AA/2014

Reg.
No.

(To be **filled** by **the** candidate**)**

09CS51

(2009 TO 2012)

COIMBATORE INSTITUTE **OF TECHNOLOGY**

(Government Aided Autonomous **Institution**)

COIMBATORE 641 014

B.E. DEGREE **EXAMINATIONS, APRIL 2014 (Fifth** Semester**)**

COMPUTER **SCIENCE AND ENGINEERING BRANCH**

09CS51 OPERATING SYSTEMS

(**Common** to B.Tech. IT V Sem. **091T51)**

Time **:3** Hours

Max: 75 Marks

INSTRUCTIONS

1.

2

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Answer ALL **questions** in **PART** A and as per choice in **PART** B.

PART A **and** PART **B** questions should **be** answered **separately** in the same **answer sheet**.

3. Question No. **11** is compulsory.

PART - A

(10 X 2 = 20)

1.

Define a **Kernel**.

2.

3. What are **three** objectives **of an** OS **design?**

Differentiate between **pre-emptive** and non **pre-emptive** processes.

4. List four characteristics of **a** suspended process.

5. List the requirements **for** mutual exclusion.

6. What is the distinction between competing processes and cooperating **processes?**

7. **State** the **need for** process relocation.

8. In **a** fixed-partitioning scheme, what are **the advantages** of **using unequal**-size partitions?

9. List the techniques for performing I/O.

10. What criteria are important in choosing a **file** organization**?**

PART - B

(5 x 11 =55)

11. **a)** What is the purpose of **system calls**, **and** how **do system calls** relate to the **OS and to** the concept of dual**-mode (kernel mode and user mode)** operation? **(7)**

(4)

b) Explain the difference between a monolithic kernel and a microkernel.

12. **a) Consider** a computer **with** N **processors** in a multiprocessor **configuration**.

i) How **many processes** can be **in** each **of the** Ready, Running, **and** Blocked states at **one time?**

ii) What **is** the minimum number **of** processes that can be in **each** of the Ready**, Running**, **and Blocked states** at **one time?**

b) What is the difference **between** a mode switch and a process switch**?**

(**OR**
)

(8)

(3)

Contd . . .

13. **a)** Explain the different types **of** scheduling algorithms with example.

(8)

b) Name five **major** activities **of an** OS **with** respect to process management, and **briefly** describe why each is **required**.

(3)

14. **a)** Consider a concurrent program **with** two processes, p **and q,** defined as follows. A, B, C, D, and E **are** arbitrary **atomic** statements. **Assume that** the **main** program does a parbegin of the two processes.

```
void p ()
{

  A:

  C:
```

void q ( ) {

D;

E: }

Show all the possible interleaving of the execution **of** the preceding two **processes**.

b) **What** conditions are **generally** associated with the **readers** / writers problem**?**

(OR)

15. **a)** Apply the deadlock detection algorithm **to** the following data **and** show the results.

Available **= (** 2 1 0 0) **.**

2 0 0 **1**

0 0.1

1

Request **=**

1 010

Allocation = 2

0 0

1

2 1 0 0

0 1 2

0

b) What are the four conditions that create **deadlock?**

(**7**)

(4)

(8)

(3)

16. a) Consider a **fixed partitioning** scheme with **equal-**size partitions **of 216** bytes **and a** total main memory **size** of 224 **bytes**. A process **table** is maintained that includes a **pointer to** a **partition** for each resident process. How **many bits are** required for the pointer?

b) What **are** some reasons **to allow two** or **more** processes **to** all have **access** to a **particular** region of memory**?**

(OR)

17. **a**) Assuming a page size of 4 **K** bytes and that a page **table** entry **takes** 4 bytes, how **many** levels **of** page tables **would be** required **to** map a 64-bit **address** space, **if** the top level page table fits into **a** single **page?**

b) A process references five pages, A, **B**, C, D, and E, in the following order:
A; B; C; D; A; B; E; A; B; C ;D; E

(8)

(3
)

(5)

Assume **that** the replacement algorithm **is first-in-**first-out and find the number of page transfers during this sequence **of** references starting **with** an empty main **memory with three** page frames. Repeat for four page frames.

(6)

18. **a)** Consider **a** program that accesses **a** single I/O device and **compare** un-buffered 1/0 to the use of **a** buffer. Show that **the** use of the buffer can **reduce** the **running time** by at **most** a **factor of two**.

(7
)

b**)** What is the difference between block**-**oriented devices and **stream-oriented** devices**?** **Give a** few examples of each.

(4

)

**(OR
)**

19. **a)** Explain **the** following: (i) Operating **system design issues** (**ii)** Secondary **storage**
management.

(6)

b) What are typical access rights that may be granted **or denied** to a particular user for a
particular **file?**

(5)