

FACULTY OF ENGINEERING

B.E. III – Semester (CE) (CBCS) (Backlog) Examination, July 2021

Subject: Engineering Geology

Time: 2 Hours

Max.Marks: 70

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions.

(5x2=10 Marks)

- 1 Define strike and dip.
- 2 Writ briefly the geological description of elastic sedimentary rocks.
- 3 Define weathering. What are the different types of weathering?
- 4 Discuss confined an unconfined aquifers.
- 5 Mention characteristic features of glacial landform.
- 6 Define aerial photograph and its application in site investigation.
- 7 Write short totes of fine aggregate and coarse aggregate.
- 8 What are the purposes of construction of a dam?
- 9 Write a note on disaster management Cycle.
- 10 How earthquake deform rocks.

PART – B

Answer any four questions.

(4x15=60 Marks)

- 11 a) Write the distinguishing features of igneous, sedimentary and metamorphic rocks.
b) Describe the geological features of granite, gneiss and marble.
- 12 a) Explain the three types of weathering processes.
b) Describe the soil formation. How soils differ based on texture?
- 13 a) Explain characteristic features of fluvial landforms.
b) Explain geological maps and their use in different phase of site investigation.
- 14 a) Mention qualities of a good building stone.
b) What are the characteristics of following stones for construction work: slate basalt, limestone?
- 15 a) Explain the types of concrete dams.
b) State the engineering and geological investigations for a masonry dam site.
- 16 a) What are the different problems of tunneling?
b) Define tunnel, over break, pay line and lining of tunnels.
- 17 a) Explain the classification of earthquakes. State three causes of earthquakes.
b) Write a note on hydrological cycle and its link on ground water table.

FACULTY OF ENGINEERING**B.E. III-Semester (CBCS) (EE/Inst.) (Backlog) Examination, July 2021****Subject: Prime Movers and Pumps****Time: 2 Hours****Max. Marks: 70****Missing data, if any, may be suitably assumed****PART – A****Note: Answer any Five Questions****(5x2= 10Marks)**

1. Define the equation of continuity.
2. Explain reheat factor?
3. Enumerate the various uses of gas turbine?
4. Define term indicator diagram.
5. Define laminar and turbulent flow.
6. Differentiate between Kaplan turbine and Francis turbine.
7. How do accessories differ from mountings?
8. List the advantages of high pressure boilers.
9. Define unit discharge in turbine.
10. What is draft tube?

PART- B**Note: Answer any Four Questions****(4x15= 60 Marks)**

11. Write Euler's equation of motion along a stream line and integrate it to obtain Bernoulli's equation? State all assumptions made.
12. Explain the construction and working of Kaplan turbine with neat sketch. Draw inlet outlet velocity triangle figures?
13. Explain the construction and working of centrifugal pump with neat sketch.
14. Explain the construction and working of Lancashire Boiler with neat sketch.
15. Describe with neat diagram a closed cycle gas and open cycle gas turbine.
16. Explain the terms
 - a) Properties of steam
 - b) Rankine cycle steam engine
17. Differentiate between
 - a) Impulse and reaction turbine
 - b) Centrifugal and reaction pumps.

FACULTY OF ENGINEERING**B.E. (ECE) III - Semester (CBCS) (Backlog) Examination, July 2021****Subject: Electronic Devices****Time: 2 hours****Max. Marks: 70****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any five questions.****(5x2 = 10 Marks)**

- 1 Calculate the static resistance of silicon diode if cut in voltage $v_r = 0.6V$ and $I_f = 60mA$.
- 2 Compare line Versus load regulations.
- 3 Distinguish between avalanche Vs. Zener mechanism.
- 4 Derive an expression for ripple factor for π -section filter using halfwave rectifier.
- 5 Give the symbols of LED, photodiode and varactor diode.
- 6 Mention few applications of tunnel diode.
- 7 Define active, saturation and cut off regions of a BJT.
- 8 Distinguish between three stability factors of a BJT.
- 9 Draw the low frequency model of JFET.
- 10 Distinguish between enhancement MOSFET Vs. Depletion of MOSFET.

PART – B**Answer any four questions.****(4x15 = 60 Marks)**

- 11 a) Derive an expression for transition and diffusion capacitances of PN junction diode.
b) A certain PN junction diode has a leakage current of 10^{-13} Amps. at room temperature of $27^\circ C$ and 10^{-9} Amps at $125^\circ C$. The diode is forward biased with a constant current source of $1mA$ at room temperature. Assume current remains constant. Calculate the barrier voltage at room temperature and also at $125^\circ C$.
- 12 a) A voltage regulator is designed to provide a constant DC output voltage of $12V$. If the line supply voltage increases by $240V$ from normal supply voltage of $230V$, the o/p voltage changes to $12.12V$. Determine the normal line regulation and also for $1V$ change in line supply voltage expressed as % Volt.
b) Draw the Zener diode voltage regulator circuit and explain its operation.
- 13 a) Draw the transistor output characteristics showing the influence of early effect for a common emitter configuration and explain phenomenon of early effect.
b) Derive an expression for stability factor of collector to base bias BJT.
- 14 a) Compare CB, CE and CC amplifiers.
b) Draw the small signal model of CE configuration and hence derive expression for voltage gain current gain, input and output resistances.
- 15 a) Compare BJT VS JFET.
b) Draw the structure diagram of N-channel JFET device and explain the various current flow mechanisms for the device to work as Amplifier.
- 16 a) Compare the performance features of MOSFET, JFET and BJT giving advantages and disadvantages of each device.
b) Define drain resistance ' r_d ' for a JFET. Also determine value of ' r_d ' if $\Delta V_{DS} = 10V$ and $\Delta I_D = 0.2 mA$ when $V_{GS} = -2V$ (constant).
- 17 Write short notes on the following:
 - a) Define α , β , and γ for BJT.
 - b) Obtain expression for pinch off voltage of JFET
 - c) Applications of LED

FACULTY OF ENGINEERING**B.E. (M/P) III-Semester (CBCS) (Backlog) Examination, July 2021****Subject: Engineering Thermodynamics****Time: 2 hours****Max. Marks: 70****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any five questions.****(5x2 = 10 Marks)**

- 1 Define macroscopic and microscopic approach in thermodynamics.
- 2 Explain the concept of quasi static process.
- 3 Explain the first law of thermodynamics.
- 4 Classify the different forms of energy.
- 5 Differentiate heat engine, heat pump and a refrigerator.
- 6 Define entropy and available energy.
- 7 Examine triple point and critical point of a pure substance.
- 8 Describe the importance of Clapeyron equation.
- 9 Explain the P-V and T-S diagram for a Rankine cycle.
- 10 Define mass fraction and mole fraction for mixtures of gases.

