

**FACULTY OF ENGINEERING**

**B.E. (CIVIL) III – Semester (AICTE) (Main) Examination, March / April 2022**

**Subject: Building Materials and Construction**

**Time: 3 Hours**

**Max. Marks: 70**

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

1.
  - (a) Differentiate mine and quarry. List the different methods of quarrying.
  - (b) What are the different grades of Portland cement?
  - (c) What is curing? List the different methods of curing.
  - (d) List the characteristics of good timber.
  - (e) What is base in an oil paint? What are its uses?
  - (f) Differentiate formwork and scaffolding.
  - (g) What are the different sources of dampness?
2. (a) Outline the characteristics of a good building stone.  
(b) What are the different tests conducted on brick? Explain in brief.
3. (a) With the help of a neat flow chart, differentiate the processes of manufacture of cement.  
(b) Give the detailed classification of aggregates.
4. (a) How do you classify mortars? Explain in brief.  
(b) What are the different stages of concrete production? Explain
5. (a) Give the detailed classification of timber.  
(b) What is a distemper? What are its characteristics? Explain its process of application.
6. (a) What is a concrete flooring? Explain its merit and demerits.  
(b) Explain the different types of pointing.
7. (a) What are the different component parts of a scaffolding? List the different types of scaffold.  
(b) Give the general measures of fire safety in buildings.

**FACULTY OF ENGINEERING**

**B.E. (EEE/INST) III - Semester (AICTE) (Main) Examination, March / April 2021**

**Subject: Electromagnetic Fields**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.**

**(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**(iii) Missing data, if any, may be suitably assumed**

1.

- (a) Define Dot product of vectors and list properties of Dot product
- (b) Deduce Maxwell's First equation with respect to static electric field
- (c) Recall Ampere's Circuit law
- (d) Draw the magnetic boundary condition between two magnetic media for Magnetic flux density
- (e) List out the Maxwell's equation for time varying fields
- (f) Define lossy dielectric medium
- (g) A point P(2,3,5) defined in Cartesian coordinate system, Convert P into spherical coordinate system

2 (a) Derive Curl of gradient of a scalar ( $\nabla \times \nabla V$ )

(b) Deduce divergence and curl of the vector  $\vec{Y} = \rho \sin \theta \hat{a}_\rho + \rho^2 z \hat{a}_\theta + z \cos \theta \hat{a}_z$

3 (a) State and explain coulomb's law and derive its expression

(b) Point charges 2 mC and -3 mC are located at (-3,-2,1) and (1,1,-4) respectively. Calculate the electric force on 10 nC charge located at (0, 0, 0)

4 (a) A circular loop located on  $x^2+y^2=9, z=0$  carries a direct current of 10A along the  $\hat{a}_\theta$  determine magnetic field intensity(**H**) at (0, 0,-4)

(b) State and explain Amperes circuit law

5 (a) Derive  $\nabla \times \mathbf{H} = \mathbf{J} + \frac{d\mathbf{D}}{dt}$  from the concept of displacement current (10M)

(b) In a given lossy dielectric medium conduction current density  $J_c = 0.04 \sin 10^9 t$  (A/m<sup>2</sup>). Find the displacement current density if  $\sigma = 10^2$  S/m and  $\epsilon_r = 5.5$

6 Explain Poynting's vector and derive Poynting's theorem

7 (a) Two point charges -5 micro coulombs and 4 micro coulombs are located (2,-1,3) and (0,4,-2) respectively find the potential at (1,1,1) .

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

**FACULTY OF ENGINEERING**

**B.E. (ECE/MECH/PROD/AE/IT) III – Semester (AICTE) (Main) Examination,  
March / April 2022**

**Subject: Finance and Accounting**

**Time: 3 Hours**

**Max. Marks: 70**

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

1.

- (a) What is journal? Explain the purpose.
- (b) Define Bank Reconciliation Statement.
- (c) Define the Net Profit.
- (d) What is Money market? Explain.
- (e) State the Time Value of Money.
- (f) What do you mean by Payback Period?
- (g) Explain Profitability ratio.

2. (a) What is Accounting Cycle? Explain the Various steps involved in it?  
(b) Write Journal Entries for the following transaction.

Sl.No	Date	Particulars	Rs.
I.	1 <sup>st</sup> Nov	Purchased goods for cash	5000
II.	2 <sup>nd</sup> Nov	Sold goods for cash	8000
III.	3 <sup>rd</sup> Nov	Received cash from Deepak	2500
IV.	4 <sup>th</sup> Nov	Paid rent	5000
V.	5 <sup>th</sup> Nov	Deposited in Bank	40000
V.	6 <sup>th</sup> Nov	Sold goods to Hari	2500

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3. Prepare the Final Account from the Trial Balance of ABC Company for the year ending 31-12-2015.

Particulars	Debit (Rs)	Credit(Rs)
X's Capital	-----	75,000
Sales	-----	1,10,000
Sundry Creditors	-----	14,000
Bills Payable	-----	6,000
Purchases	50,000	---
Opening Stock	60,000	---
Wages	5,000	---
Salaries	6,000	---
Office expenses	4,000	---
Sundry debtors	40,000	---
Cash	3,000	---
Plant and Machinery	20,000	---
Rent	2,000	---
Bad Debts	1,000	---
Receivables	4,000	---
Goodwill	10,000	---
	2,05,000	2,05,000

Adjustments:

The value of closing stock was Rs. 60,000.

4. (a) Draw a structure of Indian Financial System.  
 (b) What is the role of Financial Intermediaries? Explain.
5. The proposals in respect of the following 2 projects are to be examined using.  
 (a) Pay back method  
 (b) Accounting rate of return method

Initial investment for both projects = Rs. 20,000.

