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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Management and Entrepreneurship

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART – A

- 1 a. What are the differences between administration and management? (05 Marks)
b. Describe roles of management. (05 Marks)
c. What are the different levels of management? Explain. (10 Marks)
- 2 a. Briefly explain types of 'Planning'. (05 Marks)
b. Explain planning 'Premises'. (05 Marks)
c. Describe 'Hierarchy of Plans'. (10 Marks)
- 3 a. What are the various types of 'Organizations'? Explain briefly. (10 Marks)
b. Explain the meaning of MBO and MBE. (05 Marks)
c. Which are the various sources from where the personnel may be recruited? (05 Marks)
- 4 a. Explain principles of 'direction'. (06 Marks)
b. Compare the 'autocratic', participative and 'free-rein' types of leadership styles. (08 Marks)
c. Explain Maslow's theory of motivation. (06 Marks)

PART – B

- 5 a. Explain the meaning of 'Entrepreneur' with a block diagram. (05 Marks)
b. List out the qualities of an 'Entrepreneur'. (05 Marks)
c. What are the functions of an Entrepreneur? Highlight the functions for developing countries. (10 Marks)
- 6 a. What are the characteristics of SSIs? (10 Marks)
b. What are the various steps to start an SSI? (05 Marks)
c. Explain the role of supporting agencies of government for SSIs. (05 Marks)
- 7 a. Mention important Centre and State Government institutions providing support to SSIs. (08 Marks)
b. Explain the 'Single Window Concept' of District Industry Centres (DICs). (06 Marks)
c. What are the functions of NSIC? (06 Marks)
- 8 a. How are projects identified? Explain. (06 Marks)
b. Describe criteria for 'Project Selection'. (06 Marks)
c. Briefly mention the contents of a 'Project Report'. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Software Engineering

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.*

PART – A

- 1 a. What is software engineering? What are the key challenges facing software engineering? (05 Marks)
- b. What is software process? What are the activities of software processes? Explain. (05 Marks)
- c. Define system engineering. Mention the stages system development. Explain any four. (10 Marks)
- 2 a. Define system dependability. What are dimensions of dependability? Explain. (10 Marks)
- b. What is process iteration? Explain Boehm's spiral model with figure. (10 Marks)
- 3 a. Explain (i) User requirements and (ii) System requirements. (08 Marks)
- b. Describe the requirements elicitation and analysis with example of bank ATM. (07 Marks)
- c. Explain the structure of Software Requirements Documents. (05 Marks)
- 4 a. What is data flow model? Write data flow diagram of insulin pump and explain notations used in data flow model. (08 Marks)
- b. Explain state machine model for a simple microwave oven. (05 Marks)
- c. What a project management activities? Explain. (07 Marks)

PART – B

- 5 a. Define system organization. Explain shared repository system. Mention merits and demerits. (08 Marks)
- b. Explain with figures (i) Central control system and (ii) Event-based control. (05 Marks)
- c. Briefly explain Object-Oriented Design process. (07 Marks)
- 6 a. Explain rapid software development with figures. (08 Marks)
- b. What are agile methods? Explain extreme programming practices. (05 Marks)
- c. Explain software maintenance in detail. (07 Marks)
- 7 a. Explain software inspection process in detail. (08 Marks)
- b. Explain clean-room software development with diagrams. (05 Marks)
- c. Explain system testing and phases of system testing. (07 Marks)
- 8 a. Explain People Capability Maturity Model with figures. (10 Marks)
- b. Explain algorithmic cost modeling, the COCOMO model. (10 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
System Software

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Bring out the difference between application software and system software. Give example for each. (06 Marks)
- b. With reference to SIC machine architecture, discuss (i) Memory (ii) Registers (iii) Instruction format (iv) Addressing modes. (08 Marks)
- c. Write sequence of SIC/XE to set array element to 0 if the value of the array is element is less than 16 or else set to 1 (Assume that array of 100 words). (06 Marks)
- 2 a. Write an assembly program on SIC machine to implement block move from a memory address M1 to another address M2, without overlap. (06 Marks)
- b. Write an algorithm for Pass-1 of an assembler. (08 Marks)
- c. Show the structure of a Header record, Text Record and Modification record taking one example for each. (06 Marks)
- 3 a. With suitable example, explain the use of LTOrg assembler directive. (04 Marks)
- b. Apply the algorithm of Pass 1 and Pass 2 to assemble the following SIC source program. Write an object program. (10 Marks)