PART – B**Answer any four questions.****(4x15 = 60 Marks)**

- 11 a) Discuss the different types of systems in thermodynamics with examples.
b) Sketch and state the working principle of a constant volume gas thermometer.
- 12 a) Define Heat and Work. Explain the various forms of heat and work.
b) A certain gas of mass 4 kg is contained within a piston cylinder assembly. The gas undergoes a process for which $pV^{1.5} = \text{constant}$. The initial state is given by 3 bar, and final volume is 0.2 m³. The specific internal energy of the gas decreases by 4.6 kJ/kg. Neglecting the changes in KE and PE, evaluate
i) Final Pressure; ii) Work done during the process; iii) Heat transfer during the process and iv) Sketch the process on p-V diagram.
- 13 a) State the second law of thermodynamics in terms of Kelvin Planck statement and Clausius statement.
b) Define entropy. Derive an expression for change in entropy during the following process.
i) Constant Volume process; ii) Constant Pressure process;
iii) Isothermal Process and iv) Polytropic Process.
- 14 a) Derive the four Maxwell's relations.
b) Explain the phenomena of formation of steam with suitable diagrams.
- 15 a) Derive an expression for the thermal efficiency of Otto cycle.
b) Explain the Dalton's Law of partial pressure and Amagat's law of partial volumes as applied to gas mixtures.
- 16 a) Explain Thermodynamic Equilibrium.
b) Explain why heat and work are Path functions and energy is a point function.
c) Explain the Carnot Heat engine Cycle with a neat sketch.
- 17 a) Steam initially at 1.5 MPa, 300°C expands reversibly and adiabatically in a steam turbine to 400C. Evaluate the ideal work output of the turbine per kg of steam.
b) A diesel engine has a compression ratio of 14 and cut off takes place at 6% of the stroke. Evaluate the air standard efficiency of this Engine.

FACULTY OF ENGINEERING

B.E. III – Semester (AE) (CBCS) (Backlog) Examination, July 2021

Subject: Automotive Electrical & Electronics Engineering

Time: 2 Hours

Max.Marks: 70

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions.

(5x2=10 Marks)

- 1 What is meant by headlight dazzling?
- 2 What is HRD test?
- 3 What is the specialty of bendix drive?
- 4 Why is series motor preferred for starting system?
- 5 What are the effects of armature reaction?
- 6 Draw the various characteristics of shunt generator.
- 7 Electronic warning system can be used for _____, etc.
- 8 MPFI system is a part of modern electronic engine management system (T/F).
- 9 What are the general-purpose registers in 8085 microprocessors?
- 10 What are the applications of microprocessor in automobile?

PART – B

Answer any four questions.

(4x15=60 Marks)

- 11 Write short notes on:
 - a) Battery troubles and its remedies.
 - b) Characteristics of a battery.
- 12 Explain different types of starter drive units with neat diagrams.
- 13 With a neat sketch explain the working and functioning of a battery charging system.
- 14 Write short notes on:
 - a) Sensors used for speed measurement.
 - b) EMI & EMC.
- 15 Explain the architecture of 8085 microprocessor with a neat sketch?
- 16 Write short notes on:
 - a) Earth return system and insulated return system.
 - b) Cut out relay.
- 17 Write short notes on:
 - a) Solenoid principle with neat sketch.
 - b) Engine management system.

FACULTY OF ENGINEERING**BE III - Semester (CSE) (CBCS) (Backlog) Examination, July 2021****Subject: Data Structures****Time: 2 Hours****Max .Marks: 70****Note: Missing data, if any, may be suitably assumed****PART – A****Answer any five questions.****(5x2=10 Marks)**

- 1 How many non-zero elements are there in a tridiagonal matrix of size $n \times n$?
- 2 Define the term data structure and state the difference between linear data structure and non-linear data structure?
- 3 What is a sparse matrix? Explain the sparse matrix representation.
- 4 Define Heap?
- 5 What is minimum spanning tree?
- 6 What is quadratic probing?
- 7 Write a function to find height of a binary tree?
- 8 What is the worst case time complexity of Quick Sort?
- 9 How many number of comparisons are required to sort N equal keys using quick sort?
- 10 Define threaded binary tree?

PART – B**Answer any four questions.****(4x15= 60 Marks)**

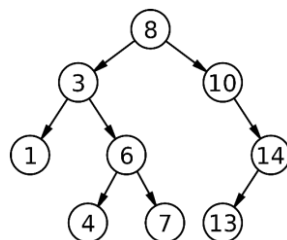
- 11 Write a non-recursive function to reverse a singly linked list in $O(N)$ time?
- 12 Declare two stacks of varying length in a single array. Write functions to push and pop elements from these stacks?
- 13 (a) Write a function successor (X) to return successor of x in a binary search tree, if x is present?
(b) Write a function to find an element in AVL tree?
- 14 (a) Write a function for insertion sort.
(b) Sort the following numbers using Quick sort?
- 15 (a) Write an algorithm to implement kruskal's algorithm?
(b) What is DFS explain with an example?
- 16 Consider the Hash function $H(i)=(2i+5)\% 11$ insert the keys 3,8,102,23,4,10,12,9,44,23 and construct the 11 item hash table by using dynamic hashing?
- 17 (a) Determine running time of merge sort for (i) sorted input (ii) reverse order input
(b) Write notes on B-Trees

FACULTY OF ENGINEERING**B.E. (IT) III-Semester (CBCS) (Backlog) Examination, July 2021****Subject: Data Structures****Time: 2 hours****Max. Marks: 70****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any five questions.****(5x2 = 10 Marks)**

- 1 Write an algorithm or function for linear search.
- 2 With the help of an example, show how a polynomial of single variable is represented using an array.
- 3 State the limitation of a linear queue. How does a circular queue overcome this limitation?
- 4 Write the equivalent postfix expression of the following infix expression: $A+B*C/(D-E)$.
- 5 Draw a doubly circular linked list with 5 elements and with a head node.
- 6 List the different types of collision resolution techniques.
- 7 Insert the following keys into an initially empty binary search tree: 12,5,6,3,7,10.
- 8 Define minimum cost spanning tree.
- 9 Describe the working of selection sort using the following keys: 23,45,12,22,18.
- 10 State the worst case time complexities of shell sort and quick sort.

