Multiple question families (grouped by meaning)

1) "Which queue contains all processes?"

- **1.1 (MCQ)** The queue which contains a set of all processes in the system:
  a) The Job Queue b) The Ready Queue c) The Waiting Queue d) The Device Queue.
- **1.2 (FIB)** _____ queue contains a set of all processes in the system.

---

2) "Which scheduler selects the next process and allocates the CPU?"

- **2.1 (MCQ)** The scheduler that selects which process should be executed next and allocates CPU is called:
  a) Long-term b) Medium-term c) Short-term d) High-term.
- **2.2 (FIB)** ..... scheduler selects which process should be executed next and allocate CPU.

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3) "Logical + relocation register → physical address"

- **3.1 (MCQ)** If logical address = 501 and relocation register = 1320, physical address will be:
  a) 2740 b) 1821 c) 902 d) 819.
- **3.2 (MCQ)** If logical address = 401 and relocation register = 1320, physical address will be:
  a) 2640 b) 1721 c) 802 d) 919.

---

4) "Independent vs. cooperating process"

- **4.1 (MCQ)** It is a process that cannot affect or be affected by other processes executing in the system:
  a) A Cooperating process b) An Independent process c) A Passive process d) A Terminated process.
- **4.2 (FIB)** A _____ process can affect or be affected by the execution of another process.

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5) "Virtual machine concept"

- **5.1 (MCQ)** An abstract hardware of a single computer into several different execution environments:
  a) Virtual machine b) Live migration c) Cloud computing d) NAT.

---

6) "Not an advantage of multiprocessor systems"

- **6.1 (MCQ)** Which of the following is not an advantage of multiprocessors systems:
  a) Increasing throughput b) Reducing reliability c) Economy of scale
  d) Fault tolerance.

---

7) "Which system call group is information maintenance?"

- **7.1 (MCQ)** Which of the following system calls is related to information maintenance:
  a) end, abort b) get device attributes c) create file, delete file d) get time or date.

---

8) "Indirect vs direct communication — property that's NOT true"

- **8.1 (MCQ)** Which of the following is not a property of indirect communication:
  a) Link established only if processes share a common mailbox.
  b) A link may be associated with many processes.
  c) Each pair of processes shares one communication link.
  d) Link may be unidirectional or bi-directional.
- **8.2 (T/F)** In direct communication, a link can exist between more than two processes.

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9) "Caching definition"

- **9.1 (MCQ)** _____ is copying information into faster storage system. (Options include Caching.)

- **9.2 (MCQ)** Information in use copied from slower to faster storage temporarily:
  a) Virtual machine b) Buffering c) Cloud computing d) Caching.

---

10) "Loader brings binaries into memory"

- **10.1 (MCQ)** Binary executable files brought into memory by:
  a) Loader b) Dispatcher c) Scheduler d) Linker.

---

11) "Zombie / orphan, device interrupts, modules"

- **11.1 (MCQ)** Process's parent did not wait (did not call wait()); process is known as:
  a) orphan process b) process scheduler c) zombie process d) independent process.
- **11.2 (MCQ)** Device controller informs CPU it has finished its operation by causing:
  a) Registry b) interrupt c) error d) SYSGEN.
- **11.3 (MCQ)** _____ structure of operating systems uses object-oriented approach:
  a) Layered b) Modules c) UNIX d) None of these.

---

12) "Amount of time required to execute a particular process"

- **12.1 (MCQ)** Amount of time required to execute a particular processes:
  a) Turnaround time b) Waiting time c) Response time d) Burst time.

---

13) "OS failure generates crash/core dump"

- **13.1 (MCQ)** An Operating system failure can generate:
  a) A crash dump file b) A program counter c) A PCB d) A core dump file.

---

14) "Accounting service"

- **14.1 (MCQ)** OS keeps track of resource usage — this service is called:
  a) Error detection b) File-system manipulation c) Accounting d) Resource allocation.

---

15) "Compaction means..."

- **15.1 (MCQ)** Compaction means:
  a) Deleting free spaces b) Shuffle memory contents to place all free memory together c) Distributing free spaces among processes d) Calculating physical address.

