

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

Hiranya Kumar Bhuyan School of Science and Technology

HOME ASSIGNMENT FOR

MASTER OF COMPUTER APPLICATION (MCA)

and

MASTER OF INFORMATION TECHNOLOGY (M.Sc.IT)

THIRD SEMESTER, 2016

COURSE: DISCRETE MATHEMATICS
(MCA-09/ M.Sc.IT-09)

Total Marks: 50

[Assignments are required to be written in your own language. Copying in to from the learning materials will carry less score]

A. Answer the following three questions:

2 X 3 = 6

Q1. Define equivalent and equal sets giving suitable examples.

Q2. When is a statement formula said to be in the normal form?

Q3. Determine which of the following sets is an empty set:

- a) $\{a|a \text{ is an odd integer and } a^2=4\}$
- b) $\{a|a \text{ is an integer and } a<1\}$
- c) $\{a|a \text{ is an integer and } a+9=9\}$

B. Answer the following three questions:

4 X 3= 12

Q1. Determine whether each of the following form is a tautology or a contradiction or neither :

(a) $(P \wedge Q) \rightarrow (P \vee Q)$

(b) $(P \rightarrow Q) \wedge (P \wedge \sim Q)$

Q2. How many combinations and permutations can be made with the letters of the word "ALGEBRA" taken three at a time.

Q3. Let $\mu=\{1,2,\dots,10\}$ be the universal set. The subsets are $A=\{1,7,8\}$, $B=\{2,4,6\}$, $C=\{1,3,6,8,9\}$. Find the min terms and max terms generated by A, B, C.

C. Answer the following two questions:

6 X 2= 12

Q1. Test whether the set of all non zero real numbers namely forms an abelian group with

respect to '*' defined by $a * b = \frac{ab}{2}$ for all $a, b \in R - \{0\}$.

Q2. Find the graph whose adjacency matrix is $\begin{bmatrix} 2 & 2 & 1 \\ 2 & 0 & 2 \\ 1 & 2 & 2 \end{bmatrix}$

D. Answer the following two questions:

10 X 2= 20

Q1. Determine whether the following set together with the binary operation is a semigroup, a monoid or neither. If it is a monoid, specify the identity. If it is a semi group or a monoid determine whether it is commutative.

(a) Set where $S = \{1,2,3,6,9,18\}$ where $a * b = LCM(a, b)$.

(b) Z , the set of integers, where $a * b = a + b - ab$.

Q2. Prove or disprove

(i) If G is a connected graph, then $G + K_1$ contains no cut-vertices.

(ii) If G is bipartite graph, then every edge of G lies on an even cycle.

COURSE: OPERATING SYSTEM
(MCA-10/ M.Sc.IT-10)

Total Marks: 50

[Assignments are required to be written in your own language. Copying in toto from the learning materials will carry less score]

A. Answer the following three questions:

2 X 3 = 6

Q1. What are system calls? What is the use of system calls?

Q2. When does race condition exists? What happens when an execution order is altered without mutual exclusion?

Q3. Distinguish between a real time system and a time sharing system.

B. Answer the following three questions:

4 X 3 = 12

Q1. What is a thread? Why a thread is called a lightweight process?

Q2. What is a process? Mention the different states of a process and their functions in brief.

Q3. What is a digital signature? How can u digitally sign a document?

C. Answer the following two questions:

6 X 2=12

Q1. Explain the purpose of **sleep** and **wakeup** primitive, citing suitable examples.

Q2. What is cache memory? Describe the memory hierarchy and the working of the cache memory system.

D. Answer the following two questions:

10 X 2 = 20

Q1. What is the need of the DMA techniques? Describe the advantages and disadvantages of memory-mapped I/O.

Q2. What is deadlock? Give the conditions for deadlock. State the strategies for dealing with deadlock.

