Bachelor of Computer Science & Engg. Examination, 2012

(3rd Year, 1st Semester)

SYSTEMS PROGRAMMING

Time: 3 hours   Full Marks: 100

All Questions are to be answered in the same Answer script
<u>Answer Question No. 1 and</u>
<u>ANY TWO questions each from GROUP-A and GROUP-B</u>
<u>Answers to different parts of same question must be contiguous</u>

1.
a. Is it possible to introduce two code segments within an assembly language program? If yes, which one will compile first and why?
b. To execute a program in debug, which one will you prefer? .com or .exe file and why?
c. Is it possible to implement nested macros within 8086 environment? If yes, give proper example for that else show the reasons.
d. Identify the responsibilities of different registers which are associated during returning different types of variables from a function
e. What is bootstrap loader?
f. What are the disadvantages of First-Come-First-Served scheduling technique?
g. What is lexical analysis?
h. What is the difference between static linking and dynamic linking?

$2+2+3+3+2+2+4+2$

GROUP – A

2.
a. Describe the utilities of the following macros/preprocessor directives with proper example
  1. IRPC
  2. REPT
  3. EQU
  4. IFE
  5. IFIDN
b. Write a program in 8086 assembly language to find out how many values is less than 20 and how many values are greater than 40 among an array of ten numbers. Array should be user given input.

$2*5+10$

3.
a. Justify the statement with proper diagrams – "8086 microprocessor can run in parallel mode".
b. Describe different Memory Indirect Addressing modes with proper examples
c. Describe the limitations of debug with respect of MASM.
d. Write the set of instructions in debug to fill n number of memory locations with "Jadavpur University".
e. Describe the set of instructions/command to save a file in debug environment.

$5+4+5+3+3$

4.
a. Describe the utilities of INT 09h and Keyboard buffer with proper diagram during taking an input from a keyboard.
b. Write the set of instructions for INT16 function 10h to accept a keystroke; if, Page Down, set the cursor to column 5 , row 20.
c. Write an assembly language programming to count the number of occurrences of a given character within a given string.

8+4+8

5.
a. Describe the differences between .exe. and .com file.
b. How do you convert an. exe file into .com format.
c. Describe the changes of different flags and registers when unsigned Division (DIV) and signed Integer multiplication is occurred in 8086.
d. Write an assembly language programming to convert hexadecimal number (more than two digit) into its ASCII equivalent. The output will show ASCII value of every digit of the input hexadecimal numbers.

3+2+5+10

GROUP - B

6.
a. Define the following terms: response time, turnaround time
b. What is nonpreemptive scheduling?
c. Explain the Shortest Job First (SJF) algorithm with its advantages and disadvantages.
d. Calculate turnaround time of each process (from the following information) using Shortest Job First (SJF) algorithm:

Process	Arrival Time	Execution time
P0	0	6
P1	3	4
P2	6	10
P3	8	2
P4	4	5

(Show the Gantt chart.)
e. What do you understand by grammar for a programming language? What does it contain?

3+2+4+5+(3+3)

7.
a. What are the basic functions of a compiler?
b. How is a macro call expanded by the macro processor? Explain with the help of the example mentioned in question 8(b).
c. What are the advantages of static unequal-size partitioned memory allocation technique?
d. What are the disadvantages of dynamic partitioned memory allocation technique?
e. How does a one-pass assembler work?

4+4+3+3+6

8.
a. What are the disadvantages of static equal-size partitioned memory allocation technique?
b. What are the different tables used by macro processor? Mention the contents of each table with reference to the following code snippet. What is the output of macro processor?

```
Position MACRO Row, Column
PUSH AX
PUSH BX
PUSH DX
MOV AH, 02H
MOV DH, Row
MOV DL, Column
MOV BH, 0
INT 10H
POP DX
POP BX
POP AX
MEND
        ..........
        ..........
        LOOP1: MOV BL, CH
        MOV BX, CX
        Position (15H, 24H)
        ADD BH, CL
        JMP LOOP1
        MOV CX, BX
        .......
```

c. How will a two-pass assembler process the code snippet mentioned in question 8(b)? What will be the output of the assembler? What are the disadvantages of a two pass assembler?

$2+(5+3)+(5+3+2)$

9.

a. How are data declarations handled by an assembler?

b. How does a linkage editor work?

c. What is relocation? Who generates relocation information and how is it denoted?

d. How does a linking loader work?

e. How are nested macro definitions handled?

f. Is there any way of handling invocation of a macro before its definition? Justify your answer.

g. Is a compiler capable of handling semantics? Justify your answer.

$2+3+3+3+3+3+3$