(Please write your Exam Roll No.)   Exam Roll No. ....

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH] JANUARY 2024

Paper Code: HS-301	Subject: Economics for Engineers
Time: 3 Hours	Maximum Marks: 75

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1   Answer the following questions briefly:-
    (a) Elaborate resource constraint as an economic problem. **(3)**
    (b) Justify how indifference curve helps in understanding consumer's choice. **(3)**
    (c) What is oligopoly market. **(3)**
    (d) Define NNP, GNP, GDP. **(3)**
    (e) State the Law of Demand. **(3)**

UNIT-I

Q2   (a) List the differences between Microeconomics and Macroeconomics. **(5)**
    (b) List the factors effecting demand and supply. **(5)**
    (c) Explain how Production Possibility Curve helps in product choice decisions. **(5)**

Q3   (a) Explain the circular flow of income in an economy. What does it measure? **(8)**
    (b) Explain the elasticity of demand and supply with example. **(7)**

UNIT-II

Q4   (a) How Cardinal and Ordinal utilityare used to analyze consumer behaviour. **(8)**
    (b) What is demand forecasting? List the features demand forecasting. How it proves a useful tool for decision makers. **(7)**

Q5   (a) List different methods of demand forecasting. Explain any two quantitative methods of demand forecasting. **(8)**
    (b) Explain about consumer equilibrium. **(7)**

UNIT-III

Q6   (a) Define 'Cost'. How are costs classified? Explain any two important cost concepts useful for managerial decisions. **(8)**
    (b) Distinguish between monopoly and perfect competition. **(7)**

Q7   (a) Define economics of scales and diseconomies of scales. **(8)**
    (b) Differentiate between perfect competition and monopolistic competition? **(7)**

UNIT-IV

Q8   (a) What are the major macroeconomic issues directly related to business decision making? **(8)**
    (b) Explain different phases of business cycle? **(7)**

Q9   (a) What is inflation. Briefly explain the features and types of inflation. **(8)**
    (b) Explain different approaches used in calculating national income? **(7)**

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END TERM EXAMINATION

FIFTH SEMESTER [B. TECH] JANUARY 2024

Paper Code: CIC-303 **Subject: Compiler Design**

Time: 3 Hours **Maximum Marks: 75**

**Note: Attempt five questions including Q. No. 1 which is compulsory.
Select one question from each unit. Assume missing data.**

Q1. Answer the following questions: (5*3=15)

a) What is Translator? Differentiate between an interpreter and a compiler in terms of functionality.

b) Define the term "parser" and its role in the context of compiler design.

c) What is left recursion? Eliminate left recursion from the following grammar:

$$E \rightarrow E + T \mid T$$
$$T \rightarrow T * F \mid F$$
$$F \rightarrow (E) \mid id$$

d) What is DAG? What are the advantages of DAG?

e) Consider the transition diagram
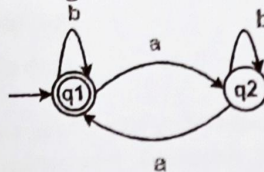
Convert the above finite automata into the regular expression.

UNIT-I

Q2. a) Define the term "compiler" and explain its role in the context of programming languages. Also explain structure and phases of a compiler in detail. (8)

b) How do we implement lexical analyzer? Explain step by step procedure for implementing lexical analyzer for the following LEX program: (7)

AUXILLARY DEFINITIONS:
(none)
TRANSLATION RULES:
a   {} /* Actions are omitted here*/
abb   {}
a*b+   {}

Q3. a) Write step by step procedure to construct the NFA for the following regular expression: (8)

$$R = (a \mid b)*abb$$

b) What is input buffering? How it helps in construction of compiler? Explain. (7)

P.T.O.

