

Computer Science 1

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Science Computer Science

TYBSc

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- N.B. : (1) All questions are compulsory.  
 (2) Figures to the right indicate full marks.  
 (3) Use of correct syntax is essential.  
 (4) Symbols have their usual meaning unless otherwise stated.  
 (5) Mixing of subquestions is not allowed.  
 (6) Answers to two sections are to be written in the different answer books and submitted separately.

## Section I

1. (a) Write down the algorithm used by a naïve top down parser (without backtracking). What are its drawbacks? 6  
 (b) Explain the term "Binding". What are the different binding times that can be used by a general purpose language processor? Explain the meaning of each, in brief. 7  
 (c) What is operator grammar? Give one example of a production obeying it. 4
- Or
1. (p) Explain the term "Regular Expression" and give any two examples of regular expressions. 6  
 (q) Explain the terms "Linear Data Structure" and "Nonlinear Data Structure" by giving an appropriate example of each. 7  
 (r) What are the desirable properties of Intermediate Representation? 4
2. (a) State the basic algorithm used by a Linker for relocation of a program. 4  
 (b) What are the different parts of a macro? What each part can contain? What is the use of each part? 7  
 (c) Explain the use of the following Assembler Directives : 6  
     (i) EQU    (ii) ORIGIN (or ORG)
- Or
2. (p) What are the three categories of programs on the basis of their relocation facilities? Explain the characteristics of each in brief. 4  
 (q) What are the different types of parameters that a macro can use? Explain by giving a suitable example (You can use any mnemonic pseudo opcodes for your example). 7  
 (r) What is meant by a software tool? Why are they needed in program development? 6
3. (a) Explain by giving a suitable example, the difference between the "Call By Value" and "Call By Reference" mechanisms used by a compiler for giving a call to a procedure. 5  
 (b) What are the different phases of a compiler? Just state the purpose of each phase in brief. 7  
 (c) Explain the terms "Pure Interpreter" and "Impure Interpreter". 4
- Or
3. (p) Explain the Infix, Prefix and Postfix notation by giving a suitable example. 5  
 (q) What are the commonly used optimization transformations, used in machine independent optimization? Explain any two of them in detail. 7  
 (r) Define and explain the use of the term "Data Type". 4

## Section II

4. (a) Attempt any one :- 6  
     (i) Give a simple model of communications. Explain the functions of key elements of the model. Draw a neat diagram of the model.  
     (ii) Explain serial and parallel data transmission.  
 (b) What are the methods used to propagate radio waves? 6  
 (c) State the basic characteristics of HDLC and give the frame format of HDLC. 5
- Or
4. (p) Why digital transmission is preferred than analog transmission? 5  
 (q) In stop-and-wait flow control, define and discuss the handling of - 6  
     (i) A damaged frame  
     (ii) A lost frame.  
 (r) Discuss statistical time division multiplexing in detail. 6
5. (a) Give a disadvantage for each type of network topology. 5  
 (b) Explain the spanning tree algorithm. 6  
 (c) Differentiate between packet switching and circuit switching. 6
- Or
5. (p) Explain working of Token ring protocol. 6  
 (q) Discuss the design aspects of bridges. Illustrate with suitable example. 6  
 (r) Explain any one switch used in circuit switching with a neat diagram. 5
6. (a) Discuss any six difference among networks that one may face while providing internetworking facility. 6  
 (b) What is the function of SMTP? How does MIME enhance SMTP? 5  
 (c) Explain the two types of services that are provided by broadband ISDN. 5
- Or
6. (p) Explain the terms (i) Datagram Lifetime (ii) Segmentation and reassembly in the context of internetworking. 6  
 (q) What are the responsibilities of the transport layer? 5  
 (r) What are the computer and network security requirements? Differentiate between active attacks and passive attacks. 5