**COURSE: FORMAL LANGUAGES AND AUTOMATA
(MCA-11/M.Sc.IT-11)**

Total Marks: 50

[Assignments are required to be written in your own language. Copying in toto from the learning materials will carry less score]

A. Answer the following three questions:

2 X 3 = 6

Q1. Describe the following language by regular expression:

a) Set of all strings of 0s and 1s that end with 11 and 0.

b) All strings having atleast two occurrences of substring 00.

Q2. What is the basic difference between PDA and Turing Machines?

Q3. What is predictive parsing?

B. Answer the following three questions:

4 X 3 = 12

Q1. Why are production used? Given a grammar defined by the production rules

$S \rightarrow AB$

$A \rightarrow Aa$

$B \rightarrow Bb$

$A \rightarrow a$

$B \rightarrow b$

Show that the word $w = a^2b^4$ belongs to $L(G)$, where L is a language generated by G .

Q2. Design a DFA to accept the following language:

$L(M) = \{w \mid w \in \{a, b, c\}^* \text{ and } w \text{ contains the pattern } \mathbf{abac}\}$

Q3. What is the significance of Turing's thesis? Write a use of Universal Turing Machine.

C. Answer the following two questions:

6 X 2 = 12

Q1. What is the significance of halting problem? Differentiate NP and P class.

Q2. Define ambiguity of grammar. Prove that $S \rightarrow S|S, S \rightarrow a$ is ambiguous.

D. Answer the following two questions:

10 X 2 = 20

Q1. Design a Turing Machine that can concatenate two strings.

Q2. Describe the Chomsky classification of languages.

COURSE: COMPUTER GRAPHICS

(MCA-12/ M.Sc.IT-12)

Total Marks: 50

[Assignments are required to be written in your own language. Copying in to from the learning materials will carry less score]

A. Answer the following three questions:

2 X 3 = 6

Q1. Define spatial redundancy and temporal redundancy.

Q2. What is curve clipping?

Q3. Define shearing.

B. Answer the following three questions:

4 X 3 = 12

Q1. How is the matrix representation of translation, scaling and rotation represented as?

Q2. Compare the technology of inkjet printer with laser printer.

Q3. How is intensity code for grayscale measured?

C. Answer the following two questions:

6 X 2=12

Q1. Give the program to draw a circle using Brasenham's circle drawing algorithm.

Q2. Write the steps in Phong Shading. How is Phong Shading better than Gouraud shading?

D. Answer the following two questions:

10 X 2 = 20

Q1. Explain the pseudocode for Sutherland-Hedgman.

Q2. Explain the various types of Bezier curves and surfaces.

Assignment Guidelines

A. Guidelines to Co-ordinators:

1. Assignments are parts of teaching-learning process and compulsory.
2. The spirit behind this is to help learners to understand the subject and prepare themselves better for the term-end examination.
3. Assignment responses are to be evaluated and feedbacks are required to be communicated to the learners, by giving back the assignments with evaluator's comments. Such assignments are to be collected at the time of issuing admit cards and be stored in the centre's office till the end of next semester.
4. Assignment marks are to be sent to the Controller of Examinations as soon as the examination routines are published.
5. Keeping the above points in mind Co-ordinators will fix the time/date of submission of assignments by the learners as may be convenient to follow the guidelines in true spirits.

B. Guidelines to learners:

1. As soon as the SLMs are received the learners will write the assignments in their own handwriting (assignment questions may be downloaded from the website, if necessary) to be submitted to Co-ordinators as per the dates fixed for the purpose. Timely submission of assignments at the Study Centres will help in quick processing of results of respective learners. Otherwise this will create unnecessary delay in declaration of results.
2. Writing of assignment (work) and submission of the same in time is compulsory.

Registrar

N.B. The learners will have to collect receipt after submitting the assignment with the signature and seal of the collector of study centre and will have to keep with him/her till the declaration of result.

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Receipt

Received the assignment from Mr/MsEnrollment number
.....of **3rd Semester MCA** on2016.

Date:

Signature of collector with seal

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