Estimated cash flows:

Year	Proposal 1	Proposal 2
1	12,500	11,750
2	12,500	12,250
3	12,500	12,500
4	12,500	13,500

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6. Following is the balance sheet of XYZ Limited as on 31-12-2002.

Particular	Rs	Particular	Rs
Equity Share Capital	40,000	Plant and Machinery	24,000
Capital Reserve	8,000	Land and Buildings	40,000
8% Loan on Mortgage	32,000	Furniture & Fixtures	16,000
Creditors	16,000	Stock	12,000
Bank overdraft	4,000	Debtors	12,000
Taxation:		Investments( Short –term)	4,000
Current	4,000	Cash in hand	12,000
Future	4,000		
Profit and Loss A/C	12,000		
	1,20,000		1,20,000

From the above, Calculate (a) the Current Ratio, (b) Quick Ratio, (c) Debt -Equity Ratio, and (d) Proprietary Ratio.

7. Explain the methods of calculating a) NPV b) IRR. What are the decision criteria of the two methods?

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**FACULTY OF ENGINEERING**  
**BE (CSE) III – Semester (AICTE) (Main) Examination, March / April 2022**

**Subject: Discrete Mathematics**

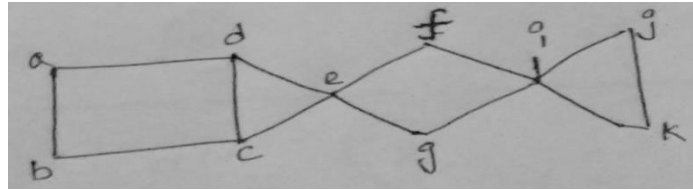
**Time: 3 Hours**

**Max. Marks: 70**

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

- 1 (a) Construct the truth table for  $(p \rightarrow q) \leftrightarrow (\sim p \cup q)$   
(b) What is the Cartesian product  $A \times B \times C$ , where  $A = \{0, 1\}$ ,  $B = \{1, 2\}$ , and  $C = \{0, 1, 2\}$  ?  
(c) Let  $f: R \rightarrow R$  and  $g: R \rightarrow R$  where  $f(x) = x^2$ ,  $g(x) = x + 5$  Show that  $f \circ g \neq g \circ f$ .  
(d) How many ways are these to select five players from 10 member tennis team to make a trip to match to another school.  
(e) What is inhomogeneous recurrence relation?  
(f) List out the properties where graph posses to qualify as tree?  
(g) Define a wheel graph. A wheel graph has  $n+1$  vertices, then determine the edges. Give example to support your answer
  
- 2 (a) Prove that  $\sqrt{2}$  is irrational.  
(b) Show that  $\sim p$  is a valid conclusion from premises.  
 $p \rightarrow r, r \rightarrow s, t \cup \sim s, \sim t \cup u, \sim u$ .
  
- 3 (a) Let  $f: R \rightarrow R$ , be defined by  $f(x) = \begin{cases} 3x - 5; & x > 0 \\ -3x + 1; & x \leq 0 \end{cases}$ , then determine:  
1.  $f^{-1}, f\left(\frac{5}{3}\right)$  and  $f\left(-\frac{5}{3}\right)$   
2.  $f^{-1}(0), f^{-1}(-6), f^{-1}(1)$   
(b) Prove that  $(Q^+, *)$  where  $*$  is a binary operation defined by  $a * b = ab/5$  is a group?
  
- 4 (a) Find the coefficient of  $x^{12}$  in  $(1 - 4x)^{-5}$   
(b) Solve the recurrence relation  $a_n - 7a_{n-1} + 10a_{n-2} = 0$  for  $n \geq 2$  with initial conditions  $a_0 = 10, a_1 = 41$
  
- 5 (a) Solve the recurrence relation  $a_n - 9a_{n-1} + 26a_{n-2} - 24a_{n-3} = 0$  for,  $n \geq 3, a_0 = 0, a_1 = 1, a_2 = 10$  using generating function method.  
(b) State and explain the properties of the pigeonhole principle.

6 (a) Draw and explain BFS and DFS algorithms for following graph.



(b) Show that any graph with 4 or fewer vertices is planar.

7 Write short notes on any two:

- (a) Algebraic Structure
- (b) Euler Circuits and Hamiltonian graphs
- (c) Isomorphic Graphs

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## FACULTY OF ENGINEERING

B.E. (CME/DS) III - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Discrete Mathematics

Time: 3 Hours

Max. Marks: 70

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

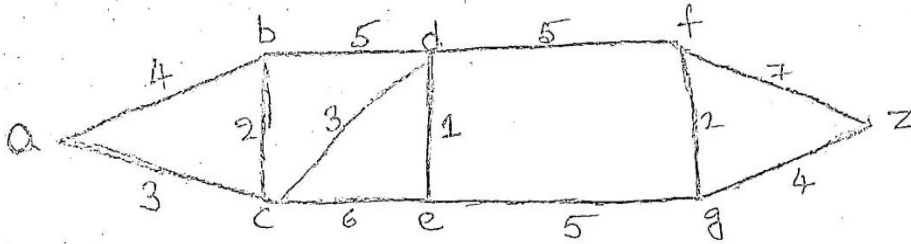
- 1 (a) Let  $A=\{0,2,4,6,8\}$  ,  $B=\{0,1,2,3,4\}$ , and  $C=\{0,3,6,9\}$ . What are  $A \cup B \cup C$  and  $A \cap B \cap C$ .  
(b) A student can choose a computer project from one of three lists. The three lists contain 23, 15, and 19 possible projects, respectively. No project is on more than one list. How many possible projects are there to choose from?  
(c) Show that  $(p \wedge q) \Rightarrow (p \rightarrow q)$ .  
(d) Give an indirect proof of the theorem if  $3n + 2$  is odd, then  $n$  is odd.  
(e) Define Monoid with suitable example.  
(f) Write the converse, inverse, contra positive of "If you work hard then you will be rewarded".  
(g) What is a chromatic number? Give the Chromatic number for a wheel graph.
- 2 (a) If  $f, g, h: R \rightarrow R$  are defined by  $f(x) = x + 2$   $g(x)=\frac{1}{x^2+1}$  and  $h(x)=3$ , find :  
(i)  $g \cdot h \cdot f(x)$   
(ii)  $f^{-1} \cdot g \cdot f(x)$   
(iii)  $g \cdot f^{-1} \cdot f(x)$   
(iv)  $f \cdot g \cdot h(x)$ .  
(b) Use a membership table to show that  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ .
- 3 Among 50 patients admitted to a hospital, 25 are diagnosed with pneumonia, 30 with bronchitis, and 10 with both pneumonia and bronchitis. Determine:  
(i) The number of patients diagnosed with pneumonia or bronchitis (or both).  
(ii) The number of patients not diagnosed with pneumonia or bronchitis.
- 4 (a) Prove the following using the rule of inference.  

