710 MCQ for 26 sessions

🖥️ OPERATING SYSTEM – MCQs (Session 1)

🟢 EASY LEVEL (1–15)

1. **What is an Operating System?**
   A. A hardware device
   B. A system software that manages hardware and software resources
   C. An application software
   D. A compiler

✅ **Answer: B**

---

2. **Which of the following is the primary role of an OS?**
   A. Writing programs
   B. Executing instructions directly
   C. Managing system resources
   D. Designing hardware

✅ **Answer: C**

---

3. **Which software starts first when a computer is powered on?**
   A. Application software
   B. Operating System
   C. Compiler
   D. Device driver

✅ **Answer: B**

---

4. **Which of the following is NOT an operating system?**
   A. Windows
   B. Linux

C. macOS
D. MS Word

✅ **Answer: D**

---

5. **Why is an OS hardware dependent?**
   A. Depends on user needs
   B. Directly interacts with hardware
   C. Written in high-level language
   D. Depends on applications

✅ **Answer: B**

---

6. **Which OS component handles process scheduling?**
   A. File system
   B. Memory manager
   C. Process manager
   D. Device driver

✅ **Answer: C**

---

7. **Android and iOS are examples of:**
   A. Batch OS
   B. Embedded OS
   C. Mobile OS
   D. Server OS

✅ **Answer: C**

---

8. **Which is a Real-Time Operating System?**
   A. Windows
   B. Linux
   C. RTLinux
   D. macOS

✅ **Answer: C**

---

9. **Which OS function manages RAM?**
   A. File management
   B. Process management
   C. Memory management
   D. Security

✅ **Answer: C**

---

10. **Which acts as an interface between user and hardware?**
    A. Compiler
    B. BIOS
    C. Operating System
    D. Application

✅ **Answer: C**

---

11. **Which mode has full hardware access?**
    A. User mode
    B. Kernel mode
    C. Safe mode
    D. Virtual mode

✅ **Answer: B**

---

12. **System calls are executed in:**
    A. User space
    B. Application space
    C. Kernel space
    D. Shell

✅ **Answer: C**

---

13. **Which OS is commonly used on servers?**
    A. Android
    B. iOS
    C. Linux
    D. DOS

✅ **Answer: C**

---

14. **BIOS stands for:**
    A. Basic Input Output System
    B. Binary Input Output Software
    C. Boot Internal OS
    D. Base I/O System

✅ **Answer: A**

---

15. **Which of the following is system software?**
    A. Browser
    B. Media Player
    C. Operating System
    D. Text Editor

✅ **Answer: C**

🟡 MEDIUM LEVEL (16–30)

16. **Which is NOT a component of OS?**
    A. Process management
    B. Memory management
    C. File management
    D. Compiler

✅ **Answer: D**

---

17. **Purpose of interrupts is to:**
    A. Stop CPU permanently
    B. Notify CPU of events
    C. Delete processes
    D. Restart OS

✅ **Answer: B**

---

18. **Which OS is used in washing machines?**
    A. Desktop OS
    B. Embedded OS
    C. Mobile OS
    D. Distributed OS

✅ **Answer: B**

---

19. **User programs run in:**
    A. Kernel mode
    B. Supervisor mode
    C. User mode
    D. Privileged mode

✅ **Answer: C**

---

20. **System calls are used to:**
    A. Compile code
    B. Access kernel services
    C. Boot system
    D. Format disk

✅ **Answer: B**

---

21. **Which ensures fair CPU usage?**
    A. File system
    B. Memory manager
    C. Process scheduler

D. I/O manager

✅ **Answer: C**

---

22. **Context switch means:**
    A. Switching users
    B. Switching processes
    C. Switching hardware
    D. Switching OS

✅ **Answer: B**

---

23. **Which OS is best for time-critical tasks?**
    A. Batch OS
    B. Time-sharing OS
    C. Real-Time OS
    D. Network OS

✅ **Answer: C**

---

24. **Which OS layer communicates directly with hardware?**
    A. Application
    B. Shell
    C. Kernel
    D. User

✅ **Answer: C**

---

25. **System calls provide a bridge between:**
    A. Hardware & BIOS
    B. User & hardware
    C. User & kernel
    D. Kernel & CPU

✅ **Answer: C**

26. **Which mode transition occurs during system call?**
    A. Kernel → User
    B. User → Kernel
    C. Kernel → Kernel
    D. User → User

✅ **Answer: B**

27. **Which OS manages I/O devices?**
    A. Kernel
    B. Device drivers
    C. Shell
    D. Compiler

✅ **Answer: B**

28. **Which OS is designed for multiple users simultaneously?**
    A. Single-user OS
    B. Batch OS
    C. Multi-user OS
    D. Embedded OS

✅ **Answer: C**

29. **Which OS feature improves CPU utilization?**
    A. Paging
    B. Multiprogramming
    C. Deadlock
    D. Fragmentation

✅ **Answer: B**

30. **Which OS uses time slices?**
    A. Batch OS

B. Real-Time OS
C. Time-sharing OS
D. Embedded OS

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (31–45)

31. **OS is hardware dependent mainly because:**
    A. Written in C
    B. Uses device drivers
    C. Has GUI
    D. User dependent

✅ **Answer: B**

---

32. **If a user program tries direct hardware access:**
    A. Allowed
    B. Ignored
    C. Causes interrupt
    D. Causes protection fault

✅ **Answer: D**

---

33. **Kernel resides in:**
    A. User space
    B. Secondary memory
    C. Kernel space
    D. Cache

✅ **Answer: C**

---

34. **Which is NOT a function of OS?**
    A. Memory allocation
    B. CPU scheduling

C. Virus removal
D. File management

✅ **Answer: C**

---

35. **System call mechanism uses:**
   A. Polling
   B. Trap instruction
   C. Looping
   D. DMA

✅ **Answer: B**

---

36. **Interrupts are generated by:**
   A. Only software
   B. Only hardware
   C. Hardware and software
   D. Compiler

✅ **Answer: C**

---

37. **Which OS guarantees response within a fixed deadline?**
   A. Time-sharing OS
   B. Distributed OS
   C. Real-Time OS
   D. Network OS

✅ **Answer: C**

---

38. **Which OS type is best for databases on servers?**
   A. Embedded OS
   B. Desktop OS
   C. Server OS
   D. Mobile OS

✅ **Answer: C**

---

39. **Which mode is more secure?**
    A. Kernel mode
    B. User mode
    C. Supervisor mode
    D. Root mode

✅ **Answer: B**

---

40. **Which OS component handles protection and security?**
    A. Process manager
    B. Memory manager
    C. Kernel
    D. Compiler

✅ **Answer: C**

---

41. **A faulty user program cannot crash system due to:**
    A. Paging
    B. Virtual memory
    C. Dual mode operation
    D. Scheduling

✅ **Answer: C**

---

42. **Which OS concept allows multiple programs in memory?**
    A. Multitasking
    B. Multiprogramming
    C. Multithreading
    D. Multiprocessing

✅ **Answer: B**

43. **Embedded OS is optimized for:**
   A. High throughput
   B. Minimal resource usage
   C. Multi-user support
   D. Gaming

✅ **Answer: B**

---

44. **Which of the following is NOT an interrupt source?**
   A. Keyboard
   B. Timer
   C. System call
   D. Cache memory

✅ **Answer: D**

---

45. **OS kernel is considered the core because it:**
   A. Provides GUI
   B. Manages users
   C. Controls hardware & system resources
   D. Runs applications