SUM	START	2000	
FIRST	LDX	ZERO	LDX = 04
	LDA	ZERO	LDA = 00
LOOP	ADD	TABLE, X	ADD = 18
	TIX	COUNT	TIX = 2C
	JLT	LOOP	JLT = 38
	STA	TOTAL	STA = 0C
	RSUB		RSUB = 4C
TABLE	RESW	2000	
COUNT	RESW	1	
ZERO	WORD	0	
TOTAL	RESW	1	
	END	FIRST	
- c. What is program relocation? Explain the need for relocation with an example. (06 Marks)
- 4 a. Explain a simple Bootstrap loader with a source program. (06 Marks)
- b. Write an algorithm for Pass 1 of a linking loader. (06 Marks)
- c. With a neat diagram, explain how object program is processed using (i) Linking loader. (ii) Linkage editor. (08 Marks)

PART – B

- 5 a. With a neat diagram, explain the structure of a text editor. (08 Marks)
- b. Discuss the functions and capabilities of interactive system. (07 Marks)
- c. Write a note on the aspect of user-interface criteria in a text editor. (05 Marks)

- 6 a. Discuss various data structures required for a design of a macroprocessor. (06 Marks)
b. Explain with example:
(i) Concatenation of macro parameters.
(ii) Generation of unique labels. (09 Marks)
(iii) Recursive macro expansion. (05 Marks)
c. Write a note on MASM macro processor. (05 Marks)
- 7 a. Describe the general structure of LEX program. (04 Marks)
b. Explain the meta-characters used in regular expression with example. (06 Marks)
c. Write a LEX program to count the number of characters words, spaces and lines in a given input file. (06 Marks)
d. Write a LEX program to count the number of positive and negative integers and positive and negative fractions. (04 Marks)
- 8 a. Explain how grammar conflicts are handled by YACC with example. (06 Marks)
b. Write a YACC program to evaluate an arithmetic expression involving operators +, -, * and /. (07 Marks)
c. Write a YACC program to check whether the given string $a^n b^n$ ($n \geq 1$) is accepted by the grammar or not. (07 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Operating System

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

1.
 - a. Write and explain the sequence of system call services those are helpful for copying a file to another (new) file. (06 Marks)
 - b. Discuss the Operating System functions that are (i) helpful to user (ii) meant for ensuring the efficient operation of system. (10 Marks)
 - c. List the advantages of multiprocessor system. Explain “graceful degradation” and “fault tolerant” in a multiprocessor system. (04 Marks)
2.
 - a. Explain Process State with diagram. What is the need for context switch? Explain fields of PCB. (06 Marks)
 - b. Consider four jobs as following. Find waiting time, turnaround time and hence average waiting time and average turnaround time using preemptive SJF and RR (with quantum time = 1) scheduling algorithms. If quantum time is set to 2, what is the behavior of RR? Comment on this.

Jobs	P ₁	P ₂	P ₃	P ₄
Arrival time	0	0.2	0.6	1.2
Burst time	5	2	8	4

- c. Why thread is called LWP? Describe anyone threading model and threading issue. (04 Marks)
3.
 - a. What are the three requirements to be met by a solution to the critical section problem? Explain. (06 Marks)
 - b. Describe the bounded-buffer problem and give a solution for the same using semaphores. Write the structure of procedure and consumer processes. (07 Marks)
 - c. Describe Dining-Philosopher problem in detail. (07 Marks)
4.
 - a. In a Resource-allocation graph (algorithm), “If each resource type has several instances, then a cycle does not necessarily imply that a deadlock has occurred.” Justify this statement with suitable example. (04 Marks)
 - b. Consider the following snapshot of a system

Processes	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

Answer the following questions using Banker’s Algorithm stepwise.

- (i) What is the content of matrix need?
- (ii) Is the system in a safe state?
- (iii) If request from process P₁ arrives for (0, 4, 2, 0) can the request be granted immediately? (12 Marks)

- c. Describe the features that characterize deadlocks. (04 Marks)