$$\begin{array}{l} p \rightarrow (q \rightarrow r) \\ \sim q \rightarrow \sim p \\ p \\ \hline \therefore r \end{array}$$
  
(b) Obtain PCNF of  $(\sim p \rightarrow r) \cap (q \leftrightarrow p)$  and hence obtain its PDNF.
- 5 (a) Let  $S = Q * Q$  be the set of all ordered pairs of rational numbers and given by  
 $(a, b) * (x, y) = (ax, ay + b)$   
(i) Check  $(S, *)$  is a semigroup. Is it commutative?  
(ii) Also find the identity element of  $S$ .



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- 6 (a) Define Graph and its properties?  
(b) Find the shortest path between a and z.



- 7 Write short notes on any two:  
(a) Ring, Field, Integral Domain  
(b) Fundamental Theorem of Arithmetic  
(c) Power set Theorem.

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## FACULTY OF ENGINEERING

B.E. (AI & DS) III - Semester (AICTE) (Main) Examination, March / April 2022

**Subject: Discrete Mathematics**

**Time: 3 Hours**

**Max. Marks: 70**

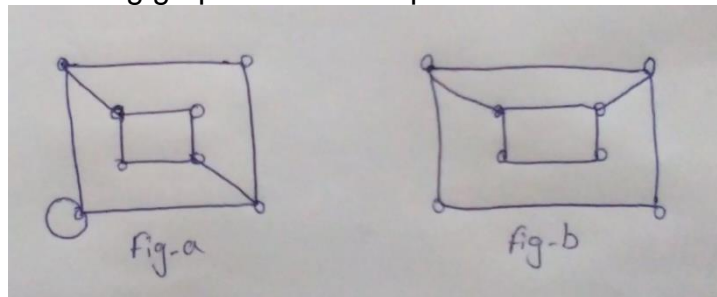
**Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 marks.**

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**(iii) Missing data, if any, may be suitably assumed.**

- 1 (a) What are the rules of Quantifiers?  
 (b) Let  $\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$  does  $AB=BA$ ?  
 (c) Write a recursive algorithm for computing the greatest common divisor of two nonnegative integers  $a$  and  $b$  with  $a < b$ .  
 (d) Define principle of Inclusion- Exclusion.  
 (e) Is the “divides” relation on the set of positive integers reflexive?  
 (f) What is meant by Homomorphism?  
 (g) Write about minimum spanning tree.
  
- 2 (a) Prove that  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ .  
 (b) If  $f: x \rightarrow y$  and  $g: y \rightarrow x$  the function  $g$  is equal to  $f^{-1}$  only if  $gof = I_x$  and  $fog = I_y$ , prove the result.
  
- 3 (a) In how many ways can the 26 letters of alphabet be permuted so that none patterns car, dog, pun or byte occurs.  
 (b) Prove by mathematical induction, that the sum of squares of the first  $n$  natural numbers is  $n(n + 1)(2n + 1)/6$ .
  
- 4 (a) Solve the recurrence relations:  $2a_r - 5a_{r-1} + 2a_{r-2} = 0$  and find the particular solution such that  $a_0 = 0, a_1 = 1$ .  
 (b) Consider a set of integers from 1 to 250. Find how many of these numbers are divisible by 3 or 5 or 7? Also indicate how many are divisible by 3 or 7 but not by 5 and divisible by 3 or 5?
  
- 5 (a) State and prove that Euler’s formula for planar graph.  
 (b) If  $R$  is relation on the set of integers such that  $(a, b) \in R$  if and only if  $b = a^m$  for some positive integer  $m$  show that  $R$  is partial ordering.
  
- 6 (a) What is a complete balanced binary tree? Give one example.  
 (b) Define a complete binary tree and show that the total number of edges are  $2(n - 1)$ , where ‘ $n$ ’ is the number of terminal vertices/nodes?

- 7 (a) What is Isomorphic graph? Explain various conditions for proving the given graphs is not isomorphic?  
(b) Check the following graphs are isomorphic or not.



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**FACULTY OF ENGINEERING**

**B.E. (AI&ML) III – Semester (AICTE) (Main) Examination, March / April 2022**

**Subject: Finance and Accounting**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.**

**(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.**

**(iii) Missing data, if any, may be suitably assumed.**

1.

- (a) Accounting cycle
- (b) Subsidiary books
- (c) Secondary market
- (d) BCR
- (e) Accounting equation concept
- (f) Income statement
- (g) Treasury bills

2. (a) Define Ledger.