PART – B**Answer any four questions.****(4x15 = 60 Marks)**

- 11 a) Explain how sparse matrices are represented using an array.
b) Explain how 1-D, 2-D and 3-D arrays are represented internally.
- 12 a) Explain how to evaluate a given infix expression using postfix notation with help of an example infix expression.
b) Write a C++ program to implement Linear Queue ADT using arrays.
- 13 Write a C++ program to implement singly linked list ADT.
- 14 a) Write the algorithm for Merge sort.
b) Explain about working of Merge sort on the following data: 26,5,37,1,61,11,59,15,48,19.
- 15 What is an AVL Tree? Illustrate, using months of a year in the following order, the Insert operation in an AVL Tree. (March, May, November, August, April, January, December, July, February).
- 16 a) Define Binary Search Tree. What is meant by a skewed binary tree? Give an example.
b) Write out Inorder, Preorder and Postorder traversals for the Binary Tree given in following figure.



17 Write short notes on:

- (a) B-Trees
- (b) Red-Black Trees

FACULTY OF ENGINEERING**B. E. III – Semester (AICTE) (CE/EE/Inst.) Examination, July 2021****Subject: Industrial Psychology****Time: 2 hours****Max. Marks: 70***(Note: Missing data, if any, may be suitably assumed)***PART – A****Answer any five questions.****(5 x 2 = 10 Marks)**

1. Define Industrial Engineering
2. Define an ORGANIZATION and Give its Broad Classification.
3. What is MOTIVATION and how many TYPES are there?
4. What do you understand by “COUNSELING”?
5. What are the KEY FACTORS based on which the consumer Behavior can be assessed?
6. What do you understand by “MORALE” in an Industry?
7. What are the few factors which DISTURB a worker in an Industrial Environment?
8. What is “Time” and “Motion” study?
9. Name at least 3 factors which result in an ACCIDENT in Industry.
10. How can be ACCIDENTS reduces in Industry?

PART – B**Answer any four questions.****(4 x 15 = 60 Marks)**

11. (a) Give a detailed account for the development of INDUSTRIAL ENGINEERING based on Historical Developments.
(b) Mention the THEORIES of ORGANIZATION and explain their differences in a comparative chart.
12. (a) Classify HUMAN NEEDS and write about the famous theories related to them.
(b) With a block diagram explain how an employee is selected, trained, placed and considered for promotion.
13. (a) Assume that you are the MD of a manufacturing company. How would you advertise your product? Which medium you will consider, out of the available media?
(b) What do you understand by the term INDUSTRIAL PSYCHOLOGY? How it can be helpful in the uplifting the Morale of the employee?
14. (a) How is TIME and MOTION study conducted in an Industry? What is it's relevance?
(b) What do you understand by WORK EFFICIENCY? Explain the relevance of EFFICIENCY CURVE.
15. (a) Explain the following terms:
(i) Allowances in Time and Motion studies
(ii) NOISE, POLLUTION and ILLUMINATION in relation to efficiency at work.
(b) The work time in an Industry is from 9 AM to 6 PM. Give a reasonable time table to the management as per standards, so that the worker is no stressed. Explain the rationale of your choice.
16. (a) Mention and explain the various factors which are considered when a job is designed.
(b) What are ACCIDENTS? How and why they are caused? What is the ECONOMIC cost to the Industry?
17. (a) Write SHORT NOTES on:
(i) Authority and Power
(ii) Hierarchy of Human Needs
(b) (i) Job Satisfaction and Job Motivation
(ii) Modes of Advertising

FACULTY OF ENGINEERING**BE (ECE/M/P/AE/IT) III – Semester (AICTE) (Main & Backlog) Examination, July 2021****Subject: Finance & Accounting****Time: 2 hours****Max. Marks: 70****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any five questions.****(5x2 = 10 Marks)**

- 1 Write the rules of Accounting.
- 2 Write about Ledger Account.
- 3 How prepaid Expenses treated in Final Accounts given in adjustments?
- 4 Explain convention of consistency.
- 5 What is Capital Market? Explain.
- 6 What is Financial Market?
- 7 Explain about NPV method.
- 8 Write about Internal Rate of Return.
- 9 What is Creditor's turnover Ratio?
- 10 Explain Internet coverage Ratio.

PART – B**Answer any four questions.****(4x15 = 60 Marks)**

- 11 a) Write any three accounting concepts.
b) Write Journal Entries for the following transactions:
1-3-2010 Rahul Commenced business with capital of Rs.50,000
2-3-2010 Purchase Machinery for cash Rs. 20,000.
3-3-2010 sold goods to Vivek Rs. 5,000.
4-3-2010 Rent paid to landlord Rs. 10,000
5-3-2010 Withdrawn Cash from bank Rs.15,000.
- 12 Prepare Trading, Profit and Loss Account and Balance sheet as on 31-12-2015.

Particulars	Debit (Rs.)	Credit(Rs.)
Cash in hand	2,000	
Cash at Bank	17,100	
Purchases, sales	50,000	1,20,600
Debtors, Creditors	17,000	9,400
Wages	12,400	
Carriage	4,200	
Fuel, Power	6,000	
Returns	700	600
Opening stock	6,800	
Machinery	25,000	
Furniture	9,000	
Salaries	20,000	
General Expenses	4,000	
Travelling Expenses	1,400	
Drawings	5,000	
Capital		50,000
	1,80,600	1,80,600

- Adjustments:** 1) Closing stock Rs.8,000
2) Provide depreciation @ 15% on Machinery and furniture
3) Outstanding salaries Rs.1,000
4) Maintain bad debts @ 5% on Sunday Debtors.

- 13 a) Draw a structure of Indian Financial Market.
b) Explain Financial System concepts.
- 14 From the following details of two machines x and y each costing Rs.1,20,000 and having a life of 4 Years Cash flow after tax are as follows:
Rate of return is 8%, Compare the project using profitability Index method.

Year	Machine x (Rs.)	Machine y (Rs.)
1	65,000	20,000
2	50,000	35,000
3	35,000	50,000
4	20,000	80,000

- 15 Calculate
- Gross Profit Ratio
 - net profit
 - Operating ratio from the following particulars:
Sales Rs.5,00,000 cost of goods sold Rs.3,00,000 operating Expenses Rs.1,00,000 Non-Operating Expenses Rs.20,000.
- 16 Prepare three column cash book from the following
September 2009
- 1st Cash in hand Rs.600, Cash at bank Rs.4,500
2nd deposited in Bank Rs.750
4th Cash sales Rs.6,500
8th Withdrawn from bank for office use Rs.950.
10th Salaries paid Rs.900
11th Cheque received from Mr. X deposited in bank Rs.450
31st Withdrawn from bank for personal use Rs.300
- 17 Prepare an Analytical Petty Cash book.
- 1-4-2013 Received cash from the head cashier Rs.300
5-4-2013 Purchase Postage stamps Rs.20.
7-4-2013 Paid stationary Rs.36.
8-4-2013 Paid for charge Rs. 16
15-4-2013 Paid for taxi hire Rs.30
20-4-2013 paid office Expenses Rs.44.
25-4-2013 Paid to Kamal Rs.36.
30-4-2013 Sent telegram to Mumbai Rs.32.