PART – B

- 5 a. Explain the concept of forward-mapped page table. (05 Marks)
 b. Explain the steps in handling page faults with neat diagram. (05 Marks)
 c. Consider following page reference strings.
 1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6. How many page faults would occur in case of LRU, FIFO and OPT page replacement algorithms assuming memory with 5 frames? Which is the most efficient algorithm? (10 Marks)
- 6 a. Explain File Attributes and File operations. (12 Marks)
 b. Explain different file access methods. (08 Marks)
- 7 a. A disk drive has 200 cylinders numbered 0 to 199. Drive is currently servicing request at 53. Queue of pending requests in FIFO order are 98, 183, 37, 122, 14, 124, 65, 67. Starting from current head position, what is the total distance that the disk arm moves in cylinders to satisfy all pending requests for FCFS, SSTF, LOOK, SCAN disk scheduling algorithms with figures in each case. (12 Marks)
 b. What is Access Matrix? Explain with domains as objects. (08 Marks)
- 8 Write short notes on :
 a. Components of LINUX system
 b. IPC facility in LINUX
 c. SCAN and C-SCAN disk scheduling algorithms
 d. Tree directory structure. (20 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Database Management Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

1.
 - a. What are the main characteristics of Database Approach? Explain any one. (06 Marks)
 - b. Explain the component modules of DBMS, with the help of a diagram. (10 Marks)
 - c. Define the following :
 - i) DBMS ii) Metadata iii) Logical data Independence
 - iv) Physical data Independence. (04 Marks)

2.
 - a. What is Recursive Relationship? Explain the significance of role names in recursive relationship with an example. (06 Marks)
 - b. Design an E – R diagram for a Bank database taking into account at least 5 entities. (10 Marks)
 - c. Explain Derived Attributes. (04 Marks)

3.
 - a. Consider the following database schema :
 SAILORS (Sid , Sname , rating , age)
 BOATS (bid , bname , color)
 RESERVES (sid , bid , day)
 Write queries in relational algebra to
 - i) Find names of sailors who have reserved a red and a green boat.
 - ii) Find the names of sailors with age above 25 years who have not reserved a red boat.
 - iii) Find name , age of sailors who have reserved boat number '100'. (09 Marks)
 - b. Discuss entity integrity and referential integrity constraints with suitable examples. (06 Marks)
 - c. Explain MINUS operation of relational algebra with an example. (05 Marks)

4.
 - a. Explain the schema change statement in SQL with examples. (08 Marks)
 - b. Consider the following database schema :
 EMP (Name , SSn , Salary , Superssn , Dno)
 DEPT (Dnum , Dname , Mgr_SSn)
 WORKS_ON (ESSN , Pno , Hours)
 PROJ (Pname , Pnumer , Dnumber)
 Write SQL queries for the following :
 - i) Retrieve name of an employee having second highest salary.
 - ii) For each employee, retrieve employee's name and his or her immediate supervisor name.
 - iii) Make a list of all project numbers for projects that involve an employee whose name is 'Raj' either as a worker or as a manager of the department that controls the project.
 - iv) Retrieve the total number of employees in 'Research' department. (12 Marks)

PART – B

- 5 a. How are triggers and assertions defined in SQL? Explain with examples. (10 Marks)
b. What is a Cursor? Explain retrieving multiple tuples with embedded SQL with an example. (10 Marks)
- 6 a. List the informal design guidelines for relational schema and explain with example update anomalies. (08 Marks)
b. What is functional dependency? When do we say a set of functional dependencies is minimal? (05 Marks)
c. What is Normalization? Explain 3NF , with an example. (07 Marks)
- 7 a. Which normal form is based on the concept of multivalued dependency? Explain it with an example. (10 Marks)
b. Explain Non – additive (Lossless) join properly of a decomposition. (10 Marks)
- 8 Write short notes on :
a. ACID properties.
b. Two – phase locking protocol.
c. The lost update problem.
d. State transition diagram of a transaction. (20 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Computer Network – I

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. What is Data Communication? List and explain five components of data communication. (06 Marks)
- b. Give the comparison between LAN, WAN, MAN. (06 Marks)
- c. Explain the OSI Reference Model for computer Networks. (08 Marks)
- 2 a. Write a descriptive note on three causes of transmission impairments. (08 Marks)
- b. Discuss Nyquist bit rate and Shannon's channel capacity. (06 Marks)
- c. Explain the transmission modes. (06 Marks)
- 3 a. What is multiplexing? Explain with a neat diagram FDM. (06 Marks)
- b. What is switching? Explain Datagram Networks and Virtual Circuit Networks. (08 Marks)
- c. What is spread spectrum? Explain the Frequency Hopping Spread Spectrum (FHSS). (06 Marks)
- 4 a. Explain error detection and error correction with respect to block coding. (10 Marks)
- b. Draw a CRC encoder and decoder for CRC code with C(7, 4). Also explain how this CRC design works, with an example. (10 Marks)