(b) Enter the following transactions in the journal

- (a) Started business with cash ₹ 4, 00,000.
- (b) Bought goods for cash ₹ 1, 50,000.
- (c) Sold goods ₹ 5,000.
- (d) Sold goods to venkatesh ₹ 30,000.
- (e) Purchased building ₹ 50,00,000
- (f) Purchased goods from Anwar ₹ 20,000.
- (g) Paid to Raghu by cheque ₹ 25,000.
- (h) Sold old machinery ₹ 50,000.
- (i) Received cash from Mohan ₹ 2,000.
- (j) Paid salaries ₹ 1, 50,000.
- (k) Commission received 35000
- (l) Received cheque from shiva 50000

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3. (a) What are the uses of final accounts?  
 (b) Prepare final accounts from the books of Devanand and company as on 31-03-2020

	Debit(₹)	Credit (₹)
Purchases	90300	
Sales		137200
Purchases returns		1300
Capital		50000
Creditors		24000
Interest		3750
Bank overdraft		40750
Sales return	2200	
Opening stock	40000	
Building	30000	
Drawings	5000	
Machinery	20000	
Rent	1500	
Bad Debts	1000	
Furniture	8000	
Debtors	25000	
Wages	3000	
Cash	10000	
Investments	3500	
Postage	2500	
Insurance	2000	
Salaries	11000	
Carriage	2000	

Adjustments : 1. The value of closing stock was ₹ .65, 000. 2. Salary outstanding ₹ 1000. 3. Depreciation on building @ 2% p.a., on machinery @ 10% p.a.

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4. (a) Define financial intermediary.  
 (b) Explain the various functions and role of financial intermediaries.
5. (a) What is capital budgeting?  
 (b) Calculate IRR of the project from the following information. The project has an investment of ₹ 20000 and life of 5 years.

The cash flows after taxes are

Years	1	2	3	4	5
CFAT(₹)	5000	10000	10000	3000	2000

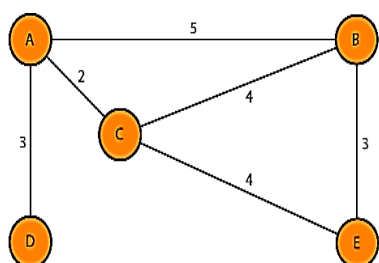
6. (a) What is Debt-Equity Ratio?  
 (b) X Limited has a Current ratio of 2: 1 and Quick ratio of 1.5: 1. Its current liabilities are ₹ 80,000. Calculate the value of stock.
7. (a) What do you understand by overdraft?  
 (b) From the following information, prepare BRS of Royal traders as on 31-12- 2020.
- (a) Bank balance as for cash book ₹ 58000.  
 (b) Cheque amounting ₹ 25000 issued on 25-12-2020 were presented on 03-1- 2021  
 (c) Cheque of ₹ 20000 deposited on 20-12-2020 was returned dishonoured on 05-1-2021.  
 (d) Interest on investments ₹ 1500 was collected and credited by bank but no entry is in the cash book.  
 (e) Bank charges debited by bank ₹ 120

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**FACULTY OF ENGINEERING****B.E. (IoT) III - Semester (AICTE) (Main) Examination, March / April 2022****Subject: Computer Networks****Time: 3 Hours****Max. Marks: 70**

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.  
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.  
(iii) Missing data, if any, may be suitably assumed.

1.
  - (a) State the difference between Synchronous TDM and Statistical TDM.
  - (b) Calculate the Minimum Hamming distance for the given code words: **(00000; 01010; 01111)**.
  - (c) Describe the purpose of Tunneling with the help of a neat diagram.
  - (d) Define Silly Window Syndrome with a neat diagram.
  - (e) Compare Packet-Filter firewall and Proxy firewall.
  - (f) Differentiate between Pure ALOHA and Slotted ALOHA.
  - (g) List differences between guided and unguided media.
2.
  - (a) Explain the data communication system components.
  - (b) List the layers of ISO-OSI reference model using the layered architecture diagram. State the Important differences between the ISO-OSI and TCP/IP reference models.
3.
  - (a) Explain Go-Back-N ARQ protocol. What is the window size of sender and receiver?
  - (b) Describe CHECKSUM mechanism for Error Detection with an example.
4.
  - (a) Calculate the routing table entries of router C using Distance Vector routing algorithm for the given network. Router C receives route updates from its neighbors A, B and E as follows:



Router B		
To	Cost	Next
A	5	-
B	0	-
C	4	-
D	8	A
E	3	-

Router E		
To	Cost	Next
A	6	C
B	3	-
C	4	-
D	9	C
E	0	-

Router A		
To	Cost	Next
A	0	-
B	5	-
C	2	-
D	3	-
E	6	C

- (b) Discuss about Classful IPv4 addressing.

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5. (a) Elaborate on TCP timer management.  
(b) Explain how addressing is done in transport layer.
6. (a) List the steps of RSA algorithm. Using it calculate the decryption (**d**) key given **p=5, q=11** and **e=7**. Use it to encrypt the number **8**.  
(b) Write about DNS name resolution approaches.
7. (a) Write short notes on  
i) BOOTP ii) DHCP.  
(b) Discuss the techniques that can be used to improve QoS.