✅ **Answer: C**

🐧 SESSION 2: LINUX & SHELL PROGRAMMING – MCQs (60)

🟢 EASY LEVEL (1–20)

1. **Linux is an example of:**
   A. Application software
   B. System software
   C. Firmware
   D. Utility software

✅ **Answer: B**

---

2. **Which directory is the root of Linux file system?**
   A. /home
   B. /root
   C. /
   D. /bin

✅ **Answer: C**

---

3. **Which command shows current working directory?**
   A. ls
   B. pwd
   C. cd
   D. who

✅ **Answer: B**

---

4. **Which command lists files in a directory?**
   A. show
   B. list
   C. ls
   D. dirlist

✅ **Answer: C**

---

5. **Which command is used to create a directory?**
   A. mkdir
   B. rmdir
   C. touch

D. create

✅ **Answer: A**

---

6. **Which command creates an empty file?**
   A. file
   B. new
   C. touch
   D. open

✅ **Answer: C**

---

7. **Which symbol is used for output redirection?**
   A. <
   B. |
   C. >
   D. &

✅ **Answer: C**

---

8. **Pipe operator is represented by:**
   A. >
   B. <
   C. |
   D. ||

✅ **Answer: C**

---

9. **Which command deletes a file?**
   A. delete
   B. remove
   C. rm
   D. del

✅ **Answer: C**

10. **Which command removes an empty directory?**
    A. rm
    B. rmdir
    C. deldir
    D. erasedir

✅ **Answer: B**

11. **File permissions in Linux are divided into:**
    A. Read, Write, Delete
    B. Owner, Group, Others
    C. Admin, User, Guest
    D. Root, User, System

✅ **Answer: B**

12. **Which permission allows file execution?**
    A. r
    B. w
    C. x
    D. e

✅ **Answer: C**

13. **Which command changes file permissions?**
    A. chown
    B. chmod
    C. setperm
    D. access

✅ **Answer: B**

14. **Which command changes file owner?**
    A. chmod

B. chgrp
C. chown
D. owner

✅ **Answer: C**

---

15. **Which command displays file content?**
    A. show
    B. read
    C. cat
    D. open

✅ **Answer: C**

---

16. **Which command is used to login remotely?**
    A. ftp
    B. telnet
    C. ssh
    D. finger

✅ **Answer: C**

---

17. **Which variable defines shell prompt?**
    A. PS0
    B. PS1
    C. PS2
    D. PATH

✅ **Answer: B**

---

18. **Which command prints text on terminal?**
    A. write
    B. show
    C. echo
    D. print

✅ **Answer: C**

---

19. **Which shell is default in most Linux systems?**
    A. C shell
    B. Bourne shell
    C. Bash
    D. Zsh

✅ **Answer: C**

---

20. **Which symbol represents all files?**
    A. ?
    B. *
    C. #
    D. $

✅ **Answer: B**

🟡 MEDIUM LEVEL (21–40)

21. **What does `ls -l` display?**
    A. Only file names
    B. Hidden files
    C. Long listing with permissions
    D. Sorted list

✅ **Answer: C**

---

22. **What does permission `rwxr-xr--` mean for group?**
    A. Read only
    B. Write only
    C. Read & execute
    D. Full access

✅ **Answer: C**

23. **Which numeric permission represents `rwxr-xr-x`?**
    A. 755
    B. 777
    C. 644
    D. 700

✅ **Answer: A**

24. **Which command shows hidden files?**
    A. ls
    B. ls -h
    C. ls -a
    D. ls -r

✅ **Answer: C**

25. **What does `|` operator do?**
    A. Redirect output
    B. Combine commands
    C. Pass output of one command as input to another
    D. Execute in background

✅ **Answer: C**

26. **Which command shows network configuration?**
    A. netstat
    B. ifconfig
    C. ipconfig
    D. route

✅ **Answer: B**

27. **Which command transfers files securely?**
    A. ftp

B. telnet
C. sftp
D. finger

✅ **Answer: C**

---

28. **Which command sets permissions recursively?**
    A. chmod
    B. chmod -r
    C. chmod -R
    D. chown -R

✅ **Answer: C**

---

29. **What does $HOME represent?**
    A. Root directory
    B. Current directory
    C. User home directory
    D. Temp directory

✅ **Answer: C**

---

30. **Which file stores user account details?**
    A. /etc/group
    B. /etc/shadow
    C. /etc/passwd
    D. /etc/profile

✅ **Answer: C**

---

31. **Which wildcard matches exactly one character?**
    A. *
    B. ?
    C. []
    D. {}

✅ **Answer: B**

---

32. **Which command reads user input in shell script?**
    A. input
    B. scan
    C. read
    D. accept

✅ **Answer: C**

---

33. **Which variable stores command-line arguments count?**
    A. $0
    B. $1
    C. $#
    D. $$

✅ **Answer: C**

---

34. **Which variable stores process ID?**
    A. $!
    B. $$
    C. $?
    D. $@

✅ **Answer: B**

---

35. **What does $? represent?**
    A. PID
    B. Exit status of last command
    C. Argument count
    D. Shell name

✅ **Answer: B**

36. **Which command executes script?**
    A. bash script.sh
    B. ./script.sh
    C. sh script.sh
    D. All of the above

✅ **Answer: D**

---

37. **Which permission is required to run a script?**
    A. r
    B. w
    C. x
    D. rw

✅ **Answer: C**

---

38. **Which command shows current user?**
    A. who
    B. whoami
    C. users
    D. id

✅ **Answer: B**

---

39. **Which file sets environment variables globally?**
    A. ~/.bashrc
    B. ~/.profile
    C. /etc/profile
    D. /etc/passwd

✅ **Answer: C**

---

40. **Which shell supports scripting best?**
    A. sh
    B. csh
    C. bash

D. ksh

✅ **Answer: C**

🔴 **HARD / TRICKY LEVEL (41–60)**

41. **Permission 640 means others have:**
   A. Read
   B. Write
   C. Execute
   D. No permission

✅ **Answer: D**

---

42. **What happens if execute permission is missing on script?**
   A. Script runs normally
   B. Script gives permission denied
   C. Script deletes itself
   D. Script runs in background

✅ **Answer: B**

---

43. **ACL is used to:**
   A. Replace chmod
   B. Provide fine-grained permissions
   C. Encrypt files
   D. Compress files

✅ **Answer: B**

---

44. **Which command shows ACL permissions?**
   A. chmod
   B. chown

C. getfacl
D. setfacl

✅ **Answer: C**

---

45. **Which is more secure: ftp or sftp?**
   A. ftp
   B. sftp
   C. both same
   D. none

✅ **Answer: B**

---

46. **PS2 variable is used for:**
   A. Primary prompt
   B. Secondary prompt
   C. Login prompt
   D. Error prompt

✅ **Answer: B**

---

47. **What does `#!/bin/bash` indicate?**
   A. Comment
   B. Compiler
   C. Interpreter path
   D. Variable

✅ **Answer: C**

---

48. **Which command redirects stderr?**
   A. >
   B. <
   C. 2>
   D. &>

Answer: C

---

49. **What does** `command1 && command2` **mean?**
    A. Run both always
    B. Run command2 only if command1 succeeds
    C. Run in parallel
    D. Pipe output

Answer: B

---

50. **Which metacharacter runs command in background?**
    A. |
    B. &&
    C. &
    D. ;

Answer: C

---

51. **Which shell variable stores all arguments?**
    A. $*
    B. $@
    C. Both A and B
    D. $#

Answer: C

---

52. **Which command searches text in files?**
    A. find
    B. grep
    C. locate
    D. search

