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Reg. No. : .....

Name : .....

Fifth Semester B.Tech. Degree Examination, December 2015
(2013 Scheme)
13.504 : SYSTEM PROGRAMMING (FR)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Differentiate between system software and application software.
2. Compare assemblers, compilers and interpreters.
3. What are the various data structures needed in pass-I of the assembler ? Explain.
4. What is a linkage editor ? How it differs from linking loader ?
5. Explain how breakpoint mechanism helps in debugging process. **(5×4=20 Marks)**

PART – B

Answer **one full** question from **each** Module.

Module – I

6. i) Describe the characteristics of VAX architecture. 8

   ii) Write a sequence of SIC instructions to add the corresponding elements of two arrays ALPHA and BETA and store the results in another array GAMMA, where ALPHA, BETA and GAMMA are of size 100 words. 12

   OR

7. i) Describe the characteristics of UltraSPARK architecture. 8

   ii) Describe the instruction formats and addressing modes of SIC/XE architecture. 7

   iii) Write a sequence of instructions for SIC/XE to set all 100 elements of an array to 0. Use immediate addressing and register-to-register instructions to make the process as efficient as possible. 5

P.T.O.

Module – II

8. i) Explain the use of following assembler directives with examples.

a) LTORG b) EQU c) ORG. **5**

ii) What is a control section ? How it differs from program blocks ? **5**

iii) Translate (by hand) the following assembly program to SIC/XE object code. Also assume Opcode for instruction. The output format will contains Header record, Text record, End record.

```
BUFTOREC    START   3000
WRREC       LDX     ZERO
WLOOP       TD      OUTPUT
            JEQ     WLOOP
            LDCH    BUFFER, X
            WD      OUTPUT
            TIX     LENGTH
            JLT     WLOOP
OUTPUT      BYTE    X'05'
ZERO        WORD    0
BUFFER      RESB    4096
LENGTH      RESW    1
            END     WRREC
```

10

OR

9. i) Describe the algorithm for one pass assembler. **12**

ii) What is a forward reference ? How it can be solved using back-patching ? **4**

iii) Write a short note on MASM assembler. **4**

Module – III

10. i) What is program relocation ? How relocation is performed by linker. Explain with example. 12

ii) How external references are handled by automatic library search process in loaders ? 8

OR

11. i) How recursive macro expansion can be included in a macro processor design ? Explain. 8

ii) Describe various machine independent macro processor features. 12

Module – IV

12. i) What are the different tasks involved in a document editing process ? 5

ii) Write a note on hardware support for debugging. 5

iii) Explain how check pointing and reverse execution helps in debugging process. 10

OR

13. i) Explain the services offered by UNIX operating system. 5

ii) Describe the UNIX system structure. 8

iii) Explain the kernel data structures of UNIX operating system. 7