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**Total No. of Pages: 02**  
**Total No. of Questions: 09**

**MCA (Sem.-4<sup>th</sup>)**  
**ADVANCED OPERATING SYSTEMS**

**Paper Code : MCA-404**

**Paper ID: [A2558]**

**Time: 3 Hrs.**

**Max. Marks: 100**

**Note:** *Attempt FIVE Questions in all, including Q-9 in Section-E, which is compulsory and selecting ONE each from Section-A to Section-D.*

**SECTION-A**

- 1) Discuss in detail the architecture and organization of Multi-Processor and Distributed (MPD) Operating system. Give suitable example. (20)
- 2) a) What is the distinguished feature of a distributed file system? What are its advantages and disadvantages? Give an example of a distributed file system.  
b) Explain various design and development issues in Multi-Processor and Distributed (MPD) systems. (10, 10)

**SECTION-B**

- 3) Describe structure of Real Time and Embedded (RE) operating systems clearly specifying difference between Interrupt Driven and Nanokernel based models. (20)
- 4) Explain the following:  
a) Hardware elements of Embedded Systems  
b) Energy Aware CPU Scheduling (10, 10)

**SECTION-C**

- 5) Describe in detail with neat diagram the grid computing architecture. What is the purpose of Grid monitoring and scheduling systems? Explain. (20)
- 6) Explain the following  
a) Performance analysis of grid applications  
b) MOSIX OS (10, 10)

**SECTION-D**

- 7) What is cloud computing and how do you think its developments could impact businesses? Describe four types of application that are especially well-suited for mobile computing and cloud computing. (20)

8) Write short notes on:

- a) Mobile Operating System
- b) SAN as a back-end concept

(10, 10)

**SECTION-E (Compulsory Question)**

(10x2=20)

- 9)
- a) What is clock synchronization in distributed system?
  - b) Define availability of resources in distributed systems.
  - c) What is mutual exclusion (mutex) in distributed systems?
  - d) How a distributed file system solves read-write conflicts on a file that is shared between multiple readers and only a single writer?
  - e) A microkernel is a kernel.
    - i) that is stripped of all nonessential components
    - ii) that is compressed before loading in order to reduce its resident memory size
    - iii) that is compiled to produce the smallest size possible when stored to disk
    - iv) Containing many components that are optimized to reduce resident memory size.
  - f) What are the benefits of using the Grid compared with computations on a local computer?
  - g) Why does Grid have multiple Virtual Organizations for Grid jobs?
  - h) What is Cluster computing?
  - i) What happens when an interrupt occurs?
  - j) What is KVM?

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