Answer: B

53. **Difference between $*$ and $@$ occurs when:**
    A. No arguments
    B. One argument
    C. Used inside quotes
    D. Used without quotes

✅ **Answer: C**

---

54. **Which command gives file type?**
    A. type
    B. stat
    C. file
    D. info

✅ **Answer: C**

---

55. **Which permission allows directory access?**
    A. r
    B. w
    C. x
    D. rw

✅ **Answer: C**

---

56. **Removing write permission from directory means:**
    A. Cannot read files
    B. Cannot execute files
    C. Cannot create/delete files
    D. Cannot enter directory

✅ **Answer: C**

---

57. **Which shell expands wildcards?**
    A. Kernel
    B. Shell
    C. Compiler

D. Loader

✅ **Answer: B**

---

58. **Which file runs when user logs in?**
    A. ~/.bashrc
    B. ~/.profile
    C. /etc/profile
    D. All of the above

✅ **Answer: D**

---

59. **What does `read a b` do?**
    A. Reads two files
    B. Reads input into variables a and b
    C. Adds a and b
    D. Displays variables

✅ **Answer: B**

---

60. **Which command terminates a process?**
    A. stop
    B. exit
    C. kill
    D. end

✅ **Answer: C**

🐚 SESSION 3: SHELL PROGRAMMING – MCQs + CODE (30)

🟢 EASY LEVEL (1–10)

1. Which keyword starts an if condition in shell?

A. if
B. then
C. fi
D. else

✅ **Answer: A**

---

2. Which command is used to evaluate conditions?

A. eval
B. test
C. check
D. verify

✅ **Answer: B**

---

3. Which symbol ends an if block?

A. end
B. endif
C. fi
D. stop

✅ **Answer: C**

---

4. Output of the following?
```
a=5
echo $a
```

A. a
B. 5
C. $a
D. error

✅ **Answer: B**

---

5. Which loop executes at least once?

A. for
 B. while
 C. until
 D. infinite

✅ **Answer: C**

---

6. Correct syntax to compare integers?

A. [$a == $b]
 B. [$a -eq $b]
 C. [$a = $b]
 D. [$a equals $b]

✅ **Answer: B**

---

7. Which keyword starts a case block?

A. switch
 B. case
 C. select
 D. choose

✅ **Answer: B**

---

8. Output?
```
echo $((3 + 2))
```

A. 32
 B. 3+2
 C. 5
 D. error

✅ **Answer: C**

9. Which symbol represents regex "any single character"?

A. *
 B. ?
 C. .
 D. ^

✅ **Answer: C**

---

10. Which command prints user input?

A. read
 B. echo
 C. scan
 D. input

✅ **Answer: B**

🟡 MEDIUM LEVEL (11–20)

11. Output?

```
x=10
if [ $x -gt 5 ]; then
  echo "Yes"
else
  echo "No"
fi
```

A. Yes
 B. No
 C. Error
 D. Nothing

✅ **Answer: A**

---

12. Which loop is best when condition checked before execution?

A. until
 B. for
 C. while
 D. do

✅ **Answer: C**

---

13. Output?

```
for i in 1 2 3
do
   echo $i
done
```

A. 123
 B. 1 2 3 (separate lines)
 C. error
 D. infinite loop

✅ **Answer: B**

---

14. Which regex matches digits?

A. [a-z]
 B. [0-9]
 C. .*
 D. ^$

✅ **Answer: B**

---

15. Output?

```
read x
echo $x
```

(If user enters DAC)

A. x
 B. DAC

C. read
D. error

Answer: B

---

16. Output?

```
n=5
while [ $n -gt 0 ]
do
   echo $n
   n=$((n-1))
done
```

A. 5 4 3 2 1
B. 1 2 3 4 5
C. infinite
D. error

Answer: A

---

17. Which operator performs arithmetic?

A. (( ))
B. {{ }}
C. [[ ]]
D. << >>

Answer: A

---

18. Output?

```
x=2
y=3
echo $((x * y))
```

A. 5
B. 6

C. xy
D. error

✅ **Answer: B**

---

19. Which symbol ends a case option?

A. ;;
B. :
C. fi
D. end

✅ **Answer: A**

---

20. Which command matches pattern in file?

A. sed
B. awk
C. grep
D. find

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (21–30)

21. Output?

```
x=10
[ $x -eq 10 ] && echo "OK"
```

A. OK
B. nothing
C. error
D. false

✅ **Answer: A**

---

22. Output?

```
i=1
until [ $i -gt 3 ]
do
  echo $i
  i=$((i+1))
done
```

A. 1 2 3
 B. infinite
 C. 3 2 1
 D. error

✅ **Answer: A**

---

23. Output?

```
echo "linux" | grep "lin"
```

A. linux
 B. lin
 C. nothing
 D. error

✅ **Answer: A**

---

24. Output?

```
echo $((10 / 3))
```

A. 3.33
 B. 3
 C. error
 D. 0

✅ **Answer: B**

---

25. Regex ^a.*z$ matches:

A. az
 B. abcz
 C. a123z
 D. All of the above

✅ **Answer: D**

---

26. Output?

```
x=5
if [ $x -lt 3 ]; then
   echo A
elif [ $x -lt 10 ]; then
   echo B
else
   echo C
fi
```

A. A
 B. B
 C. C
 D. error

✅ **Answer: B**

---

27. Output?

```
case 2 in
1) echo one ;;
2) echo two ;;
*) echo other ;;
esac
```

A. one
 B. two
 C. other
 D. error

✅ **Answer: B**

---

28. Which regex matches start of line?

A. $

 B. *

 C. ^

 D. .

✅ **Answer: C**

---

29. Output?

```
set hello world
echo $2
```

A. hello

 B. world

 C. set

 D. error

✅ **Answer: B**

---

30. Output?

```
for i in {1..3}
do
   echo $i
done
```

A. 123

 B. 1 2 3

 C. error

 D. nothing

✅ **Answer: B**

🧠 SESSIONS 4 & 5: PROCESSES – MCQs (60)

🟢 EASY LEVEL (1–20)

1. **A process is:**
   A. A program stored on disk
   B. A program in execution
   C. A hardware unit
   D. A compiler

✅ **Answer: B**

2. **Which OS component manages processes?**
   A. File system
   B. Memory manager
   C. Process manager
   D. I/O manager

✅ **Answer: C**

3. **Which process state means "currently executing"?**
   A. Ready
   B. Waiting
   C. Running
   D. Terminated

✅ **Answer: C**

4. **Which scheduling allows CPU to be taken away from a process?**
   A. Non-preemptive
   B. Preemptive
   C. Batch
   D. FCFS

✅ **Answer: B**

5. **Which scheduling algorithm is non-preemptive by default?**
   A. Round Robin
   B. Priority
   C. FCFS
   D. Multilevel Queue

✅ **Answer: C**

---

6. **Which entity executes a process?**
   A. RAM
   B. CPU
   C. Disk
   D. Cache

✅ **Answer: B**

---

7. **Which system call creates a new process?**
   A. exec
   B. fork
   C. wait
   D. exit

✅ **Answer: B**

---

8. **After `fork()`, child process gets:**
   A. New code
   B. Copy of parent
   C. No memory
   D. Only registers

✅ **Answer: B**

---

9. **Which process has no parent?**
   A. Zombie

B. Child
C. Orphan
D. Daemon

✅ **Answer: C**

---

10. **Which process is terminated but still has entry in process table?**
    A. Orphan
    B. Zombie
    C. Daemon
    D. Init