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**FACULTY OF ENGINEERING**

**B. E. (IT) III - Semester (AICTE) (Backlog) Examination, March / April 2022**

**Subject: Data Structures**

**Time: 3 Hours**

**Max marks: 70**

**(Missing data, if any may be suitably assumed)**

**PART – A**

**Note: Answers all questions.**

**(10 x 2 = 20 Marks)**

1. What is copy constructor?
2. What are access specifiers?
3. What is sparse matrix? How sparse matrix is represented.
4. Convert the following infix expression to prefix and postfix  $(A * B * (C - A) - D$
5. What are the different types of linked lists?
6. What is hash function? List few hash functions.
7. The preorder traversal of a binary tree is ABCDEFG and its converse inorder is GDFEABC. Construct the tree.
8. Define Max Heap with example.
9. Compare and contrast DFS and BFS
10. What is an internal sort and give examples of internal sorting mechanisms

**PART - B**

**Note: Answers any five questions.**

**(5 x 10 = 50 Marks)**

11. a) Explain class templates.  
b) What is exception handling? Give different types of exceptions with example of each.
12. a) Explain Array as an ADT in detail  
b) Write a C++ program for implementing Insertion and Deletion in string ADT
13. a) Write an algorithm to delete an element at a given location in singly linked list.  
b) Explain how overflow handling is done in hashing.
14. Define AVL Tree. Describe the AVL tree rotation with the help of suitable examples.
- 15 a) Explain Merge sort for the following elements. 66, 48, 57, 92, 24, 65, 83, 72  
b) Write Kruskal's algorithm to find minimum cost spanning tree of a Graph. Explain it with the help of an example.
16. a) Explain different types of Hash functions.  
b) Explain the working of List and Table Sorts.
17. Write short notes on the following
  - a) Asymptotic notation.
  - b) Threaded Binary Trees.

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**FACULTY OF ENGINEERING**

**B. E. (EIE) III – Semester (AICTE) (Backlog) Examination, March / April 2022**

**Subject: Network Theory**

**Time: 3 hours**

**Max. Marks: 70**

*(Missing data, if any, may be suitably assumed)*

**PART – A**

**Note: Answer all questions.**

**(10 x 2 = 20 Marks)**

1. Define Symmetry and Reciprocity.
2. Draw the equivalent circuit of h-parameter.
3. Define characteristic Impedance and Propagation Constant.
4. Determine the image impedance parameters? If series arm impedances  $Z_A=200 \Omega$   $Z_B=150 \Omega$  and shunt arm impedance  $Z_C=180 \Omega$ .
5. Write advantages of m-derived filter.
6. Define Composite filter and give example?
7. Define Asymmetrical attenuator and give example.
8. Define Inverse impedance and give example.
9. Explain properties of Hurwitz Polynomial.
10. Draw the Circuit diagram of Foster form – I.

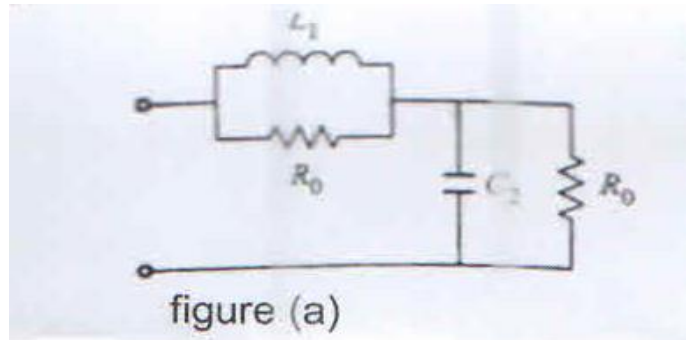
**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 (a) Derive the expression for image impedances in terms of ABCD parameters.  
(b) The y-parameters of a two port network are  $Y_{11}=0.8 \text{ mho}$ ,  $Y_{22}=1.8 \text{ mho}$  and  $Y_{12}=Y_{21}=-0.5 \text{ mho}$ . (a). Determine the ABCD parameters and (b). The equivalent  $\Pi$  network.
- 12 (a) Show that  $(Z_{ot})^2=Z_{oc}.Z_{sc}$ .  
(b) Calculate the iterative impedance of an asymmetrical T – network having two series arm impedances  $150 \Omega$  and  $250 \Omega$  and shunt arm impedance  $300 \Omega$ .
- 13 (a) A Prototype high pass filter has a cut-off frequency of  $15\text{kHz}$  and nominal impedance is  $400\Omega$ . Calculate the element values of L and C.  
(b) If an m-derived high pass filter has design impedance of  $350 \Omega$  and cut-off frequency of  $2.7 \text{ KHz}$  and infinite attenuation at  $1.8 \text{ KHz}$ , design the filter.

- 14 (a) Design a Symmetrical T-attenuator that offers 60 DB attenuation when the load is  $420 \Omega$ .
- (b) Design a full series Equalizer shown in figure (a), such that it gives 20 dB at attenuation at 800 Hz and whose design resistance  $R_0$  is  $750 \Omega$  determine the values of  $L_1$  and  $C_2$ .



- 15 (a) Using the foster form I, Synthesize the impedance function.

$$Z(s) = \frac{(S^2 + 7)(S^2 + 3)}{S(S^2 + 3)(S^2 + 5)}$$

- (b) Using the Cauer form I, Synthesize the impedance function.

$$Z(s) = \frac{5(S + 1)(S + 4)}{S(S^2 + 3)}$$

- 16 (a) Derive the expression for Series-parallel connection of two-port networks.
- (b) The impedances of a series and shunt of an L network is given as  $j150 \Omega$  and  $j350 \Omega$ . Calculate its iterative impedance.
- 17 (a) Draw the characteristics curves of constant 'k' low pass filter.
- (b) Explain about two terminal series equalizer.
- (c) Check whether the function

$$Z(s) = \frac{s^3 + 4s^2 + 2s + 8}{s^3 + 3s^2 + 5s + 7} \quad \text{is positive real or not.}$$

## FACULTY OF ENGINEERING

B.E.(ECE) III - Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Network Theory

Time: 3 Hours

Max. Marks: 70

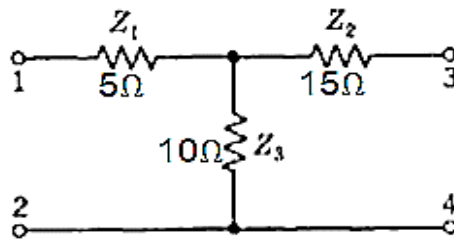
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### PART – A

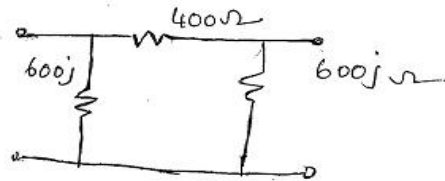
Note: Answer all questions.

