University of Sargodha

BS 3rd Term Examination 2022

Subject: I.T/S.E **Paper: Linear Algebra (MATH-201/MATH-203/MATH-3215)**

Time Allowed: 02:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)

i. Consider vectors in R^3, $u = (1,1,1), v = (1,2,-3)$ *and* $w = (1,-4,3)$ then which vectors are orthogonal.

ii. Write the bases for the vector space $M_{2\times2}$ of 2×2 matrices.

iii. Let V be vector space and $u \in V$ then show that $(-1)u = -u$.

iv. If A is invertible matrix then A^T is also invertible and $(A^T)^{-1} = (A^{-1})^T$.

v. Define Rank and Nullity of homomorphism.

vi. Define similar matrices.

vii. Find x, y, z, t such that $\begin{bmatrix} x+y & 2z+t \\ x-y & z-t \end{bmatrix} = \begin{bmatrix} 3 & 7 \\ 1 & 5 \end{bmatrix}$.

viii. Define trace of a matrix.

ix. Find inverse of $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$.

x. Whether the vectors $u_1 = (1,2,-3), u_2 = (1,-4,3)$, are orthogonal or not.

xi. Let V be a vector space over a field K. Show that for any scaler k and $0 \in V, K0 = 0$.

xii. Show that set of all matrices with trace zero is subspace of vector space of all $n \times n$ matrices.

Subjective Part (3*12)

Q.2. **a)** If $A = \begin{bmatrix} 4 & 2 \\ 3 & -1 \end{bmatrix}$ then diagonalize that matrix.

b) Show that matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ satisfy its characteristic equation.

Q.3. **a)** Find Eigen values and corresponding Eigen vectors of $A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$.

b) Determine whether $(1,1,1,1), (1,2,3,2), (2,5,6,4), (2,6,8,5)$ form basis of R^4. If not, find the dimension of the subspace they span.

Q.4. **a)** Consider the vectors $u_1 = (1,2,1,3,2), u_2 = (1,3,3,5,3), u_3 = (3,8,7,13,8)$, $w_1 = (1,4,6,9,7), w_2 = (5,13,13,25,19)$ in R^4, *let* $U = span(u_i), w = span(w_i)$. Then show that $U = W$

b) Solve the following system of Linear equations by using Row Operation.

$$x + y + 2z = 9$$
$$2x + 4y - 3z = 1$$
$$3x + 6y - 5z = 0$$

Q.5. **a)** Let W be subspace of R^5 spanned by the vectors $u_1 = (1,2,-1,3), u_2 = (2,4,1,-2)$, $u_3 = (3,6,3,-7)$, $u_4 = (1,2,-4,11), u_5 = (2,4,-5,14)$. Find basis and dimension of W.

b) Find A^{-1}, if $A = \begin{bmatrix} 2 & 0 & 3 \\ 0 & 3 & 2 \\ -2 & 0 & -4 \end{bmatrix}$

Q.6. **a)** Apply the Gram-Schmidt process to find an orthogonal basis and then an orthonormal basis for the subspace U of R^4 spanned by $u_1 = (1,1,1,1), u_2 = (1,2,4,5), u_3 = (1,-3,-4,-2)$.

b) Let $v_1 = (1,2,1)$, $v_2 = (2,9,0)$ and $v_3 = (3,3,4)$. Show that the set $S = \{v_1, v_2, v_3\}$ is basis for $\mathbb{R}^3$.

---------- LK-6607/6608/6610 ----------

University of Sargodha

BS 3rd Term Examination 2022

Subject: I.T **Paper: Enterprise System (ITSC-201)**

Time Allowed: 02:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)

i. How we can manage cloud architecture in organization?
ii. Differentiate between fixed fee and time-and-material contracts.
iii. Write down the approaches for parallel SDLC?
iv. How many types of deployments plans?
v. What are the hardware components necessary for ERP system?
vi. Define the responsibility of project.
vii. What is management office (PMO)?
viii. Why we used enterprise resource planning (ERP)?
ix. How we can manage business process reengineering?
x. What is OPM3 Model?
xi. How we can manage the resources in outsourcing?
xii. Write down the phases of supply chain management?

Subjective Part (3*12)

Q.2. What is global ethics and security management issues in enterprise planning?
Q.3. What is business process reengineering implementation and strategies?
Q.4. What is the role of ERP system in project malmanagement?
Q.5. Write a detailed note on how to secure ERP system?
Q.6. Describe the customer relationship process in detail. Along with it briefly explain customer relationship strategies.

---------- LK-6566 ----------

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BS 3rd Term Examination 2022

Subject: I.T **Paper: Discrete Structure (CMPC-205)**

Time Allowed: 02:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)

i. Differentiate between pseudo graphs and multigraphs.

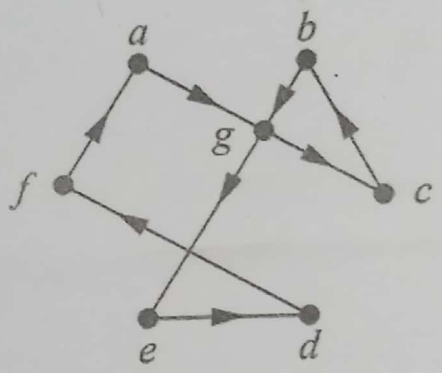
ii. Use a Truth Table to verify the first De Morgan law?

iii. Find the value of this postfix expression 5 2 1 - - 3 1 4 + + *

iv. Using truth-table, verify the equivalence "p v T ≡ T".

v. Determine whether the relation R= {(1,1), (1,2), (2,1), (3,2)} on the set A = {1,2,3} is reflexive or not?

vi. Determine whether Euler or Hamilton path exists in the following graph.