✅ **Answer: B**

---

11. **Which call replaces process image?**
    A. fork
    B. wait
    C. exec
    D. exit

✅ **Answer: C**

---

12. **Which process scheduler selects next process to execute?**
    A. Long-term
    B. Medium-term
    C. Short-term
    D. Dispatcher

✅ **Answer: C**

---

13. **Which algorithm uses time quantum?**
    A. FCFS
    B. SJF
    C. Priority
    D. Round Robin

✅ **Answer: D**

---

14. **Which scheduling minimizes average waiting time?**
    A. FCFS
    B. SJF
    C. RR
    D. Priority

✅ **Answer: B**

---

15. **Which scheduling may cause starvation?**
    A. FCFS
    B. Round Robin
    C. Priority
    D. FIFO

✅ **Answer: C**

---

16. **Which scheduler controls degree of multiprogramming?**
    A. Short-term
    B. Medium-term
    C. Long-term
    D. CPU scheduler

✅ **Answer: C**

---

17. **Process states include all EXCEPT:**
    A. Ready
    B. Running
    C. Waiting
    D. Compiled

✅ **Answer: D**

---

18. **Which scheduling is best for time-sharing systems?**
   A. FCFS
   B. SJF
   C. Round Robin
   D. Priority

✅ **Answer: C**

---

19. **What does `waitpid()` do?**
   A. Creates child
   B. Waits for child termination
   C. Kills process
   D. Replaces process

✅ **Answer: B**

---

20. **Which process becomes parent of orphan processes?**
   A. shell
   B. kernel
   C. init (PID 1)
   D. daemon

✅ **Answer: C**

🟡 MEDIUM LEVEL (21–40)

21. **Difference between process and thread:**
   A. Process has no memory
   B. Thread is heavier
   C. Process has separate address space
   D. Thread cannot execute

✅ **Answer: C**

22. **Threads share:**
   A. Registers
   B. Stack
   C. Address space
   D. PID

✅ **Answer: C**

---

23. **Which scheduling is preemptive?**
   A. FCFS
   B. SJF
   C. Priority (preemptive)
   D. FIFO

✅ **Answer: C**

---

24. **Turnaround time =**
   A. Completion time – Arrival time
   B. Waiting time – Burst time
   C. Burst time – Arrival time
   D. Completion – Burst

✅ **Answer: A**

---

25. **Waiting time =**
   A. Turnaround – Burst
   B. Burst – Arrival
   C. Completion – Arrival
   D. Turnaround – Arrival

✅ **Answer: A**

---

26. **Which scheduling causes convoy effect?**
   A. SJF
   B. FCFS
   C. RR

D. Priority

✅ **Answer: B**

---

27. **Round Robin performance depends on:**
    A. Arrival time
    B. Priority
    C. Time quantum
    D. CPU speed

✅ **Answer: C**

---

28. **Very large time quantum in RR behaves like:**
    A. SJF
    B. FCFS
    C. Priority
    D. Multilevel

✅ **Answer: B**

---

29. **Very small time quantum causes:**
    A. Starvation
    B. More context switches
    C. Deadlock
    D. Thrashing

✅ **Answer: B**

---

30. **Which scheduler performs swapping?**
    A. Short-term
    B. Long-term
    C. Medium-term
    D. Dispatcher

✅ **Answer: C**

31. **Which algorithm is optimal but impractical?**
    A. FCFS
    B. Priority
    C. SJF
    D. RR

✅ **Answer: C**

32. **Belady's anomaly is related to:**
    A. CPU scheduling
    B. Deadlock
    C. Page replacement
    D. Disk scheduling

✅ **Answer: C**

33. **Belady's anomaly occurs in:**
    A. LRU
    B. Optimal
    C. FIFO
    D. LFU

✅ **Answer: C**

34. **Which scheduling uses multiple queues?**
    A. SJF
    B. Multilevel Queue
    C. FCFS
    D. RR

✅ **Answer: B**

35. **After fork(), return value in child is:**
    A. −1

B. 0
C. PID
D. Parent PID

✅ **Answer: B**

---

36. **After fork(), return value in parent is:**
   A. 0
   B. −1
   C. Child PID
   D. Parent PID

✅ **Answer: C**

---

37. **Zombie processes occur when:**
   A. Parent exits first
   B. Child exits first
   C. Child not waited by parent
   D. Kernel crashes

✅ **Answer: C**

---

38. **Which system call terminates a process?**
   A. exit
   B. kill
   C. wait
   D. exec

✅ **Answer: A**

---

39. **Which scheduling is suitable for batch systems?**
   A. FCFS
   B. RR
   C. Priority
   D. Multilevel

✅ **Answer: A**

---

40. **Which entity actually switches context?**
    A. CPU
    B. Kernel
    C. Dispatcher
    D. Scheduler

✅ **Answer: C**

🔴 **HARD / TRICKY LEVEL (41–60)**

41. **Starvation can be solved using:**
    A. SJF
    B. FCFS
    C. Aging
    D. FIFO

✅ **Answer: C**

---

42. **Which scheduling considers burst time first?**
    A. Priority
    B. SJF
    C. RR
    D. FCFS

✅ **Answer: B**

---

43. **Process control block (PCB) does NOT contain:**
    A. PID
    B. Program counter
    C. CPU registers
    D. Source code

✅ **Answer: D**

44. **Which state transition uses scheduler?**
    A. Ready → Running
    B. Running → Waiting
    C. Waiting → Ready
    D. Running → Terminated

✅ **Answer: A**

45. **If parent does not call wait(), child becomes:**
    A. Orphan
    B. Zombie
    C. Init
    D. Daemon

✅ **Answer: B**

46. **If parent terminates before child:**
    A. Child becomes zombie
    B. Child becomes orphan
    C. Child terminates
    D. Kernel panic

✅ **Answer: B**

47. **Which scheduling is unfair to long processes?**
    A. FCFS
    B. SJF
    C. RR
    D. Priority

✅ **Answer: B**

48. **Context switch overhead includes:**
    A. User execution

B. Saving registers
C. Disk I/O
D. Cache write

✅ **Answer: B**

---

49. **Which scheduler is invoked most frequently?**
    A. Long-term
    B. Medium-term
    C. Short-term
    D. Job scheduler

✅ **Answer: C**

---

50. **Which system call blocks parent until child finishes?**
    A. exec
    B. wait
    C. fork
    D. kill

✅ **Answer: B**

---

51. **exec() after fork() results in:**
    A. New process
    B. Same process with new program
    C. Parent replaced
    D. Kernel process

✅ **Answer: B**

---

52. **Which scheduling gives best response time?**
    A. FCFS
    B. RR
    C. SJF
    D. Priority

---

53. **Belady's anomaly means:**
    A. Less frames → more faults
    B. More frames → more faults
    C. Same faults always
    D. Page fault disappears

✅ **Answer: B**

---

54. **Which scheduling is NOT starvation-free?**
    A. FCFS
    B. SJF
    C. RR
    D. FIFO

✅ **Answer: B**

---

55. **Which scheduling is preemptive version of SJF?**
    A. RR
    B. FCFS
    C. SRTF
    D. Priority

✅ **Answer: C**

---

56. **CPU idle time is minimized by:**
    A. Multiprogramming
    B. Paging
    C. Swapping
    D. Deadlock

✅ **Answer: A**

---

57. **Which algorithm is best for minimizing turnaround time?**
    A. FCFS
    B. RR
    C. SJF
    D. Priority