FACULTY OF ENGINEERING**BE III – Semester (AICTE) (CSE) (Main & Backlog) Examination, July 2021****Subject: Data Structures & Algorithm****Time: 2 hours****Max. Marks: 70****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any five questions.****(5x2 = 10 Marks)**

- 1 Define Space and Time complexity. Write the metrics needed for calculation.
- 2 How Dynamic memory allocation and deallocation are done in C++?
- 3 Define ADT. Write stack ADT.
- 4 What is the need for using circular arrays to implement queues?
- 5 Differentiate between single linked list and doubly linked list.
- 6 Evaluate the following postfix expression.
6 2 3 + - 3 8 2 / + * 2 3 / +
What is the stack top after evaluating the given expression?
- 7 Write the different binary tree traversals.
- 8 List out different representations of Graph.
- 9 What is hashing? What do you mean by collision in hashing?
- 10 Define max heap and min heap.

PART – B**Answer any four questions.****(4x15 = 60 Marks)**

- 11 a) Explain how virtual functions are used along with base class pointers to implement runtime polymorphism?
b) What is Exception handling? How can we achieve it in C++?
- 12 a) Write a C++ program to implement stack ADT using linked list.
b) What is the use of 'this' pointer?
- 13 a) Write a C++ program to insert and delete a node into/from a double linked list.
b) Discuss the above operations time complexity.
- 14 a) Construct an AVL tree by inserting the following numbers in the order in which they are given. (Draw figure in each step)
17 25 19 23 75
b) How do you copy a binary tree? Explain the code with an example.
- 15 a) What is 'DIVIDE and CONQUER' strategy?
b) Sort the following numbers using heap sort.
5, 23, 7, 18, 2, 1, 9, 15, 6, 4, 8, 3, 13
- 16 a) What is BFS and DFS? Explain with an example.
b) Explain Kruskal's algorithm to find minimum spanning tree.
- 17 a) Consider the hash function $H(i)=(2i+5)\%11$.
Insert keys 3, 8, 102, 23, 4, 10, 9, 12, 44, 15 and construct the 11 item hash table by using open addressing.
b) Explain constructor and destructor with a program.

FACULTY OF ENGINEERING**B.E. III – Semester (AICTE) (CME) (Main) Examination, July 2021****Subject: Logic and Switching Theory****Time: 2 Hours****Max.Marks: 70****Note: Missing data, if any, may be suitably assumed****PART – A****Answer any five questions.****(5x2=10 Marks)**

- 1 Convert the given function into other canonical form $F(X,Y,Z)=X+YZ$.
- 2 State and prove De Morgan's theorem.
- 3 Simplify the Boolean function using theorems $F = xy + xyz + xy\bar{z} + x\bar{y}z$
- 4 Write the VHDL code to design a Half-Adder circuit.
- 5 Define the terms prime implicant and essential prime implicant with an example.
- 6 Explain about PLA.
- 7 Draw the state diagram of 3-bit binary counter.
- 8 Differentiate between latch and flip-flop.
- 9 Convert the given Boolean function POS to SOP

$$F = (A + B + C)(A + B + \bar{C})(A + \bar{B} + C)(\bar{A} + B + \bar{C})$$
- 10 Realize the subtractor and half subtractor.

PART – B**Answer any four questions.****(4x15=60 Marks)**

- 11 With the help of Karnaugh map simplify the function.
 $F(A,B,C,D)=\sum m(1,5,9,10,13)$ using don't care function $d(A,B,C,D)=\sum m(8,11)$
- 12 Realize the function with minimum number of literals using K-map method.
 $F(A,B,C,D,E)=\sum(0,2,4,6,9,11,13,15,17,21,25,27,29,31)$
- 13 Simplify the Boolean function using Quine-mccluskey method
 $F(A,B,C,D)=\sum(0,1,4,7,8,10,12,13,14,15)$
- 14 Design and explain the logic diagram of 4x1 multiplexer and De-multiplexer.
- 15 a) Methods for reduction of State tables and state assignments.
b) Design the characteristic and excitation tables of SR & JK Flip-Flop.
- 16 Design a mod-12 synchronous counter using JK Flip-Flop.
- 17 Tabulate the PLA programming table for Boolean function listed below and draw the PLA circuit to implement

$$F1 = A\bar{B} + AC + A\bar{B}\bar{C} \quad F2 = (AC + BC)'$$

FACULTY OF ENGINEERING**BE II/IV (CE) I-Semester (Backlog) Examination, July 2021****Subject: Engineering Materials & Constructions****Time: 2 Hours****Max .Marks: 75****Note: Missing data, if any, may be suitably assumed****PART – A****Answer any seven questions.****(7x3=21 Marks)**

- 1 State any three characteristics of good building stone.
- 2 What are the constituents of burnt clay bricks?
- 3 List out the various characteristics of good mortar sand.
- 4 Classify sand as per availability.
- 5 Why steel is used as a reinforcing material in concrete.
- 6 What are the various types of blended cements?
- 7 What are the different types of flooring?
- 8 Differentiate between form-work and scaffolding.
- 9 What do you mean by smart materials?
- 10 What are distempers and why are they necessary.