PART – B

- 5 a. Explain salient features of:
 - i) Stop-and-wait protocol
 - ii) Stop-and-wait ARQ protocol
 (10 Marks)
- b. Explain the frame format and transition phases of PPP. (10 Marks)
- 6 a. What is Random Access? Explain following Random Access Protocols:
 - i) Slotted ALOHA
 - ii) CSMA/CD
 (10 Marks)
- b. Describe Frame format of IEEE 802.3MAC frame. What are salient features of fast Ethernet? (10 Marks)
- 7 a. Explain IEEE 802.11 and Bluetooth architecture. (10 Marks)
- b. With neat diagram, explain cellular system. (10 Marks)
- 8 a. Explain with respect to IPV4, class full addressing and classless addressing. (10 Marks)
- b. Explain in detail IPV6 packet format and also briefly explain the advantages of IPV6. (10 Marks)

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Formal Languages and Automata Theory

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.**

PART - A

- 1 a. Differentiate between DFA and NFA. Construct DFA to accept the following language.
 $L = \{\omega : |\omega| \bmod 3 \geq |\omega| \text{ and } 2\}$ where $\Sigma = \{a, b\}$. (10 Marks)
- b. Write a procedure to convert NFA to equivalent DFA convert the following NFA into equivalent DFA.

$\rightarrow q_0$	$\{q_0\}$	$\{q_0, q_1\}$
q_1	$\{q_2\}$	$\{q_2\}$
q_2	$\{q_3\}$	$\{q_3\}$
$*q_3$	\emptyset	\emptyset

(10 Marks)

- 2 a. Define Regular expression. Write regular expression to accept the following languages
 $L = \{a^n b^m : n \geq 1, m \geq 1, nm \geq 3\}$ (08 Marks)
- b. Show that every language defined by a regular expression is also defined by a finite automata. (06 Marks)
- c. Discuss any three applications for Regular expressions. (06 Marks)
- 3 a. State pumping lemma for regular languages. Show that the following language is not regular. $L = \{0^n : n \text{ is prime number}\}$ (06 Marks)
- b. If L and M are regular languages, show that $L \cap M$ is also regular. (06 Marks)
- c. Minimize the following DFA using Table filling method. (08 Marks)

	0	1
$\rightarrow A$	B	A
B	A	C
C	D	B
$*D$	D	A
E	D	F
F	G	E
G	F	G
H	G	D

- 4 a. Define Context Free Grammar. Construct CFG for the following language.
 $L = \{0^i 0^j 0^k \mid j > i + k\}$ (08 Marks)
- b. Write leftmost, derivation and construct parse tree for the string 'aabbbb' using the grammar
 $S \rightarrow AB \mid \epsilon$
 $A \rightarrow aB$
 $B \rightarrow Sb$ (06 Marks)
- c. Define ambiguous grammar. Show that the following language is ambiguous.
 $S \rightarrow SS/(S)/()$ (06 Marks)

PART – B

- 5 a. Define push Down Automata. Construct NPDA for accepting the following language.
 $L = \{\omega\omega^R : \omega \in \{a, b\}^*\}$
 Show all ID's to process the string 'baab' (14 Marks)
- b. Convert the grammar to equivalent PDA.
 $S \rightarrow 0AA$
 $A \rightarrow 0S \mid 1S \mid 0$ (06 Marks)
- 6 a. Convert the grammar into GNF.
 $S \rightarrow AA \mid 0$
 $A \rightarrow SS \mid 1$ (08 Marks)
- b. Eliminate all ϵ production from the grammar
 $S \rightarrow ABC$
 $A \rightarrow BC \mid a$
 $B \rightarrow bAC \mid \epsilon$
 $C \rightarrow cAB \mid \epsilon$ (06 Marks)
- c. If L is a CEL and R is a regular language then show that $L \cap R$ is a CEL. (06 Marks)
- 7 a. Define Turing machine. Design Turing machine that accept the following language
 $L = \{a^n b^n c^n : n \geq 1\}$ (10 Marks)
- b. Write a note on :
 i) Multiple Turing Machine
 ii) Nondeterministic Turing Machine. (10 Marks)
- 8 a. Define Recursively Enumerable language. Prove that Diagonalization is not recursively enumerable. (08 Marks)
- b. Write a note on :
 i) Recursive language
 ii) Post's correspondence problem. (12 Marks)