✅ **Answer: C**

---

58. **Which process always runs in background?**
    A. Zombie
    B. Orphan
    C. Daemon
    D. Init

✅ **Answer: C**

---

59. **Which process has PID 1?**
    A. shell
    B. kernel
    C. init
    D. daemon

✅ **Answer: C**

---

60. **Which scheduling is complex but flexible?**
    A. FCFS
    B. SJF
    C. Multilevel Queue
    D. FIFO

✅ **Answer: C**

🧠 SESSION 8: VIRTUAL MEMORY – MCQs (30)

🟢 EASY LEVEL (1–10)

1. **Virtual memory is used to:**
   A. Increase CPU speed
   B. Increase RAM physically
   C. Execute programs larger than physical memory
   D. Reduce disk usage

✅ **Answer: C**

2. **Which memory is used as backing store in virtual memory?**
   A. Cache
   B. Register
   C. Hard Disk
   D. ROM

✅ **Answer: C**

3. **Virtual memory provides illusion of:**
   A. Faster CPU
   B. Larger main memory
   C. Infinite cache
   D. Larger disk

✅ **Answer: B**

4. **Demand paging means:**
   A. Pages are loaded initially
   B. Pages are loaded only when required
   C. Pages are never removed
   D. Pages are loaded sequentially

✅ **Answer: B**

5. **A page fault occurs when:**
   A. Page is in cache
   B. Page is in RAM
   C. Page is not in RAM
   D. Disk fails

✅ **Answer: C**

6. **Which table keeps track of pages?**
   A. Process table
   B. Page table
   C. File table
   D. Frame table

✅ **Answer: B**

7. **Which component handles page faults?**
   A. CPU
   B. MMU
   C. Operating System
   D. Hard Disk

✅ **Answer: C**

8. **Which memory access is faster?**
   A. Disk
   B. Virtual memory
   C. Main memory
   D. Secondary memory

✅ **Answer: C**

9. **Page size is decided by:**
   A. User

B. Compiler
C. Hardware
D. OS only

✅ **Answer: C**

---

10. **Which is NOT a page replacement algorithm?**
    A. FIFO
    B. LRU
    C. Optimal
    D. FCFS

✅ **Answer: D**

🟡 MEDIUM LEVEL (11–20)

11. **Page fault service time includes:**
    A. Disk access
    B. Updating page table
    C. Restarting instruction
    D. All of the above

✅ **Answer: D**

---

12. **Which page replacement algorithm may suffer from Belady's anomaly?**
    A. LRU
    B. Optimal
    C. FIFO
    D. LFU

✅ **Answer: C**

---

13. **Which algorithm replaces the page that will not be used for longest time?**
    A. FIFO
    B. LRU

C. Optimal
D. LFU

✅ **Answer: C**

---

14. **Which algorithm replaces least recently used page?**
    A. FIFO
    B. Optimal
    C. LRU
    D. MRU

✅ **Answer: C**

---

15. **Belady's anomaly means:**
    A. Page fault always decreases
    B. Page fault always increases
    C. More frames cause more page faults
    D. Less frames cause more page faults

✅ **Answer: C**

---

16. **Which algorithm is stack-based and avoids Belady's anomaly?**
    A. FIFO
    B. LRU
    C. LFU
    D. Random

✅ **Answer: B**

---

17. **Page replacement is needed when:**
    A. Free frame is available
    B. Page already in memory
    C. No free frame is available
    D. Disk is full

✅ **Answer: C**

---

18. **Thrashing occurs when:**
    A. CPU is idle
    B. Too many page faults occur
    C. Disk is slow
    D. RAM is large

✅ **Answer: B**

---

19. **Working set model is used to prevent:**
    A. Deadlock
    B. Starvation
    C. Thrashing
    D. Fragmentation

✅ **Answer: C**

---

20. **Which hardware supports virtual memory?**
    A. Cache controller
    B. MMU
    C. BIOS
    D. ALU

✅ **Answer: B**

🔴 HARD / TRICKY LEVEL (21–30)

21. **Which page replacement algorithm is theoretically best?**
    A. FIFO
    B. LRU
    C. Optimal
    D. LFU

✅ **Answer: C**

22. **Why is Optimal algorithm not implementable?**
   A. Too slow
   B. Requires future knowledge
   C. Uses extra memory
   D. Complex hardware

✅ **Answer: B**

---

23. **LRU implementation is difficult because:**
   A. Requires future access info
   B. Needs hardware support or timestamps
   C. Causes thrashing
   D. Has high page faults

✅ **Answer: B**

---

24. **Page fault rate should be:**
   A. As high as possible
   B. Zero
   C. As low as possible
   D. Equal to hit rate

✅ **Answer: C**

---

25. **If page fault rate increases suddenly, system may be:**
   A. Deadlocked
   B. Thrashing
   C. Idle
   D. Optimized

✅ **Answer: B**

---

26. **Which algorithm is simplest to implement?**
   A. Optimal

B. LRU

C. FIFO

D. LFU

✅ **Answer: C**

---

27. **Which memory access occurs on page fault?**

A. Cache

B. RAM only

C. Disk

D. Register

✅ **Answer: C**

---

28. **Which replacement algorithm does NOT consider frequency or recency?**

A. FIFO

B. LRU

C. LFU

D. MRU

✅ **Answer: A**

---

29. **Increasing number of frames in FIFO may:**

A. Always reduce faults

B. Increase faults

C. Keep faults same

D. Remove page faults

✅ **Answer: B**

---

30. **Effective memory access time increases due to:**

A. Cache hit

B. Page hit

C. Page fault

D. Fast CPU

✅ **Answer: C**

🧠 SESSION 9: DEADLOCK & SYNCHRONIZATION – MCQs (30)

🟢 EASY LEVEL (1–10)

1. **Deadlock is a situation where:**
   A. CPU is idle
   B. Processes execute faster
   C. Processes wait indefinitely for resources
   D. Memory is full

✅ **Answer: C**

---

2. **Which is NOT a necessary condition for deadlock?**
   A. Mutual exclusion
   B. Hold and wait
   C. Preemption
   D. Circular wait

✅ **Answer: C**

---

3. **How many necessary conditions are required for deadlock?**
   A. 2
   B. 3
   C. 4
   D. 5

✅ **Answer: C**

---

4. **Which condition states resources cannot be forcibly taken?**
   A. Mutual exclusion
   B. Hold and wait
   C. No preemption
   D. Circular wait

✅ **Answer: C**

---

5. **Which condition requires a cycle in resource allocation graph?**
   A. Mutual exclusion
   B. Hold and wait
   C. No preemption
   D. Circular wait

✅ **Answer: D**

---

6. **Which mechanism ensures only one process accesses critical section?**
   A. Semaphore
   B. Mutex
   C. Monitor
   D. Spinlock

✅ **Answer: B**

---

7. **Which problem is classical synchronization problem?**
   A. Dining philosophers
   B. Producer–Consumer
   C. Reader–Writer
   D. All of the above

✅ **Answer: D**

8. **Which semaphore type has only 0 and 1 values?**
   A. Counting
   B. Binary
   C. General
   D. Integer

✅ **Answer: B**

---

9. **Mutex stands for:**
   A. Mutual Execution
   B. Mutual Exclusion
   C. Multiple Execution
   D. Multiple Exclusion

✅ **Answer: B**

---

10. **Starvation means:**
   A. Deadlock
   B. Infinite execution
   C. Process never gets CPU/resources
   D. Memory leak

✅ **Answer: C**

🟡 MEDIUM LEVEL (11–20)

