This question paper contains 4 printed pages.]

5127 *Your Roll No. .....*

B.Sc. (Prog.) / III **B**

CS-301 – Operating Systems and Networks

(Admissions of 2005 & onwards)

Time : 3 Hours *Maximum Marks : 75*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Note : 1. Attempt all questions.

2. Questions in a section should be answered together.

3. Parts of a question must be answered together.

Section A (Operating System)

1. (a) What are the three main services provided by the operating system ? Explain these from the system point of view. 3

(b) Which type of operating system is suitable for the following application environments and why ?

(i) Railway ticket reservation application

(ii) Missile control application 2+2

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(c) What is the purpose of command interpreter ? Why is it usually kept separate from kernel ? 1+2

2. (a) Consider 4 jobs in a queue waiting to be processed. Their respective total service times and order of arrival are given below :

Job Number	Arrival Time	CPU Burst time
1	0	12
2	1	2
3	3	4
4	6	1

(i) Draw the Gantt chart for preemptive and non-preemptive Shortest-job-first scheduling algorithm.

(ii) Calculate turnaround time for each process and average waiting time for all processes for both algorithms. 2+4

(b) What is a scheduler ? Which scheduler controls the degree of multiprogramming and how ? 1+3

(c) Explain critical-section problem briefly. 2

3. (a) What is a page fault ? Describe the actions taken by the operating system when a page fault occurs. (2+2)

(b) Given memory partitions of 100 kb, 500 kb, 200 kb, 300 kb, and 600 kb (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 250 kb, 350 kb, 100 kb and 426 kb (in order)? Which algorithm makes the most efficient use of memory ? 6

4. What do you mean by a file ? What are the various ways for accessing a file ? 6

Section B (Computer Networks)

5. (a) Which layer of OSI model performs following function ?

(i) Routing of packets

(ii) Framing of bits and sending acknowledgement for frames. 1

(b) List two similarities and two dissimilarities between OSI and TCP/IP reference models. 5

(c) What are the advantages of using layered protocols? 3

6. (a) What are the differences between connection-oriented and connectionless communication ? 4

(b) Explain the following terms :

(i) Multi-casting

(ii) HTTP

(iii) MIME

(iv) Virtual Circuits 2×4

7. (a) Why is cryptography necessary for communication ? 3

(b) What are the services provided by data link layer to network layer ? 4

(c) What is URL and what does it consist of ? Explain in detail. 3

(d) Explain the IP datagram header format with the help of a diagram. 3

(e) Explain error correcting codes with the help of an example. 3