(10 x 2 = 20 Marks)

1. Draw the equivalent circuit of h parameter
2. Find the equivalent  $\Pi$  Network for given T network.



3. Define Image impedance and Iterative impedance.
4. Find the characteristic impedance of the following Network.



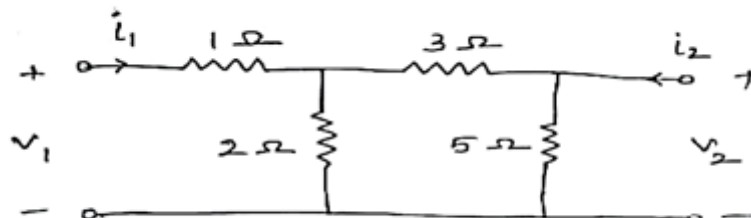
5. Derive the condition for the pass band.
6. What are the advantages of 'm' – derived filter over constant K filter?
7. Design a symmetrical 'T' attenuator with an attenuation of 60db and  $R_0 = 600\Omega$ .
8. What is an equalizer? Classify them.
9. List the properties of positive real functions.
10. Test whether the polynomial  $P(s) = S^4 + S^3 + 4S^2 + 2S + 3$  is Hurwitz or not.

### PART – B

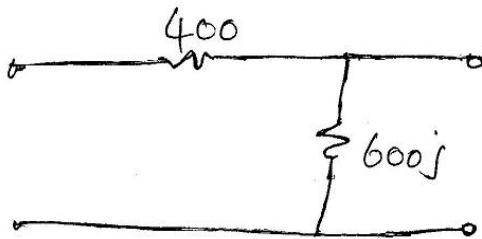
Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. (a) Define h parameters of a two-port network. Establish the relation between y-parameters and h-parameters.
- (b) Find the z-parameter of the following network



12. (a) Design a Symmetrical T Network. Obtain the characteristic Impedance and propagation Constant.  
 (b) Given  $Z_a=200\Omega$ ,  $Z_b=400\Omega$  and  $Z_c=500\Omega$  for a non-asymmetrical network, Calculate image impedances.  $Z_a$ ,  $Z_b$  are series impedances and  $Z_c$  is shunt impedance of a T-network.
13. Design a composite low pass filters with a cutoff frequency 2kHz and a nominal impedance of  $600\Omega$  with frequency of infinite attenuation is 2.1 kHz.
14. (a) Design two terminal series equalizer  
 (b) Design a symmetrical lattice attenuator with  $R_o = 600$  ohms and attenuation of 60 db.
15. (a) Synthesize the LC immittance function  $Y(s) = \frac{s(s^2+4)(s^2+6)}{(s^2+3)(s^2+5)}$  using Cauer Form-I  
 (b) The driving point impedance of a RL network is given by  $Z(S) = \frac{5(S+1)(S+4)}{(S+3)(S+5)}$ . Synthesize using Foster Form-I.
16. (a) Find the image and iterative impedances of the following Network



- (b) Prove that in a parallel-parallel interconnected two networks  $[Y_A]$  and  $[Y_B]$  respectively, the overall Y-matrix is given as  $[Y] = [Y_A] + [Y_B]$ .
17. (a) Design a constant – k LPF (T-type) having a cut off Frequency of 4 kHz and nominal characteristic impedance of  $500 \Omega$ .  
 (b) In a symmetrical T-attenuator the series arm resistance is 1200 ohms. Calculate the load resistance if attenuation is 40 db.

**FACULTY OF ENGINEERING**  
**B.E. (CME/CSE) III - Semester (AICTE) (Backlog) Examination,**  
**March / April 2022**

**Subject: Operations Research**

**Time: 3 Hours**

**Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

**PART – A**

**Note: Answer all questions.**

**(10 x 2 = 20 Marks)**

- 1 Write the scope of Operations Research.
- 2 Define Slack variables with an example.
- 3 Explain how you will write the dual of a given primal.
- 4 State the optimality condition in the dual simplex method.
- 5 What is Transportation problem?
- 6 Discuss practical applications of Assignment problems.
- 7 Discuss the reasons for replacement.
- 8 Define Two – persons zero sum Game.
- 9 What is Sequencing problem?
- 10 What is Jokeying?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 Solve by Simplex method

Maximize  $Z = 2x_1 + 2x_2 + 4x_3$  subject to the constraints

$$2x_1 + 3x_2 + x_3 \leq 300$$

$$x_1 + x_2 + 3x_3 \leq 300$$

$$x_1 + 3x_2 + x_3 \leq 240$$

$$x_1 \ x_2 \ x_3 \geq 0.$$

- 12 Apply the dual simplex method to solve

Minimize  $Z = 2x_1 + x_2$  subject to the constraints

$$3x_1 + x_2 \geq 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \geq 3$$

$$x_1 \ x_2 \geq 0.$$

- 13 Solve the following transportation problem for its optimum solution

	D1	D2	D3	D4	Supply
S1	6	8	8	5	30
S2	5	11	9	7	40
S3	8	9	7	13	50
Demand	35	28	32	25	120

14 The assignment costs of four operators to four machines are given in the following table

		Operators				
		I	II	III	IV	
A		10	5	13	15	
B		3	9	18	3	
C		10	7	3	2	
D		5	11	9	7	Machines

Find the optimal assignment using the Hungarian method.