11. **Which deadlock prevention method breaks hold-and-wait?**
   A. Request all resources at once
   B. Preempt resources
   C. Circular wait elimination
   D. Banker's algorithm

✅ **Answer: A**

---

12. **Deadlock avoidance requires:**
    A. No resource sharing
    B. Future resource requests known in advance
    C. High CPU speed
    D. Preemption

✅ **Answer: B**

---

13. **Which algorithm is used for deadlock avoidance?**
    A. FIFO
    B. Banker's Algorithm
    C. Round Robin
    D. SJF

✅ **Answer: B**

---

14. **Which structure is used to detect deadlock?**
    A. Page table
    B. Resource Allocation Graph
    C. Ready queue
    D. Process table

✅ **Answer: B**

---

15. **Semaphore operations are:**
    A. lock and unlock
    B. open and close
    C. wait and signal
    D. read and write

✅ **Answer: C**

---

16. **Counting semaphore is used when:**
    A. Only one resource
    B. Multiple identical resources
    C. No resource

D. Mutual exclusion

✅ **Answer: B**

---

17. **Producer–Consumer problem mainly deals with:**
    A. CPU scheduling
    B. Synchronization
    C. Memory allocation
    D. Deadlock detection

✅ **Answer: B**

---

18. **Which is true about mutex?**
    A. Can have values >1
    B. Can be unlocked by any process
    C. Only owner can unlock
    D. Used for signaling

✅ **Answer: C**

---

19. **Busy waiting occurs in:**
    A. Blocking semaphore
    B. Mutex
    C. Spinlock
    D. Monitor

✅ **Answer: C**

---

20. **Starvation is caused due to:**
    A. Deadlock
    B. Infinite resources
    C. Scheduling policies
    D. Paging

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (21–30)

21. **Deadlock prevention guarantees:**
    A. No deadlock but low utilization
    B. High utilization
    C. No starvation
    D. Maximum throughput

✅ **Answer: A**

22. **Deadlock avoidance ensures system stays in:**
    A. Unsafe state
    B. Safe state
    C. Dead state
    D. Starvation state

✅ **Answer: B**

23. **Banker's algorithm avoids deadlock by:**
    A. Preempting resources
    B. Killing processes
    C. Checking safe sequence
    D. Ignoring circular wait

✅ **Answer: C**

24. **Binary semaphore and mutex difference:**
    A. Same always
    B. Semaphore supports signaling, mutex doesn't
    C. Mutex allows multiple access
    D. Semaphore has ownership

✅ **Answer: B**

25. **Producer–Consumer without proper synchronization may cause:**
    A. Deadlock only
    B. Starvation only
    C. Race condition
    D. Thrashing

✅ **Answer: C**

---

26. **Which deadlock condition is hardest to eliminate?**
    A. Mutual exclusion
    B. Hold and wait
    C. No preemption
    D. Circular wait

✅ **Answer: A**

---

27. **Which technique orders resource acquisition?**
    A. Deadlock detection
    B. Deadlock prevention
    C. Deadlock avoidance
    D. Deadlock recovery

✅ **Answer: B**

---

28. **Which problem demonstrates deadlock clearly?**
    A. Producer–Consumer
    B. Reader–Writer
    C. Dining Philosophers
    D. Sleeping Barber

✅ **Answer: C**

---

29. **Difference between deadlock and starvation:**
    A. Both are same
    B. Deadlock is permanent, starvation is temporary
    C. Starvation always leads to deadlock

D. Deadlock solved by scheduling

✅ **Answer: B**

---

30. **Which synchronization tool avoids busy waiting?**
    A. Spinlock
    B. Mutex
    C. Semaphore with blocking
    D. Test-and-set

✅ **Answer: C**

🧑‍💻 SESSION 10: VERSION CONTROL & GIT – MCQs (55)

🟢 EASY LEVEL (1–15)

1. **Why is version control used in team development?**
   A. To compile code
   B. To track and manage code changes
   C. To execute code
   D. To design UI

✅ **Answer: B**

---

2. **Main issue developers face without version control:**
   A. Faster coding
   B. Code conflicts
   C. Better collaboration

D. Easy debugging

✅ **Answer: B**

---

3. **Which is a version control system?**
   A. Maven
   B. Git
   C. Jenkins
   D. Docker

✅ **Answer: B**

---

4. **Git is a:**
   A. Centralized VCS
   B. Distributed VCS
   C. Cloud service
   D. IDE

✅ **Answer: B**

---

5. **Which command creates a new Git repository?**
   A. git clone
   B. git init
   C. git start
   D. git create

✅ **Answer: B**

---

6. **Which file tracks changes before commit?**
   A. Repository
   B. Staging area
   C. Branch
   D. Remote

✅ **Answer: B**

7. **Command to add file to staging area:**
   A. git push
   B. git commit
   C. git add
   D. git stage

✅ **Answer: C**

8. **Which command records changes in repository?**
   A. git add
   B. git save
   C. git commit
   D. git update

✅ **Answer: C**

9. **Which command shows status of files?**
   A. git log
   B. git diff
   C. git status
   D. git show

✅ **Answer: C**

10. **Which command lists commit history?**
    A. git history
    B. git log
    C. git show
    D. git list

✅ **Answer: B**

11. **Default branch name in modern Git is:**
    A. dev

B. master
C. main
D. trunk

✅ **Answer: C**

---

12. **Which command creates a new branch?**
    A. git new
    B. git checkout
    C. git branch
    D. git fork

✅ **Answer: C**

---

13. **Which command switches branch?**
    A. git move
    B. git checkout
    C. git change
    D. git branch

✅ **Answer: B**

---

14. **Which command merges branches?**
    A. git combine
    B. git join
    C. git merge
    D. git rebase

✅ **Answer: C**

---

15. **Which tool is also a version control system?**
    A. SVN
    B. Tomcat
    C. Eclipse
    D. Nginx

🟡 MEDIUM LEVEL (16–35)

16. **Which problem occurs when two developers modify same file?**
    A. Starvation
    B. Merge conflict
    C. Deadlock
    D. Thrashing

✅ **Answer: B**

---

17. **Which command shows difference between working tree and staging area?**
    A. git status
    B. git diff
    C. git log
    D. git show

✅ **Answer: B**

---

18. **Which command clones remote repository?**
    A. git fork
    B. git pull
    C. git clone
    D. git init

✅ **Answer: C**

---

19. **What is a commit in Git?**
    A. Backup of code
    B. Snapshot of project
    C. Merge of branches
    D. Push to remote

✅ **Answer: B**

20. **Which Git area holds committed changes?**
    A. Working directory
    B. Staging area
    C. Local repository
    D. Remote repository

✅ **Answer: C**

---

21. **Which command gets latest changes from remote?**
    A. git fetch
    B. git pull
    C. git clone
    D. Both A and B

✅ **Answer: D**

---

22. **Difference between git fetch and git pull:**
    A. Same
    B. Pull merges, fetch doesn't
    C. Fetch deletes commits
    D. Pull creates branch

✅ **Answer: B**

---

23. **Which command shows branch list?**
    A. git branch
    B. git show
    C. git status
    D. git log

✅ **Answer: A**

---

24. **Which command deletes a branch?**
    A. git remove

B. git branch -d
C. git delete
D. git drop

✅ **Answer: B**

---

25. **Which command creates and switches branch in one step?**
    A. git branch new
    B. git checkout new
    C. git checkout -b new
    D. git switch new

✅ **Answer: C**

---

26. **What does HEAD point to?**
    A. Repository
    B. Current branch/commit
    C. Remote repo
    D. Staging area