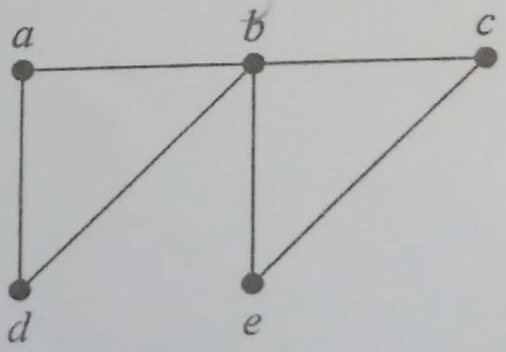
vii. What is cardinality of these sets?
i) {a, {a}, {a, {a}}} ii) {{a}}

viii. Define this function f(x) = x+1 onto or one-to-one. Domain consists of all integers.

ix. Derive average case complexity of insertion sort.

x. Define recurrence relation.

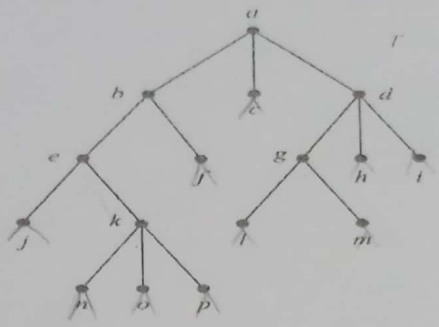
xi. Find spanning tree for the following graph by removing edges in simple circuits.



xii. What is the secret message produce from the message "MEET YOU IN THE PARK" using the Caesar Cipher?

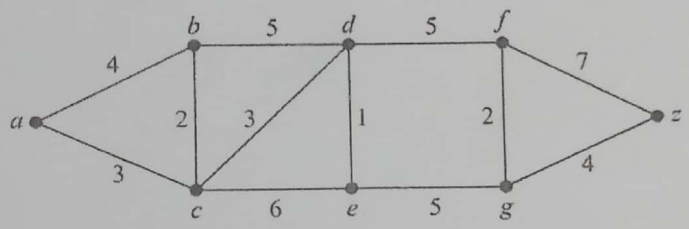
Subjective Part (3*12)

Q.2. In which order does a preorder and in order traversal visits the following tree.



Q.3. Find the length of shortest paths between the following vertices.

a) a and d
b) a and f
c) c and f
d) b and z



Q.4. Use Divide and Conquer algorithm to put 6, 1, 2, 4, 3 into increasing order.

Q.5. Describe the Linear Search algorithm and Find out the average case complexity of the linear search algorithm, assuming that the element x is in the list.

Q.6. Let p,q and r be the propositions

p: You have the flu

q: you miss the final examination

r: You pass the course

Express each of these propositions as an English sentence.

a) $p \rightarrow q$
b) $q \rightarrow \neg r$
c) $\neg q \leftrightarrow r$
d) $(p \wedge q) \vee (\neg q \wedge r)$
e) $P \vee q \vee r$
f) $(p \rightarrow \neg r) \vee (q \rightarrow \neg r)$

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BS 3rd Term Examination 2022

Subject: I.T **Paper: Data Structures & Algorithm (CMPC-203)**

Time Allowed: 02:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)

i. Declare the structure of a node using JAVA of a singly linked list.
ii. Why we use queues as data structure?
iii. What is meant by greedy algorithms?
iv. What is meant by asymptotic notations?
v. What is meant by time complexity of an algorithm?
vi. State the difference between primitive and non-primitive data types.
vii. Give an example of reference in JAVA.
viii. How many pointers are used while using stack as data structure and why?
ix. What is minimum spanning tree?
x. Write prefix equivalent of A + B * C.
xi. Define Hashing.
xii. What is ultimate benefit of sorting in data structures?

Subjective Part (3*12)

Q.2. Convert the following infix expression into postfix using stack. (^ indicates exponentiation)
A – B / (C * D ^ E)

Q.3. Write a function in JAVA that accepts reference of starting node of singly linked list and adds as the first node in the list.

Q.4. Write a function in JAVA to implement the INSERTION SORT.

Q.5. Make a BST for the following sequence of numbers and traverse it by using all types of traversal.
1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 20, 25

Q.6. Write a function in java to implement binary search recursively.

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BS 3rd Term Examination 2022

Subject: I.T **Paper: Professional Practices (ITSCC-201)**

Time Allowed: 02:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*12)

i. What are the strands in the ethical thinking?
ii. Write the steps involved in the memorandum of association?
iii. Differentiate between Centralization and decentralization?
iv. Explain the terminology Equity Capital and gearing?
v. Write some negative impacts of technology.
vi. What is contractual arrangement and write its type?
vii. Write the acts involved in the Primary infringement?
viii. Define system reliability.
ix. Draw a company management structure?
x. What is a trade mark?
xi. Who governs a contract?
xii. Define current liability.

Subjective Part (3*12)

Q.2. Explain the organizing an organization in detailed?
Q.3. Write in details about the Standards and methods of working?
Q.4. Briefly explain the sources of an obligation of confidence?
Q.5. Comparison of Health Hazard safety act pre-and post-1947 legislation?
Q.6. Write in detailed about the guidelines and principles of data protection practices?

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