PART – B**Answer any three questions.****(3x18= 54 Marks)**

- 11 (a) Discuss in detail the classification of rocks.
(b) Explain various quarrying methods of stones along with importance.
- 12 (a) How are bricks classified? How do they differ in compressive strength?
(b) Explain in detail the burning of bricks in Bull Trench kiln.
- 13 (a) Explain the manufacturing process of cement with neat flow diagram.
(b) List out different tests on aggregate. Explain any one in detail.
- 14 (a) Explain in detail seasoning and preservation of Timber.
(b) What are the different constituents of paints? Explain them.
- 15 (a) Explain in detail about stone flooring and concrete flooring.
(b) Explain any two types of arches with neat sketches.
- 16 (a) What is the mechanism followed for plastering on an old surface of a wall? Explain.
(b) Describe the requirements and types of form work used in the construction?
- 17 Write short notes on:
 - (a) Load bearing and non-load bearing wall.
 - (b) Workability tests on concrete

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) I - Semester (Backlog) Examination, July 2021

Subject: Electrical Circuits - I

Time: 2 Hours

Max. Marks: 75

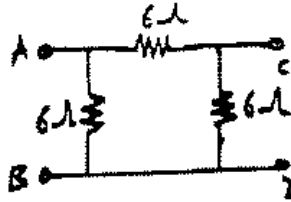
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PART – A

Note: Answer any Seven Questions

(7x3= 21Marks)

1. Obtain the star connected equivalent for the delta connected circuit show in the figure below.



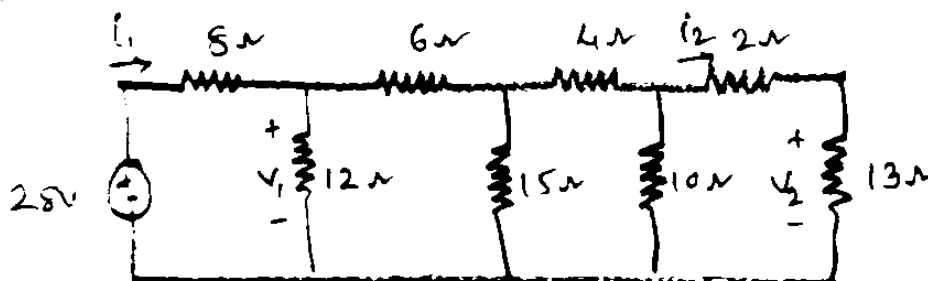
2. Distinguish between Active and Passive elements and give examples
3. A sinusoidal voltage is applied to a capacitor of $0.01 \mu\text{F}$. The frequency of the sine wave is 3 KHz. Determine the capacitive reactance.
4. Define RMS and Average value of alternating quantity
5. What are limitations of super position theorem?
6. State maximum power theorem.
7. Two inductively coupled coils have self-inductances are 25 mH and mH. If the coefficient of coupling is 0.5. Find the value of mutual inductance between the coils.
8. Give analogy between magnetic and electric circuit.
9. Write properties of cut set matrix.
10. What is the difference between steady response and transient response?

PART-B

Note: Answer any Three Questions

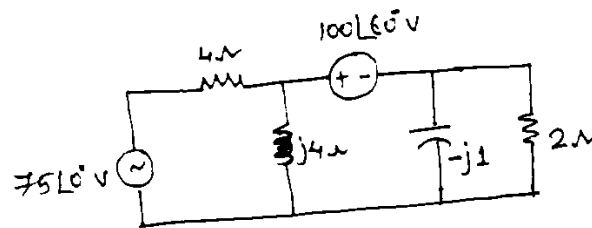
(3x18= 54Marks)

- 11 Determine i_1 , i_2 , V_1 & V_2 in the ladder network in below using Nodal Analysis.

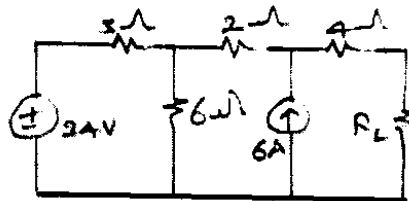


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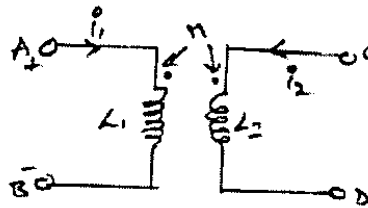
12. Calculate voltage across inductor and capacitor for a given circuit below.



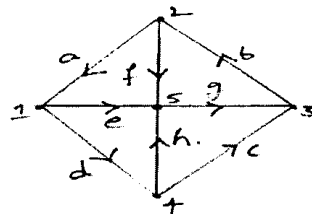
13. Write procedure for solving circuit using maximum power theorem and find the value of R_L for maximum power transfer in the circuit shown below and maximum power.



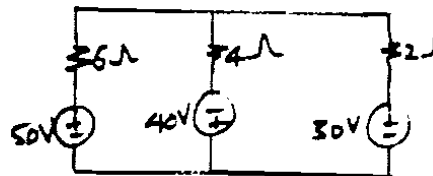
14. In below shown circuit $L_1 = 4H$, $L_2 = 9H$, $K = 0.5$, $i_1 = 5 \cos(50t - 30^\circ)$ A, $i_2 = 2 \cos(50t - 30^\circ)$ A. Find the values of V_1 , V_2 , and total energy stored in the system at $t = 0$.



15. For the network graph shown in below, draw all possible trees. For any one of these trees, prepare a cut-set schedule and obtain the relation between tree-branch voltages and branch currents.



16. Use Mesh analysis to find the power delivered by 50V voltage source for the circuit shown below.



17. Explain how the 3 phase power is measured by three watt meter method?

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) I – Semester (Backlog) Examination, July 2021

Subject: Network Theory

Time: 2 hours

Max. Marks: 75

Note: Missing data, if any, may be suitably assumed.

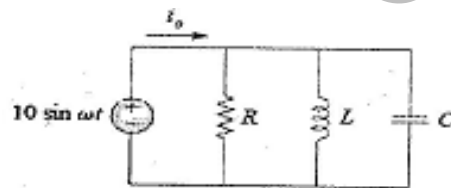
PART – A

Answer any seven questions.

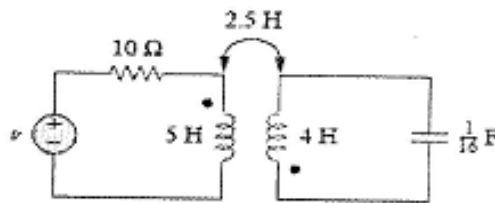
(7x3 = 21 Marks)

1. Define 1. Node 2. Loop 3. Mesh 4. Super node.
2. State superposition theorem.
3. Define time constant of Circuit.
4. Define a) Unit Step b) Unit Ramp function.
5. Find the amplitude, phase, period and frequency of the sinusoid.
 $V(t) = 12 \cos(50t + 10^\circ)$
6. The voltage $v=12\cos(60t+45^\circ)$ is applied to a 0.1H inductor. Find the steady state current through inductor.
7. In the circuit shown in the fig. find Quality factor and Bandwidth.