✅ **Answer: B**

---

27. **Which command shows changes between commits?**
    A. git diff
    B. git log
    C. git status
    D. git show

✅ **Answer: A**

---

28. **Which workflow uses feature branches?**
    A. Centralized workflow
    B. Feature branch workflow
    C. Forking workflow
    D. Trunk-based

✅ **Answer: B**

---

29. **Which file stores Git configuration globally?**
    A. .git/config
    B. ~/.gitconfig
    C. /etc/gitconfig
    D. Both B and C

✅ **Answer: D**

---

30. **Which command sets username globally?**

```
git config --global user.name "Amol"
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

31. **Which command shows staged changes only?**
    A. git diff
    B. git diff --staged
    C. git diff HEAD
    D. git status

✅ **Answer: B**

---

32. **Which Git object stores file contents?**
    A. Commit
    B. Tree
    C. Blob
    D. Tag

✅ **Answer: C**

---

33. **Which command reverts a commit safely?**
    A. git reset
    B. git revert
    C. git checkout
    D. git clean

✅ **Answer: B**

---

34. **Which command discards local changes?**
    A. git revert
    B. git reset --hard
    C. git stash
    D. git clean

✅ **Answer: B**

---

35. **Which Git command temporarily saves changes?**
    A. git save
    B. git stash
    C. git hold
    D. git temp

✅ **Answer: B**

🔴 HARD / TRICKY LEVEL (36–55)

36. **Merge conflict occurs when:**
    A. Two branches modify same line
    B. Branch deleted
    C. Commit missing
    D. Repo corrupted

✅ **Answer: A**

---

37. **Which merge creates extra commit?**
    A. Fast-forward
    B. Rebase
    C. Recursive
    D. No-fast-forward

✅ **Answer: D**

---

38. **Fast-forward merge occurs when:**
    A. Branch diverged
    B. No new commits on main branch
    C. Conflict exists
    D. HEAD detached

✅ **Answer: B**

---

39. **Which command aborts a merge?**
    A. git merge --stop
    B. git merge --abort
    C. git abort
    D. git reset

✅ **Answer: B**

---

40. **Rebase rewrites:**
    A. Working tree
    B. Commit history
    C. Remote repo
    D. Staging area

✅ **Answer: B**

---

41. **Which command moves HEAD to previous commit?**

```
git reset --soft HEAD~1
```

A. Removes commit only
B. Removes commit & changes
C. Deletes repo
D. Deletes branch

✅ **Answer: A**

---

42. **Detached HEAD means:**
    A. On a branch
    B. HEAD points to commit not branch
    C. Repo corrupted
    D. Merge failed

✅ **Answer: B**

---

43. **Which Git workflow is best for open-source projects?**
    A. Centralized
    B. Feature branch
    C. Forking workflow
    D. Trunk-based

✅ **Answer: C**

---

44. **Which command removes untracked files?**
    A. git reset
    B. git clean -f
    C. git stash
    D. git rm

✅ **Answer: B**

---

45. **Which command shows commit affecting a file?**
    A. git log file.txt
    B. git show file.txt
    C. git diff file.txt

D. git blame file.txt

✅ **Answer: D**

---

46. **Which object links commits together?**
    A. Tree
    B. Blob
    C. Hash
    D. Parent pointer

✅ **Answer: D**

---

47. **Git ensures data integrity using:**
    A. Encryption
    B. SHA-1 hash
    C. Compression
    D. Permissions

✅ **Answer: B**

---

48. **Which command pushes local commits?**
    A. git send
    B. git upload
    C. git push
    D. git share

✅ **Answer: C**

---

49. **Which command pulls specific branch?**