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16) "DMA, backing store, directory, segmentation, performance"

- **16.1 (MCQ)** The process used to avoid programmed I/O for large data movement:
  a) Direct Memory Access b) The CPU c) Device driver d) Device controller.
- **16.2 (MCQ)** A fast disk large enough to hold copies of all memory images:
  a) Backing store b) CPU scheduler c) The Processor d) The hard disk.
- **16.3 (MCQ)** A collection of nodes containing information about all files:
  a) CPU Structure b) Segmentation c) Directory Structure d) Serialization.
- **16.4 (MCQ)** A memory-management scheme that supports user view of memory is called:
  a) Serialization b) Segmentation c) Paging d) IPC.
- **16.5 (MCQ)** Reduce interrupts via large transfers / smart controllers / polling leads to improve:
  a) Performance b) Security c) Maintainability d) Protection.

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17) "IPC mechanism name"

- **17.1 (MCQ)** The mechanism for processes to communicate and to synchronize their actions is called:
  a) Serialization b) Segmentation c) Paging d) Interprocess Communication.

---

18) "Information maintenance (again) & maintenance-adjacent MCQ"

- **18.1 (MCQ)** Which of the following system calls is related to information maintenance:
  a) end, abort b) get device attributes c) create file, delete file d) get time or date.
- **18.2 (MCQ)** (Similar cluster) Operating system failure can generate (bugs/crash/core/trace).

True / False (grouped by statement meaning)

19) "Binary semaphore has unrestricted domain" (False)

- **19.1 (T/F)** Binary semaphore contains an integer value that can range over an unrestricted domain.

20) "Time quantum ↑ ⇒ context switches ↑"

- **20.1 (T/F)** When the time quantum increases, the number of context switches increases.

21) "MMU maps virtual to physical"

- **21.1 (T/F)** The MMU maps the virtual address generated by the CPU to its physical address.

22) "Protection vs Security (defense)"

- **22.1 (T/F)** Protection is used to defense of the system against internal and external attacks.

23) "SJF gives maximum average waiting time" (False)

- **23.1 (T/F)** SJF scheduling gives maximum average waiting time for a given set of processes.

24) "CPU utilization = keep CPU as busy as possible"

- **24.1 (T/F)** CPU utilization means keeping the CPU as busy as possible.

25) "Main memory is the only large storage CPU can access directly"

- **25.1 (T/F)** Main memory is the only large storage media that the CPU can access directly.

26) “Blocking is asynchronous” (False)

- **26.1 (T/F)** Message passing may be blocking or non-blocking; Blocking is considered Asynchronous.

27) Other T/F cluster from EXAM-441-2

- **27.1 (T/F)** Data section of a process contains global variables.
- **27.2 (T/F)** Symmetric clustering has one machine in hot-standby mode.
- **27.3 (T/F)** Medium-term scheduler can be added if degree of multiprogramming needs to increase.
- **27.4 (T/F)** Execute user programs is not an OS goal.
- **27.5 (T/F)** Secondary storage is an extension of main memory that provides large volatile storage capacity.
- **27.6 (T/F)** In symmetric multiprocessing, not all CPUs are treated equally.
- **27.7 (T/F)** A trap is a software-generated interrupt caused only by an error.
- **27.8 (T/F)** Command interpreter always contains code to execute built-in commands.
- **27.9 (T/F)** Job queue has a set of processes waiting for an I/O device.
- **27.10 (T/F)** One program can be several processes.
- **27.11 (T/F)** Dual-mode operation allows OS to protect itself and other components.
- **27.12 (T/F)** Operating system is a resource allocator.
- **27.13 (T/F)** In direct communication of IPC, a link can exist between more than two processes.

28) API / microkernel / bootstrap / timer / “waiting state”

- **28.1 (T/F)** Most details of OS interface hidden from programmer by API.
- **28.2 (T/F)** Timer used to prevent infinite loop in dual-mode operation.
- **28.3 (T/F)** Bootstrap program typically stored in a secondary storage.
- **28.4 (T/F)** When the process is waiting to be assigned to a processor, it will be in waiting state.

- **28.5 (T/F)** In the microkernel structure, a client program accesses a file by communicating with it directly.

29) Classic OS T/F set (appears across multiple files)

- **29.1 (T/F)** Peterson's solution solves the critical-section problem.
- **29.2 (T/F)** In FCFS scheduling, processes can be preempted.
- **29.3 (T/F)** A program is passive; a process is active.

Fill-in-the-blank (grouped by meaning)

30) File system / mounting

- **30.1 (FIB)** Entity containing file system is known as a _____.
- **30.2 (FIB)** A file system must be _____ before it can be accessed.
- **30.3 (T/F variant)** A file system must not be mounted before it can be accessed.