UNIT-II

Q4. a) Consider the following grammar: **(5)**

$$S \rightarrow ABC, A \rightarrow Aa \mid d, B \rightarrow Bb \mid e, C \rightarrow Cc \mid f$$

Eliminate left recursion from the above grammar.

b) Explain and remove the ambiguity from following CFG. **(5)**

$$E \rightarrow E+E \mid E-E \mid E/E \mid E*E \mid (E) \mid -E \mid id$$

c) Find the FIRST and FOLLOW for the following given grammar: **(5)**

$$E \rightarrow TE'$$
$$E' \rightarrow +TE' \mid \varepsilon$$
$$T \rightarrow FT'$$
$$T' \rightarrow *FT' \mid \varepsilon$$
$$F \rightarrow (E) \mid id$$

Q5. a) Test whether the grammar is LL (1) or not and construct a **(8)** predictive parsing table for it.

$$S \rightarrow iCtSS' \mid a$$
$$S' \rightarrow eS \mid \epsilon$$
$$C \rightarrow b$$

b) Construct the LR(0) parsing table for the following grammar. **(7)**

$$S \rightarrow L=R$$
$$S \rightarrow R$$
$$L \rightarrow *R$$
$$L \rightarrow id$$
$$R \rightarrow L$$

Check whether the above grammar is LR (0) grammar or not.

UNIT-III

Q6. a) State and explain the syntax directed translation scheme for the **(8)** desk calculator and give the parse tree and translation for the string

$$w = 20 * 7 + 3.$$

b) What is intermediate code representation? Explain various **(7)** intermediate code representation schemes with the help of an example.

Q7. a) What do you mean by three address code? Convert the following **(8)** statements into the Quadruple, Triple and Indirect triple representation: (A+B)*(C-D*E)

b) What is type checking? Explain rules of type checking in context of **(7)** semantic analysis.

UNIT-IV

Q8. a) What is the use of symbol table? Explain the any two data **(8)** structures associated with symbol table in detail.

b) Write short note on the following: **(7)**
   a) Loop unrolling & Loop jamming
   b) Code generation

Q9. a) Write short note on the following: **(8)**
   a) Basic blocks & flow graph
   b) Peephole optimization

b) Explain the various types of errors generated during the various **(7)** phases of the compiler. How do we recover from these errors?

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END TERM EXAMINATION

FIFTH SEMESTER (B.TECH) JANUARY-2024

Paper Code: CIC-311	**Subject: Design Analysis & Algorithm**
Time: 3 Hours	**Maximum Marks: 75**

Note: Attempt five questions including Q. no.1 which is compulsory.
Select one question from each unit.

Q1   Attempt **Any five** questions: (3×5=15)

    a.   What is an Algorithm and also discussed the characteristics of algorithm.

    b.   Define big oh(O),Big omega(Ω) and big theta(Θ) notations

    c.   What is the use of Warshall's algorithm and Floyd's Algorithm?

    d.   What are NP Hard and NP Complete problems?

    e.   Explain local search heuristic with example

    f   Explain optimal binary search tree Problem with example

    g   Apply the Quick sort to the list E , X , A , M , P , L , E

UNIT I

Q2   a.   What do you mean by complexity of an algorithm? Explain the notations used to denote the complexity of an algorithm.   (7)

    b.   Explain the following with example: (8)

      (i)   Selection sort.

      (ii)   Disjoint Sets.

Q3   a.   How the operations performed in Strassen's Matrix multiplication   (7)

    b   Explain in detail merge sort. Illustrate the algorithm with a numeric example. Provide complete analysis of the same.   (8)

UNIT II

Q4   a   Explain Prim's algorithm for minimal spanning tree with an example.   (7)

    b   Write in detail about Hamiltonian cycles. Give example to it.   (8)

Q5   a   Write backtracking algorithm for   (7)

      I.   The n-queens problem
      II.   Hamiltonian problem
      III.   The subset-Sum problem

    b   Define Greedy knapsack. Find the optimal solution of the Knapsack instance n= 7, M=20, (p1, p2, ...p7) = (8,5,6,7,6,12,3) and (w1,w2,....w7)=(2,10,8,7,6,4,11)   (8)

UNIT-III

Q6   a   Explain the Travelling salesmen problem using Branch and bound technique..   (7)

    b   What is backtracking? Solve 8 queens problem with backtracking.   (8)

Q7   a   What do you mean by dynamic Programming? Explain O/I knapsack problem by using dynamic programming.   (7)

    b   Explain the chained matrix multiplication with suitable example   (8)

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UNIT-IV

Q8 a   Explain the following   **(7)**
                (a) NP hard Graph.
                (b) NP scheduling problems

     b   What are NP Hard and NP Complete problems? Explain Cook's theorem   **(8)**

Q9 a   Explain non-deterministic algorithm with an example.   **(7)**

     b   What is state space tree? What are the different ways of searching an answer node in an state space tree explain with example.   **(8)**

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CIC-311