss per square meter of the surface area of a furnace wall 25 cm thick. The inner and outer surface temperatures are 400^0C and 40^0C respectively. The variation of the thermal conductivity in W/m k with temperature in ^{0}C is given by the following equation: $K = 0.002T-10^{-6}T^2$. 4

    (b) The temperatures on the two surfaces of a 25 mm thick steel plate, (k = 48 w/m^{0}C) having a uniform volumetric heat generation of 30 x 10^6 w/m^3, are 180^0C and 120^0C. Neglecting the end effects, determine (i) The temperature distribution across the plate, (ii) The value and position of the maximum temperature, and (iii) The flow of heat from each surface of the plate. 6

12. (a) Derive expression for temperature distribution and heat dissipation in a straight fin of rectangular profile for the infinitely long fin. 4

    (b) An aluminium cube 12 cm on a side is originally at a temperature of 500^0C. It is suddenly immersed in a liquid at 10^0C for which h is 120 $\frac{w}{m^2k}$. Estimate the time required for the cube to reach a temperature of 250^0C. For aluminium ρ = 2700 kg/m^3, Cp = 900 j/kg k, k = 204 W/mk. 6

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13. A sheet metal of air duct carries air-conditioned air at an average temperature of 10^{0}C. The duct size is 200 mm height x 320 mm width and length of the duct exposed to the surrounding air at 30^{0}C is 15 m long. Calculate the heat gained by the duct. Assuming duct to be horizontal. 10

14. (a) What is a gray body? How does $\mathcal{E}_\lambda$ vary for a gray body and for a real surface? 4

    (b) Emissivities of two large parallel plates maintained at T_1K and T_2K are 0.6 and 0.6 respectively. Heat transfer is reduced 75 times when a polished aluminium radiation shields of emissivity o0.04 are placed in between them. Calculate the number of shields required. 6

15. (a) Draw a temperature -controlled saturated pool boiling curve for a liquid and explain its various regimes. 4

    (b) In a cross flow heat exchangers, both fluids unmixed, hot fluid with a specific heat of 2300 J/kg k enter at 300^{0}C. Cold fluid enters at 25^{0}C and leaves at 210^{0}C. Calculate the required surface area of heat exchanger. Take overall heat transfer coefficient is 750 W/m^{2}k. Mass flow rate of hot fluid is 1kg/s. 6

16. (a) Air at 30^{0}C, 6 m/s flows in a rectangular section size 300 x 800 mm. Calculate the heat leakage per meter length per unit temperature difference. 4

    (b) A steel rod (k = 30 w/m^{0}C), 10 mm in diameter and 50mm ling, with an insulated end, is to be used as a spine. It is exposed to surroundings with a temperature of 65^{0}C and a heat transfer coefficient of 50 w/m^2 ^{0}C. The temperature at the base of the fin is 98^{0}C. Determine 9i) The fin efficiency, (ii) The temperature at the edge of the spine, and (iii0 The heat dissipation. 6

17. (a) A black body at 3000 k emits radiation. Determine (i) Monochromatic emissive power at 1µm wave length, (ii) Wave length at which emission is maximum, (iii) Maximum emissive power, and (iv) Total emissive power. 4

    (b) In a double pipe heat exchanger, hot fluid with a specific heat of 2300 J/kg k enters at 380^{0}C and leaves at 210^{0}C. Calculate the heat exchanger area required for counter flow and what would be the percentage of increase in area if fluid flows were parallel. Take U = 750 w/m^{2}k, mass flow rate of hot fluid is 1kg/s. 6

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Code No. 2635/CBCS

FACULTY OF ENGINEERING

B. E. (Prod.) (CBCS) V – Semester (Main & Backlog) Examination, December 2019

Subject: Machine Tool Engineering

Time: 3 hours **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (10 x 2 = 20 Marks)

1. Sketch heat generation zones of metal cutting using single point cutting tool.
2. State beneficial effect of cutting fluid while machining metal.
3. What is machiniability of material?
4. State the design feature of multi point cutting tools.
5. State the specification of lathe.
6. State four differences between capstan and turret lathe.
7. State four applications of indexing dividing head.
8. Sketch rack cutter generation process on mill machine.
9. What are functions of G code CNC machines?
10. State the feature of Group technology application in manufacturing.

PART – B (5 x 10 = 50 Marks)

11. (a) Sketch and explain resultant cutting force in truning operation of SPCT.
    (b) Give the specification of Indexible inserts.
12. (a) Give comments tailors tool life equation (1) role of ‘n’, (2) role of c, (3) role of n and C.
    (b) Explain tool life tests-multipass turning operation.
13. (a) Explain the thread milling methods in lathe machines = sketch.
    (b) State the work holding devices capstan lathe.
14. (a) Sketch end milling operations.
    (b) Sketch helical gear cutting methods on milling machine.
15. (a) State and explain the factors affecting the selection of grinding wheel.
    (b) State and define APT statement for (i) geometry (ii) motion.
16. (a) Sketch ten types of grinding wheel shapes.
    (b) Sketch internal and external thread milling operation process.
17. (a) Sketch the Positional, paraxial and contouring types in CNC tool motion.
    (b) State special grinding machine operations for specialized work-sketch any two.