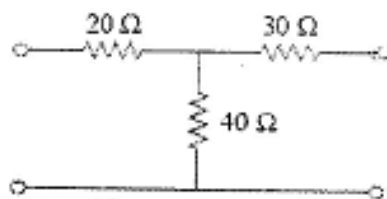
$$R = 8\text{kohm} \quad L = 0.2\text{mH} \quad C = 8\text{microF}$$



8. Determine coupling coefficient.



9. Define two port Network.
10. Determine Z_{11} for the circuit.

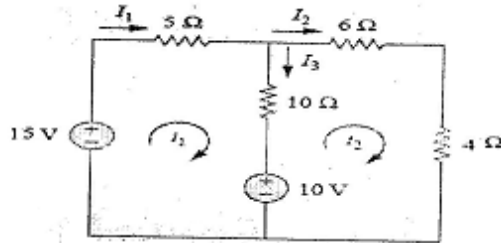


PART – B

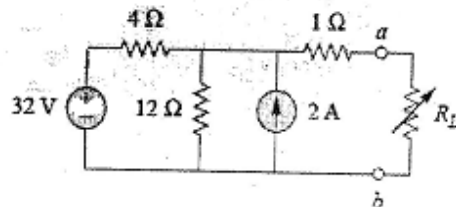
Answer any three questions.

(3x18 = 54 Marks)

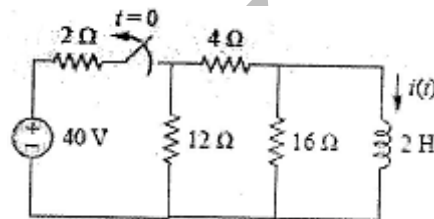
11. (a) For the circuit in fig. Find the branch currents
- I_1
- ,
- I_2
- and
- I_3
- using mesh analysis.



- (b) Find the thevenin equivalent of the circuit. Find the current through
- $R_L = 36\Omega$
- .



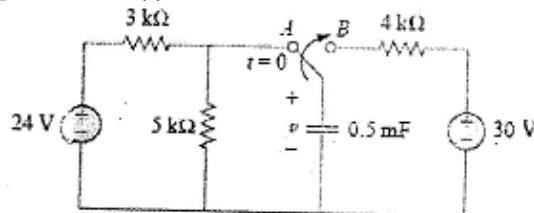
12. (a) The switch has been closed for a long time. At
- $t = 0$
- , the switch is opened. Calculate
- $i(t)$
- for
- $t > 0$
- .



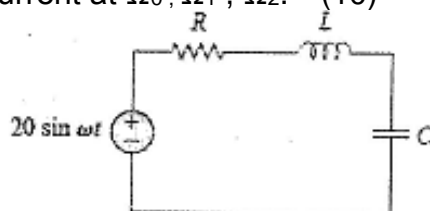
- (b) Write short notes on Singularity Functions.

13. (a) (a) Derive the
- $v(t)$
- for an RC circuit subjected to step Input voltage.

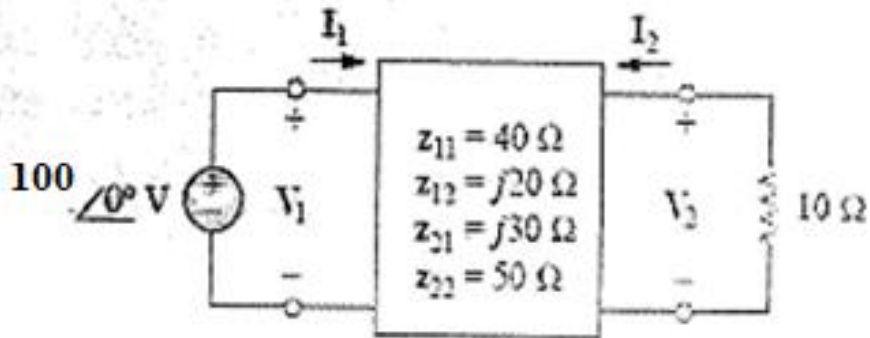
- (b) The switch in fig. has been in position A for a long time. At
- $t = 0$
- , the switch moves B. Determine
- $v(t)$
- for
- $t > 0$
- and calculate its value at
- $t = 1s$
- and
- $4s$
- .



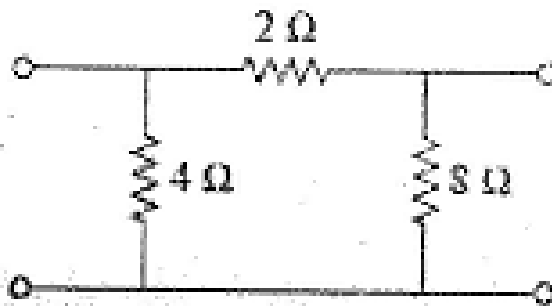
14. In the circuit of Fig,
- $R = 20\Omega$
- ,
- $L = 1\text{mH}$
- and
- $C = 0.4\text{ micro F}$
- (a) Find the resonant frequency and the half-power frequencies. (b) Calculate the quality factor and bandwidth. (c) Determine the amplitude of the current at
- Ω_0
- ,
- Ω_1
- ,
- Ω_2
- . (10)



15. (a) Find I_1 and I_2 of the circuit shown in fig.



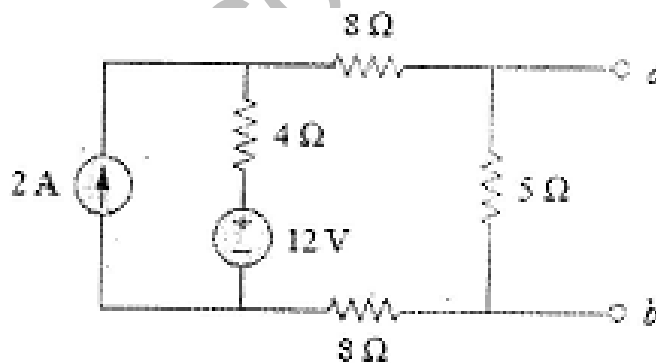
(b) Obtain the y parameter for the Π network shown in fig.



16. (a) Write short notes on Average & RMS value of periodic time function.

(b) Write short notes on Power measured by 3-Wattmeter method.

17. (a) Find the Norton equivalent of the circuit shown below.



(b) Write short notes on

- (i) Star-Delta transformation.
- (ii) Active Power & Reactive Power.