15 Consider the 4 x 4 game played by players A and B solve it optimally.

		Player B				
		1	2	3	4	
Player	1	6	2	4	8	
	2	2	-1	1	12	
	3	2	3	3	9	
	4	5	2	6	10	A

16 Find the sequence of jobs that minimizes the total elapsed time to complete the following jobs on the machines.

Jobs	1	2	3	4	5	6
Machine A	3	12	5	2	9	11
Machine B	8	10	9	6	3	1

17 The arrival rate of customers at banking counters follows Poisson distribution with a means of 45 per hour. The service rate of the counter clerk also follows Poisson distribution with a mean of 60 per hour.

- What is the Probability of having zero customer in the system ( $P_0$ )?
- What is the Probability of having 5 customers in the system ( $P_5$ )?
- What is the Probability of having 10 customers in the system ( $P_{10}$ )?
- Find  $L_s$ ,  $L_q$ ,  $W_s$  and  $W_q$ .

## FACULTY OF ENGINEERING

B.E. (EEE) III - Semester (AICTE) Examination, March / April 2022

Subject: Electrical Circuits Analysis

Time: 3 hours

Max. Marks: 70

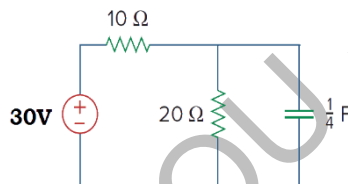
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### PART – A

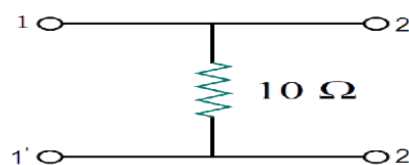
Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 The voltage phasor of a circuit is  $10 \angle 15^\circ$  V and the current phasor is  $2 \angle 45^\circ$  A. The active, reactive and apparent power in the circuit are?
- 2 Two identical coils of negligible resistance when connected in series across a 200V, 50 Hz source draws, a current of 10A. When the terminals of one of the coils are reversed, then the drawn current is 8 A. The coefficient of coupling between the two coils is?
- 3 State reciprocity theorem.
- 4 What is duality and dual networks?
- 5 Determine the time constant of circuit given below :



- 6 For a RLC series circuit  $R = 40 \Omega$ ,  $L = 4$  H and  $C = 0.25$  F. Calculate the characteristics roots of the circuit and nature of natural response?
- 7 Find the Laplace transform ramp and exponential decaying functions.
- 8 Find the inverse Laplace transform  $(s) = \frac{3}{s} - \frac{5}{s+1} + \frac{6}{s^2+4}$ .
- 9 What is the condition for reciprocity and symmetry in Transmission parameters?
- 10 Obtain Z – parameters for a single element two – port network given below

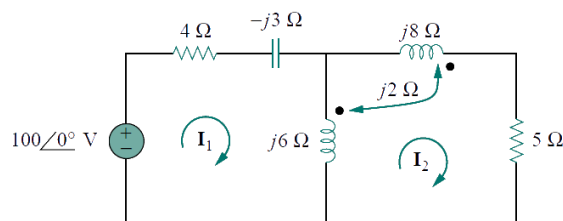


### PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11(a) Calculate the mesh currents  $I_1$  and  $I_2$ .

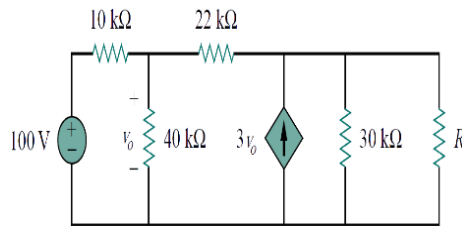


- (b) A series R-L-C circuit has  $R=50\Omega$ ;  $L=100 \mu\text{H}$  and  $C=1 \mu\text{F}$  connected across a 220 V a.c supply. Calculate the (i) frequency at which the circuit resonates (ii) current at resonance (iii) band width (iv) half power frequencies (v) voltage across capacitance at resonance.



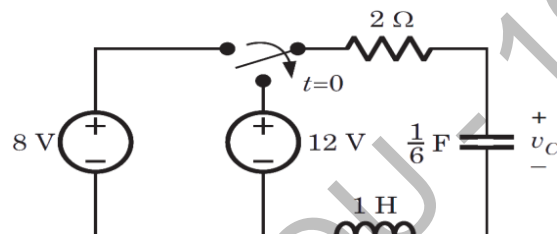
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- 12 (a) Find the maximum power transferred to resistor R

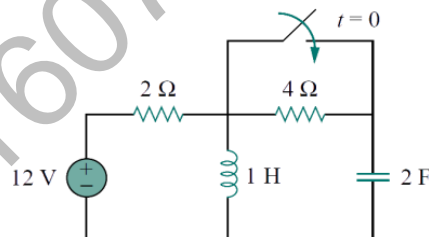


- (b) State and explain superposition theorem.

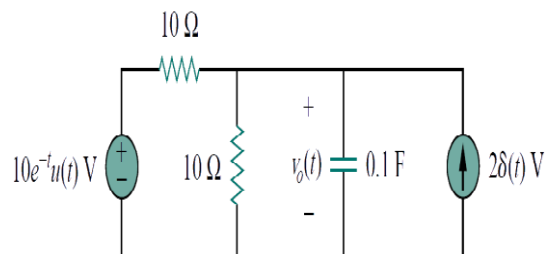
- 13 (a) Switch is moved from 8 V to 12 V at  $t = 0$ . The voltage  $V_c(t)$  for  $t > 0$



- (b) The capacitor voltage and inductor current at  $t = 0^-$  ( just before the switch is closed)