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Code No.2641/CBCS

FACULTY OF ENGINEERING

B.E. V – Semester (CSE)(CBCS)(Main & Backlog) Examination, December 2019

Subject: Automata Languages and Computation

Time: 3 Hours **Max. Marks: 70**

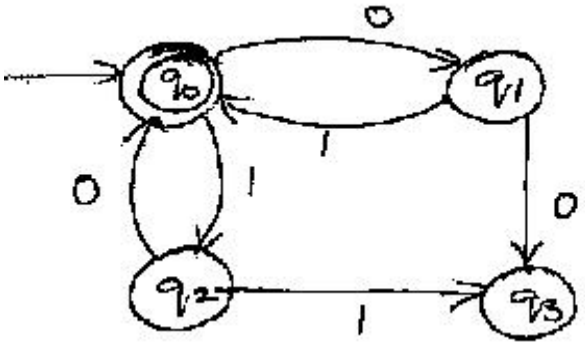
Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (2x10=20 Marks)

1. Define Non-deterministic Finite automata. [2]
2. Give examples for regular expressions. [2]
3. State pumping lemma for regular languages. [2]
4. What is a derivation tree? [2]
5. State the general form of transition function for NPDA. [2]
6. What are the reasons for a TM not accepting its input? [2]
7. What is LL(k) grammar? [2]
8. What is a universal language L_u? [2]
9. State Rice theorem. [2]
10. Define PCP and MPCP. [2]

PART – B (5x10=50 Marks)

11. a) Obtain a regular expression for the finite automata. [7]



b) Define ε-closure of a state and explain with a suitable example. [3]

12. a) Convert the following grammar to CNF. [7]

S → aAa | aBC

A → aS | bD | ε

B → aBa | C | b

C → abb | DD

D → aDa

b) State pumping Lemma for CFL's. What are its applications? [3]

13. How can a PDA be converted to a grammar? Explain the methodology with the help of given example. S→0BB, B→0S, B→1S, B→0 [10]

Contd…2

14. a) Show that the CFG with following production is Unambiguous. [5]

$S \rightarrow S(S)|\varepsilon$

b) Is the following grammar ambiguous? Justify [5]

$S \rightarrow AB,\ A \rightarrow aA|\varepsilon,\ B \rightarrow ab|bB|\varepsilon.$

15. Minimize the following DFA [10]

		0	1
→	A	B	E
	B	C	F
*	C	D	H
	D	E	H
	E	F	I
*	F	G	B
	G	H	B
	H	I	C
*	I	A	E

16. Show the PCP with two lists X = (b, bab3, ba) and Y = (b3, ba, a) has a solution. Give the solution sequence. [10]

17. a) Explain various types of Turing Machines. [5]

b) Construct a TM to accept the language in which all strings ends with 'abb' over the alphabet {a, b}. [5]

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Code No. 2650/ CBCS

FACULTY OF ENGINEERING

B.E. (IT) V-Semester (CBCS) (Main & Backlog) Examination, December 2019

Subject : Automata Theory

Time : 3 hours **Max. Marks : 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1 Construct DFA to accept the string ending with 'ab' for Σ = {a, b}.
2 Define NFA, ε - nfa.
3 Write the R.E. to accept string of 'a' and 'b's having 3 consecutive a's.
4 What is an Ambiguous G?
5 What are useless symbol and unit production?
6 What is CFG?
7 What is DPDA?
8 What is multi-tape TM?
9 Define counter machines.
10 Explain MPCP.

PART – B (50 Marks)

11 Convert the t-NFA to NFA.

12 State pumping lemma and prove
$L = \{0^i 1^i \mid i \geq 1\}$ is regular or not.

13 Consider the following G
$S \rightarrow AB \mid BC$
$A \rightarrow BA \mid a$
$B \rightarrow CC \mid b$
$C \rightarrow AB \mid a$

Test whether the string "baaba" is in the language by cyk algorithm.

14 Obtain PDA to accept the language
$L(M) = \{W \subset W^r \mid W \in (a+b)^*\}$ by final state.

15 Explain the programming techniques for TM.

16 Construct a PDA 'M' equivalent to the following CFG
$S \rightarrow OBB$
$B \rightarrow 0S \mid 1S \mid 0$

Test whether 010^4 is in the language.

17 Define PCP and show whether the list is having solution.

	A	B
1	10	101
2	011	11
3	101	011

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