FACULTY OF ENGINEERING

BE 2/4 (ECE) I-Semester (Backlog) Examination, July 2021

Subject: Basic Circuit Analysis

Time: 2 Hours

Max. Marks: 75

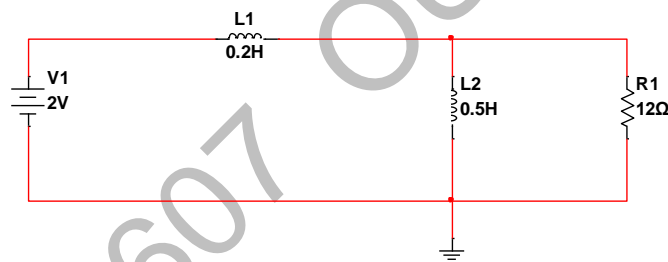
Missing data, if any, may be suitably assumed

PART – A

Note: Answer any Seven Questions

(7x3= 21Marks)

1. State Norton's theorem.
2. Define incidence matrix and Tie-set matrix.
3. Define Zero input response and Zero state response.
4. Define coefficient of coupling
5. What are the conditions of symmetry and reciprocity for Z-parameters?
6. Write the condition for underdamping and critical damping in RLC series circuit
7. What are the characteristics of parallel resonance?
8. Write the expression for critical resistance and damping ratio of RLC Series circuit
9. What is the time constant of RL circuit shown below?



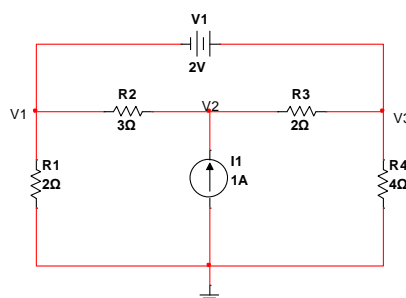
10. What is resonance?

PART-B

Note: Answer any Three Questions

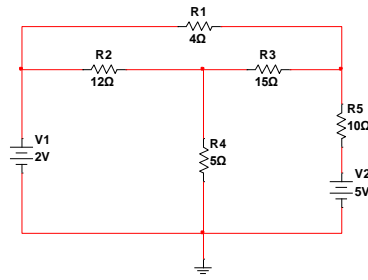
(3x18= 54Marks)

11. Find the node voltages V_2 and V_3 in the below circuit.

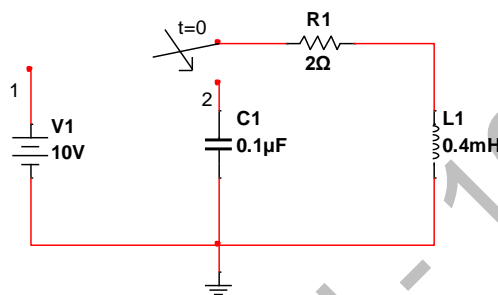


-2-

12. Write the tie set schedule and obtain all the branch currents for the below circuit.



13. In the circuit shown below, the switch remains in position 1 for a long time. At $t=0$, the switch is changed to position 2. Determine the current response.



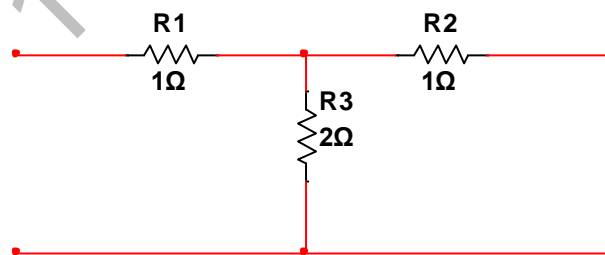
14 (a) Explain Norton's theorem for circuits containing both independent and dependent sources.

(b) Explain Maximum Power Transfer theorem for AC circuits.

15 (a) A RLC series circuit consists of $R=16\ \Omega$, $L=5\text{mH}$ & $C=2\ \mu\text{F}$. Calculate the quality factor, bandwidth and Half power frequencies.

(b) Explain the necessary conditions for Transfer function.

16 (a) Two networks shown in Fig(a) & Fig(b) are connected in series. Obtain the Z-parameters of the combination.



Fig(a)

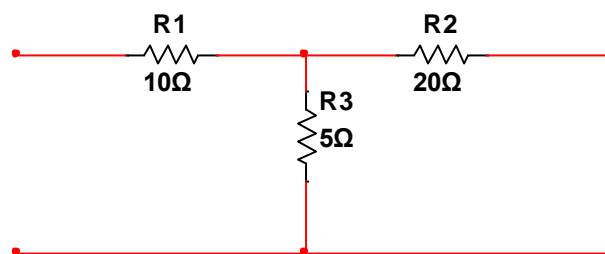


Fig (b)

(b) Express Z-parameters in Y-parameters.

17 (a) How to obtain the time domain behavior from a pole-zero plot.

(b) Define various functions of one port and two port networks.

FACULTY OF ENGINEERING**B.E. 2/4 (M/P/AE) I-Semester (Backlog) Examination, July 2021****Subject: Metallurgy and Material Science****Time: 2 hours****Max. Marks: 75****Note: Missing data, if any, may be suitably assumed.****PART – A****Answer any seven questions.****(7x3 = 21 Marks)**

- 1 What is Bauchinger's Effect?
- 2 Distinguish between edge and screw dislocations.
- 3 Draw the structure of the fatigue fracture specimen and show the various regions on it.
- 4 State and explain FICK's Law of diffusion.
- 5 Distinguish the terms solid solution, mixture and compound with examples.
- 6 What is HSS and list some of its properties?
- 7 What is full annealing?
- 8 What are the different microstructures observed in Iron-Iron Carbide diagram?
- 9 Write different zones in cupola.
- 10 How do you classify composite materials?

PART – B**Answer any three questions.****(3x18 = 54 Marks)**

- 11 (a) Explain the influence of recovery and recrystallization on mechanical properties.
(b) What is critical shear stress? Derive the critical resolved shear stress relating to the tensile stress.
- 12 (a) Explain the three stages of creep with the help of a neat diagram.
(b) Define "Fatigue". Explain factors effecting fatigue.
- 13 Draw a binary phase diagram where in two components are completely soluble in the liquid state but only partially soluble in the solid state. Label the important points, lines and phases in it. Explain the solidification of a hypo eutectic alloy.
- 14 (a) Discuss Normalising as heat treatment process and mention the applications.
(b) Explain Austenite to martensite transformation of 0.8% C steel with the help of TTT diagram.
- 15 Explain with a neat sketch, the production of pig iron in a blast furnace.
- 16 (a) Distinguish between cold working and hot working. What are the advantages of cold working?
(b) Differentiate between creep curve and stress rupture curve.
- 17 Write short notes on the following:
 - (a) Flame hardening
 - (b) Stainless steels
 - (c) Steel making by L.D. Process

FACULTY OF ENGINEERING
B.E. 2/4 (CSE) I-Semester (Backlog) Examination, July 2021

Subject: Discrete Structures

Time: 2 hours

Max. Marks: 75

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any seven questions.