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**Section I**

1. (a) What is an IR ? What are its advantages ? 5
  - (b) What are the properties of hashing function to ensure good search performance ? Describe any one class of hashing function. 6
  - (c) What is parsing ? Explain Top-Down parsing algorithm. 6
- Or
1. (p) Explain the following terms :- 6  
(i) Derivation (ii) Context free grammars (iii) Reduction.
  - (q) Write a short note on table organization ? 5
  - (r) Define the following terms 6  
(i) FSA (ii) DFA (iii) SPG (Simple Precedence Grammar)
2. (a) Compare Variant I and Variant II of the intermediate code. 5
  - (b) What is nested macro call ? Write a macro which contains nested call and give its expanded code. 6
  - (c) Briefly explain the different types of editors. 6
- Or
2. (p) What are the advantages of assembly language ? What is a forward reference ? 5
  - (q) Define a macro. Distinguish between macro definition and macro call. 6
  - (r) Attempt any one :- 5  
(i) Explain the following terms :-  
(a) Translation time address (b) Linked address  
(c) Load Time address (d) Translated origin  
(e) Linked origin (f) Load origin  
(ii) What is linking ? Explain the following with reference to object module.  
(a) Header (b) Program (c) Linking table.
3. (a) Draw a block diagram of the phase of a compiler and give the main function of each phase. 6
  - (b) What is lexical analysis of the source program ? State the purpose of uniform symbol table. 5
  - (c) Discuss different types of storage allocation and their use. 5
- Or
3. (p) How intermediate form is advantageous ? Explain the different intermediate forms of the arithmetic statements. 4
  - (q) Which phases of compiler manipulate the matrix and what does each do ? Which phase refer the matrix without modifying it ? 6
  - (r) Explain the uses of interpreters. What are pure and impure interpreter ? 6

**Section II**

4. (a) Draw the diagram of OSI model and state the responsibilities of Network layer and Transport layer. 6
  - (b) Define data rate and bandwidth. Explain the formulae for calculating maximum data rate for a Noiseless and Noisy Channels respectively. 5
  - (c) Explain Frequency Shift Keying (FSK). Find the minimum bandwidth for an FSK signal transmitting at 2000 bps, in half duplex mode and carriers are separated by 3000 Hz. 6
- Or
4. (p) Differentiate between Unipolar encoding and Polar encoding. Explain Non Return to Zero (NRZ) and Manchester Encoding. 6
  - (q) What is multiplexing and how it is useful in data communication ? Explain Time Division Multiplexing (TDM). 6
  - (r) What is guided media ? Discuss optical fiber cable. 5
5. (a) Explain any one method of Error detection and Error Correction schemes respectively, with an example. 6
  - (b) Explain GO-BACK-N ARQ flow Control mechanism. Explain its operation in various situations. 5
  - (c) Describe HDLC frame format and types of frames. What is Bit stuffing in HDLC and why is it needed ? 6
- Or
- (p) Explain CSMA/CD operation. How does CSMA/CA differs from CSMA/CD ? 6
  - (q) Explain the three popular controlled access methods. 5
  - (r) What are Transparent Bridges ? How is the looping problem solved in systems equipped with Transparent Bridges ? 6
6. (a) Attempt any one of the following :- 5  
(i) What is packet Switching ? Differentiate between Virtual Circuit approach and Datagram approach to Packet Switching.  
(ii) What is meant by subnetting ? Explain addressing in a subnetted network.
  - (b) Explain ARP packet format and discuss ARP operation. 5
  - (c) What is Unicast Routing ? Explain Routing Information Protocol (RIP) updating algorithm, with an example. 6
- Or
6. (p) Attempt any one of the following :- 5  
(i) What is multicast routing ? How does Reverse Path Forwarding (RPF) differs from Reverse Path Broadcasting (RPB) ?  
(ii) What are FQDN and PQDN ? Explain the three domains of the domain name space.
  - (q) Explain how TCP implements connection oriented transmission. 5
  - (r) Write a short note on any one of the following :- 6  
(i) Mail Transfer Agent (MTA) and POP3. (ii) HTTP and FTP.