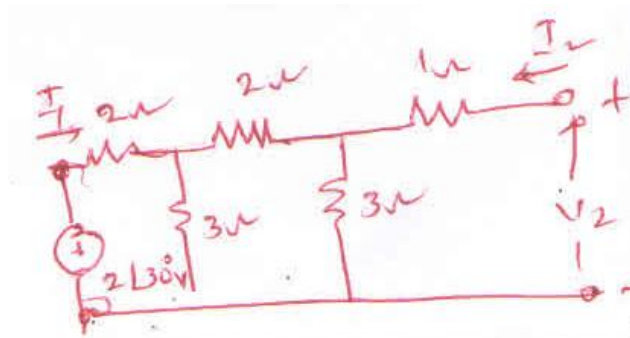


- 14 (a) Find  $V_o(t)$  in the given circuit below,  $V_o(0) = 5V$  by using Laplace transform

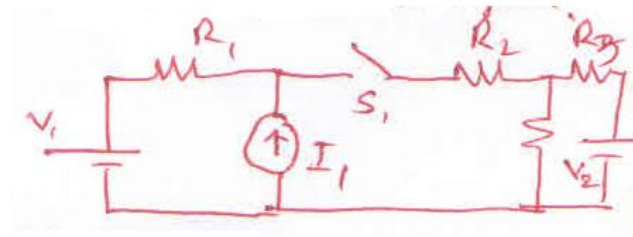


- (b) Find  $f(0)$  and  $f(\infty)$  if they exist, when  $F(s) = \frac{8(s+3)(s+1)}{s(s+2)(s+4)}$ .

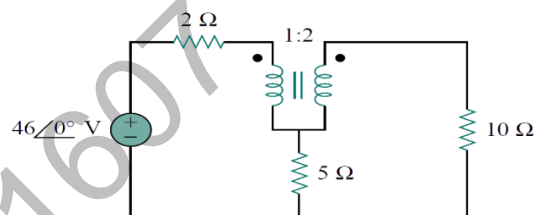
- 15 (a) Obtain Z – parameters of a two – port shown below



- (b) Draw the dual network for the below figure.

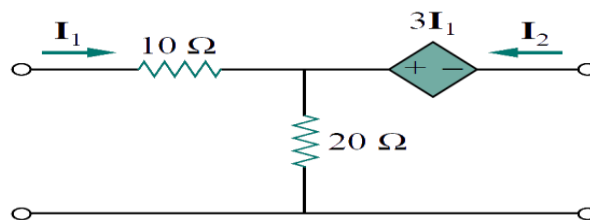


- 16 (a) Find the power absorbed by 10 Ω resistor for a given circuit below

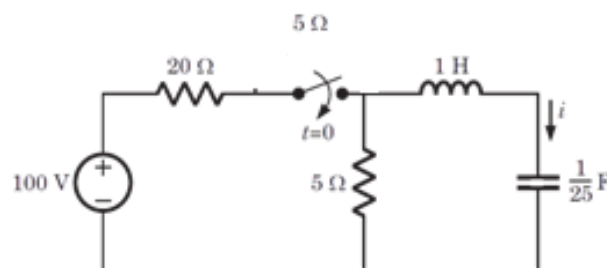


- (b) Derive the relation between Z and Y parameters.

- 17 (a) Obtain ABCD – parameters of a two – port shown below



- (b) Calculate  $i(t)$  for  $t > 0$  for given circuit below



**FACULTY OF ENGINEERING****BE (CIVIL) III - Semester (AICTE) (Backlog) Examination, March / April 2022****Subject: Surveying and Geometrics****Time: 3 Hours****Max marks: 70****(Missing data, if any may be suitably assumed)****PART – A****Note: Answers all questions.****(10 x 2 = 20 Marks)**

1. State the principles of surveying
2. Define Contour and Contour interval
3. What are the fundamental lines of a theodolite?
4. Why face left and face right observations are taken in Theodolite survey?
5. Determine the length of the curve, if the radius of circular curve is 200m and deflection angle is 65
6. List the salient features of vertical curves
7. Discuss the principle of EDM Instruments
8. List the salient features of GPS Constellation
9. Discuss the advantages of photogrammetric surveying?
10. Define Remote Sensing

**PART - B****Note: Answers any five questions.****(5 x 10 =70 Marks)**

11. a) Define Surveying and discuss the classification of surveying based on instruments.
- b) The following staff readings were taken with a level. The instrument having been shifted after the 4<sup>th</sup>, 7<sup>th</sup> and 10<sup>th</sup> reading. RL of the starting BM is 100.00m. Enter the readings in the form of level book page and reduce the level by the collimation method and apply usual checks. 2.65, 3.74, 3.83, 5.27, 4.64, 0.38, 0.96, 1.64, 2.84, 3.48, 4.68, and 5.26
12. a) In running a traverse, the lengths and bearings of the lines observed are tabulated. Point F is situated at the center of the line joining A and E. Find out the true length and bearing of the line CG.

Line	Length(m)	Bearing
AB	150	N75°42'E
BC	100	M32°48'E
CD	300	S28°54'E
DE	800	S5°36'E

13. Two Straights AI and BI meet at a chainage of 3450m. A right-handed simple circular curve of 250m radius joins them. The deflection angle between the two straights is 50°. Tabulate the necessary data to layout the curve by Rankine's method of deflection angles. Take the chord interval as 20m.

14. a) Discuss various types of errors in GPS  
b) Discuss the applications of Total Station
15. a) A section line AB appears to be 8.16 cm on a photograph for which the focal length is 14cm. The corresponding line measures 2.54 cm on a map which is to a scale 1/50000. The terrain has an average elevation of 150m above mean sea level. Calculate the flying altitude of the aircraft, above mean sea level, when the photograph was taken.  
b) Differentiate between Active and Passive Remote Sensing.
16. a) Discuss the characteristics of Contours with neat sketches.  
b) The fore bearing of the lines AB, BC, CD and DE are  $45^{\circ} 30'$ ,  $120^{\circ} 15'$ ,  $200^{\circ} 30'$  and  $280^{\circ} 45'$  respectively, find angles B, C, D and show them in a neat sketch
17. Discuss various segments of GPS in detail.

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