(7x3 = 21 Marks)

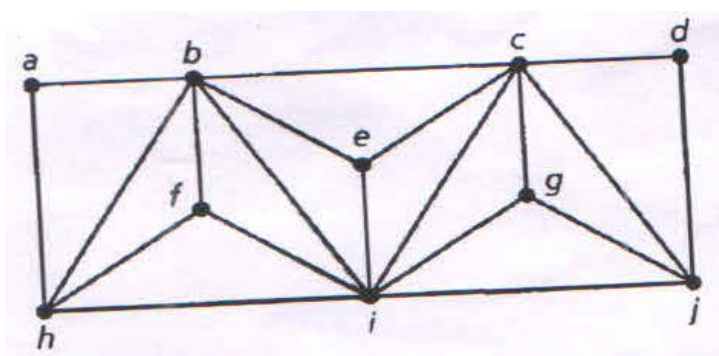
- 1 Show that $\forall x((P(x) \rightarrow Q(x)) \cap \exists xP(x)) \Rightarrow \exists xQ(x)$.
- 2 Prove that for all integers $n \geq 4$, $3^n > n^3$ using Mathematics induction.
- 3 Define onto function with an example.
- 4 Define pigeonhole principle with an example.
- 5 Differentiate between homogeneous and Non-homogeneous recurrence relations.
- 6 Find the solutions to the recurrence relation with the initial condition $a_0=2, a_1=5, a_n=6a_{n-1} - 11a_{n-2}$.
- 7 Define Semigroup with an example.
- 8 Define Moniod with an example.
- 9 Define Planar graph with an example.
- 10 What is meant by MST?

PART – B

Answer any three questions.

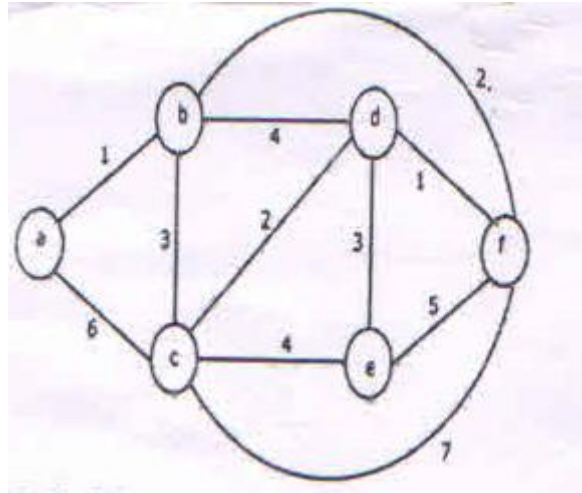
(3x18 = 54 Marks)

- 11 (a) Express the statements "Some students in this class has visited Mexico" and "Every student in this class has visited either Canada or Mexico" using Predicates and Quantifiers.
 (b) Prove the following argument is valid.
 If the band could not play rock music or the refreshments were not delivered on time, then the New Year's party would have been canceled and Alicia would have been angry. If the party were canceled, then refunds would have had to be made. No refunds were mad.
- 12 (a) Let $f : \mathbb{R} \rightarrow \mathbb{R}$, $g : \mathbb{R} \rightarrow \mathbb{R}$ and $h : \mathbb{R} \rightarrow \mathbb{R}$, where $f(x)=x^2$, $g(x) = x+5$ and $h(x)= \sqrt{x^2 + 2}$. Prove that $(h \circ g) \circ f = h \circ (g \circ f)$.
 (b) Determine the number of integer solution to $x_1 + x_2 + x_3 + x_4 = 19$ where $5 \leq x_i \leq 10$ for all $1 \leq i \leq 4$.
- 13 (a) Solve the recurrence relation using Generating functions $a_n = 8a_{n-1} + 10^{n-1}$.
 (b) Solve the recurrence relation $a_n = -a_{n-1} + 6a_{n-2} + 2^n$.
- 14 (a) What is an algebraic system? Write the properties of an algebraic system.
 (b) For a group 'G'. f is mapping from G to G $f(x) = x^2$. Prove that G is an abelian group.
- 15 (a) Define the chromatic number. Find the chromatic number for the following graph.



..2..

(b) Find minimum spanning tree using Kruskal's algorithm.



- 16 (a) Represent the relation $a R b$ if $a \leq b$ in $\{1, 2, 3, 4\}$ by their matrix and digraph.
 (b) Show that the set N of natural numbers is a semi group under the operation $x * y = \max \{x, y\}$. Is it a monoid?
- 17 (a) How many arrangements can be made out of the letters of the word 'MISSISSIPPI'?
- (b) Write short notes on Hamiltonian Path and Circuit with an example.

FACULTY OF ENGINEERING**BE II/IV (IT) I-Semester (Backlog) Examination, July 2021****Subject: Digital Electronics & Logic Design****Time: 2 Hours****Max .Marks: 75****Note: Missing data, if any, may be suitably assumed****PART – A****Answer any seven questions.****(7x3=21 Marks)**

1. Using algebraic manipulation prove that $(x + y)(x + \bar{y}) = x$
2. List the different stages of CAD Tools.
3. Mention difference between PAL and PLA
4. What is decoder? Give an example
5. List three differences between synchronous counters and asynchronous Counter.
6. Design JK flip flop using D flip - flop
7. What are the basic design steps in design of synchronous sequential circuits?
8. Draw three elements of ASM charts
9. Define Setup time and Hold time of a Flip Flop.
10. What are different types of Hazards.

PART – B**Answer any three questions.****(3x18=54 Marks)**

11. Minimize the following expression using K map into SOP and POS form. Realize them with NAND gates only and NOR gates only. $F(A, B, C, D) = \sum m(5,6,9,10,12,3,14,15) + d(2,4)$
12. a) Draw the general structure of FPGA and show how it can be programmed using JTAG cable.
b) Explain the architecture of CPLD.
13. a) Draw and explain Gated SR Latch with neat timing diagram. Draw the truth table mention SR latch. Disadvantage in the timing diagram
b) Explain Johnson counter with neat diagram
14. What is state minimization? How do you identify the equivalent states? Minimize the give state table using the partitioning procedure.

Presnt State	Next State		Output
	W=0	W=1	
A	B	C	1
B	D	F	1
C	F	E	0
D	B	G	1
E	F	C	0
F	E	D	0
2547G	F	G	0

15. a) Explain the state assignment problem with an example.
b) Differentiate between Static and Dynamic hazards.
- 16.a) Construct 8: 1 multiplexer using 4:1 multiplexer and 2:1 multiplexer units.
b) Differentiate between combinational and sequential circuits.
17. Write short note on
(i) ASM charts (ii) CAD tools