31) Peterson / critical section

- **31.1 (FIB)** Peterson's Solution is a solution to the _____ problem.

32) Program must be brought into memory

- **32.1 (FIB)** A program must be brought _____ into memory and placed within a process for it to be run.
- **32.2 (T/F variant)** Program must be brought (from disk) into memory and placed within a process for it to be run.

33) Debugging definition

- **33.1 (FIB)** _____ is finding and fixing errors, or bugs.
- **33.2 (FIB)** Debugging ..... is Activity of finding errors, and fixing it in both hardware and software.

34) Process can affect / be affected

- **34.1 (FIB)** A _____ process can affect or be affected by the execution of another process.

35) DMA controller blank

- **35.1 (FIB)** The DMA ..... is used for high-speed I/O devices able to transmit information at close to memory speed.

36) Protection vs. Security (fill-in wording)

- **36.1 (FIB)** ..... defence of the system against internal and external attacks.

Essay / Open-ended (short-answer & problem-solving)

37) Process states (list)

- **37.1 (Open)** List four different possible states for a process?

38) Priority scheduling starvation & aging

- **38.1 (Open)** In priority scheduling, low-priority processes may never execute—what is this problem called and how to prevent it?

39) Directory operations / base & limit registers

- **39.1 (Open)** List five operations performed on a directory.
- **39.2 (Open)** Discuss the Base and Limit Registers.

40) API benefits / Protection vs Security (definitions)

- **40.1 (Open)** List two benefits of using APIs over system calls directly.
- **40.2 (Open)** Define both Protection and Security.

41) OS design goals / services / microkernel / context switch overhead / PCB / diagram

- **41.1 (Open)** Explain user goals and system goals for designing an operating system.
- **41.2 (Open)** List four services of the operating system.
- **41.3 (Open)** What are the benefits of microkernel system structure?
- **41.4 (Open)** Context-switch time is overhead—why?
- **41.5 (Open)** List three components of the Process Control Block (PCB).
- **41.6 (Open)** Label each state in the given Process State Diagram.

42) IPC messaging modes (conceptual)

- **42.1 (Open)** What is the difference between Direct Communication and Indirect Communication?

43) CPU scheduling problems

- **43.1 (Open)** Non-preemptive SJF: P1=21, P2=3, P3=6, P4=2; all arrive at 0. Draw Gantt, compute average waiting time.
- **43.2 (Open)** Round-Robin q=3: P1=6, P2=2, P3=4; all arrive at 0. Draw Gantt, compute average waiting time.
- **43.3 (Open)** Shortest-Remaining-Time-First with arrivals: P1—20—arrival 1; P2—2—0; P3—6—4; P4—2—6. Draw Gantt, compute average waiting.
- **43.4 (Open)** Dynamic storage allocation: place P1 size 5 KB using first/best/worst fit; give location.

Multiple-choice

- **"Kernel runs at all times"** — is the program running at all times on the computer:
  a) Registry b) Kernel c) Memory d) SYSGEN.
- **"Cooperating vs. independent (positive form)"** — Process can affect or be affected by other processes:
  a) independent b) cooperation c) process scheduler d) None. (Grouped as a variant with your "independent vs. cooperating" family.)
- **"Process memory — temporary data lives in…"** — When a process is assigned to memory, temporary data will be in:
  a) Text section b) Data section c) Heap d) Stack section.
- **"OS failure → artifacts (alt options set)"** — Operating system failure can generate:
  a) bugs b) crash dump c) core dump d) trace listings. (Add as a variant to your crash/core-dump family.)

Fill-in-the-blank

- **“Minimum average waiting time”** — _____ scheduling technique gives minimum average waiting time for a given set of processes.

Essay / open-ended

- **Apps on multiple OSes** — Discuss how apps can be multi-operating system.
- **Pipes (types + difference)** — What are the two types of pipes, and what’s the major difference?
- **Parameter-passing to the OS** — Explain the three general methods used to pass parameters to the OS.
- **Scheduling criteria (list)** — List four scheduling-algorithm optimization criteria.

(Optional) questions embedded in the lecture PDFs

- **Bounded buffer (shared-memory)** — “Q. Explain the function of the following segment.” (Shared-data snippet.)
- **Bounded buffer (producer)** — “Q. Explain the function of the following segment?” (Producer code.)
- **Dining philosophers (algorithm)** — “What is the problem with this algorithm?”