```
git pull origin dev
```

A. Correct
B. Wrong

✅ **Answer: A**

---

50. **Which command renames branch?**
    A. git branch -m new
    B. git rename
    C. git mv
    D. git change

✅ **Answer: A**

---

51. **Which command creates tag?**
    A. git label
    B. git tag
    C. git mark
    D. git release

✅ **Answer: B**

---

52. **Which command shows remote URLs?**
    A. git remote
    B. git remote -v
    C. git show
    D. git url

✅ **Answer: B**

---

53. **Git index refers to:**
    A. Local repo
    B. Staging area
    C. Remote repo
    D. Branch

✅ **Answer: B**

54. **Which command undoes staged file?**
    A. git reset file
    B. git revert file
    C. git checkout file
    D. git clean file

✅ **Answer: A**

---

55. **Which Git concept helps parallel development?**
    A. Commit
    B. Branch
    C. Tag
    D. Merge

✅ **Answer: B**

🧠 SESSIONS 12–15: SOFTWARE ENGINEERING – MCQs (60)

🟢 EASY LEVEL (1–20)

1. **Software Engineering is:**
    A. Writing code only
    B. Applying engineering principles to software development
    C. Testing software
    D. Debugging programs

✅ **Answer: B**

---

2. **Software product consists of:**
   A. Programs only
   B. Programs + documentation + data
   C. Hardware + software
   D. Source code only

✅ **Answer: B**

---

3. **SDLC stands for:**
   A. Software Design Life Cycle
   B. System Development Life Cycle
   C. Software Development Life Cycle
   D. Software Deployment Life Cycle

✅ **Answer: C**

---

4. **Which is the first phase of SDLC?**
   A. Design
   B. Coding
   C. Requirement analysis
   D. Testing

✅ **Answer: C**

---

5. **Which model follows linear sequential flow?**
   A. Spiral
   B. Agile
   C. Waterfall
   D. RAD

✅ **Answer: C**

---

6. **Which process model is risk-driven?**
   A. Waterfall
   B. Spiral
   C. Incremental

D. V-Model

✅ **Answer: B**

---

7. **Functional requirement describes:**
    A. How system performs
    B. What system should do
    C. Performance limits
    D. Security needs

✅ **Answer: B**

---

8. **Non-functional requirements include:**
    A. Login feature
    B. Report generation
    C. Performance, security
    D. CRUD operations

✅ **Answer: C**

---

9. **SRS stands for:**
    A. Software Requirement Specification
    B. System Requirement Software
    C. Software Resource Sheet
    D. System Requirement Structure

✅ **Answer: A**

---

10. **Which UML diagram shows system functionality?**
    A. Class diagram
    B. Sequence diagram
    C. Use case diagram
    D. Activity diagram

✅ **Answer: C**

11. **Design phase focuses on:**
    A. What to build
    B. How to build
    C. Testing
    D. Deployment

✅ **Answer: B**

12. **Good software design should be:**
    A. Complex
    B. Highly coupled
    C. Simple and understandable
    D. Large

✅ **Answer: C**

13. **Cohesion refers to:**
    A. Inter-module dependency
    B. Intra-module strength
    C. Number of classes
    D. Inheritance

✅ **Answer: B**

14. **Coupling refers to:**
    A. Relationship inside module
    B. Dependency between modules
    C. Code reuse
    D. Abstraction

✅ **Answer: B**

15. **High cohesion and low coupling is:**
    A. Bad design

B. Average design
C. Good design
D. Complex design

✅ **Answer: C**

---

16. **Which is function-oriented design technique?**
    A. UML
    B. DFD
    C. Class diagram
    D. Sequence diagram

✅ **Answer: B**

---

17. **Object-Oriented design focuses on:**
    A. Functions
    B. Data flow
    C. Objects and classes
    D. Algorithms only

✅ **Answer: C**

---

18. **Which UML diagram shows object interaction over time?**
    A. Use case
    B. Class
    C. Sequence
    D. State

✅ **Answer: C**

---

19. **Coding conventions improve:**
    A. Compilation speed
    B. Code readability
    C. Execution time
    D. Memory usage

✅ **Answer: B**

---

20. **Which is an OOP principle?**
    A. Compilation
    B. Inheritance
    C. Linking
    D. Scheduling

✅ **Answer: B**

🟡 **MEDIUM LEVEL (21–40)**

21. **Which SDLC model allows early delivery of software?**
    A. Waterfall
    B. Incremental
    C. V-Model
    D. Big Bang

✅ **Answer: B**

---

22. **Agile model emphasizes:**
    A. Heavy documentation
    B. Customer collaboration
    C. Strict planning
    D. Fixed requirements

✅ **Answer: B**

---

23. **Which requirement defines response time?**
    A. Functional
    B. Non-functional
    C. User
    D. Business

✅ **Answer: B**

24. **Requirement elicitation involves:**
    A. Coding
    B. Testing
    C. Gathering requirements
    D. Deployment

✅ **Answer: C**

25. **Which is NOT a requirement engineering step?**
    A. Elicitation
    B. Analysis
    C. Validation
    D. Coding

✅ **Answer: D**

26. **DFD represents:**
    A. Data flow
    B. Control flow
    C. Object flow
    D. Message flow

✅ **Answer: A**

27. **Which design principle divides system into layers?**
    A. Modularity
    B. Layering
    C. Abstraction
    D. Inheritance

✅ **Answer: B**

28. **Low coupling improves:**
    A. Complexity

B. Maintenance
C. Cost
D. Size

✅ **Answer: B**

---

29. **Which UML diagram shows system states?**
    A. Activity
    B. Class
    C. State diagram
    D. Use case

✅ **Answer: C**

---

30. **Class diagram represents:**
    A. Behavior
    B. Static structure
    C. Execution flow
    D. Use cases

✅ **Answer: B**

---

31. **Which model validates each SDLC phase?**
    A. Spiral
    B. Agile
    C. V-Model
    D. Prototype

✅ **Answer: C**

---

32. **Which design model shows data hierarchy?**
    A. ER diagram
    B. Structure chart
    C. Use case
    D. Sequence

✅ **Answer: B**

---

33. **Which metric measures module independence?**
    A. Coupling
    B. Cohesion
    C. Size
    D. LOC

✅ **Answer: A**

---

34. **Which principle hides internal details?**
    A. Abstraction
    B. Polymorphism
    C. Inheritance
    D. Encapsulation

✅ **Answer: D**

---

35. **Which is NOT UML diagram?**
    A. Class
    B. Sequence
    C. Flowchart
    D. Activity

✅ **Answer: C**

---

36. **OOAD stands for:**
    A. Object Oriented Analysis & Design
    B. Operational Object Analysis Design
    C. Object Oriented Architecture Design
    D. Open Object Analysis Design

✅ **Answer: A**

---

37. **Which principle encourages code reuse?**
     A. Inheritance
     B. Coupling
     C. Cohesion
     D. Layering

✅ **Answer: A**

---

38. **Coding standards mainly help in:**
     A. Faster execution
     B. Team collaboration
     C. Memory optimization
     D. Debugging hardware

✅ **Answer: B**

---

39. **Which diagram models workflow?**
     A. Class
     B. Use case
     C. Activity
     D. State

✅ **Answer: C**

---

40. **Which requirement is validated by users?**
     A. Functional
     B. Technical
     C. System
     D. User requirement

✅ **Answer: D**

🔴 HARD / TRICKY LEVEL (41–60)

41. **Which SDLC model is best when requirements are unclear?**
    A. Waterfall
    B. Prototype
    C. V-Model
    D. Big Bang

✅ **Answer: B**

---

42. **High cohesion implies:**
    A. Many responsibilities
    B. Single well-defined purpose
    C. Tight coupling
    D. Complex design

✅ **Answer: B**

---

43. **Which UML diagram is dynamic?**
    A. Class
    B. Object
    C. Sequence
    D. Package

✅ **Answer: C**

---

44. **Function-oriented design suffers from:**
    A. Poor abstraction
    B. Data hiding
    C. Reusability
    D. Encapsulation

✅ **Answer: A**

---

45. **Which metric indicates design quality?**
    A. LOC
    B. Cohesion & Coupling
    C. Compilation time

D. CPU usage

✅ **Answer: B**

---

46. **Agile discourages:**
    A. Iterative development
    B. Customer feedback
    C. Heavy documentation
    D. Frequent releases

✅ **Answer: C**

---

47. **Which principle reduces impact of change?**
    A. Low cohesion
    B. High coupling
    C. Low coupling
    D. No abstraction

✅ **Answer: C**

---

48. **Which model combines iterative & waterfall?**
    A. Agile
    B. Spiral
    C. V-Model
    D. RAD

✅ **Answer: B**

---

49. **Design models are created during:**
    A. Coding
    B. Requirement phase
    C. Design phase
    D. Testing

✅ **Answer: C**

50. **Which UML diagram shows object collaboration?**
   A. Sequence
   B. Communication
   C. Class
   D. Package

✅ **Answer: B**

51. **Which is NOT an OOP concept?**
   A. Encapsulation
   B. Polymorphism
   C. Modularity
   D. Scheduling

✅ **Answer: D**

52. **Requirement validation ensures:**
   A. Correct design
   B. Correct code
   C. Right product is built
   D. Fast execution

✅ **Answer: C**

53. **Which coding principle improves maintainability?**
   A. Hard coding
   B. Proper naming
   C. Global variables
   D. Complex logic

✅ **Answer: B**

54. **Which model gives early user feedback?**
   A. Waterfall

B. Prototype

C. V-Model

D. Big Bang

✅ **Answer: B**

---

55. **Which diagram shows class relationships?**
    A. Activity
    B. Use case
    C. Class
    D. State

✅ **Answer: C**

---

56. **OOAD mainly improves:**
    A. Hardware speed
    B. Software scalability & reuse
    C. Network performance
    D. Compilation time

✅ **Answer: B**

---

57. **Layered architecture improves:**
    A. Complexity
    B. Maintainability
    C. Tight coupling
    D. Execution speed

✅ **Answer: B**

---

58. **Which requirement is hardest to validate?**
    A. Functional
    B. Performance
    C. Security
    D. User interface

✅ **Answer: C**

---

59. **Which design approach focuses on top-down decomposition?**
    A. OO design
    B. Function-oriented design
    C. Agile
    D. RAD

✅ **Answer: B**

---

60. **Main goal of software engineering is:**
    A. Write maximum code
    B. Build reliable, maintainable software
    C. Reduce testing
    D. Increase complexity

✅ **Answer: B**

🧠 SESSIONS 16–18: AGILE, SCRUM, XP & JIRA – MCQs (75)

🟢 EASY LEVEL (1–25)

1. **Agile development focuses on:**
    A. Heavy documentation
    B. Fixed requirements
    C. Iterative and incremental development
    D. Linear process

✅ **Answer: C**

2. **Which is a core value of Agile manifesto?**
   A. Processes over people
   B. Working software over documentation
   C. Contract negotiation over collaboration
   D. Tools over individuals

✅ **Answer: B**

3. **Agile breaks development into:**
   A. Phases
   B. Iterations / sprints
   C. Modules
   D. Versions

✅ **Answer: B**

4. **Sprint duration is usually:**
   A. 1 day
   B. 1–4 weeks
   C. 6 months
   D. 1 year

✅ **Answer: B**

5. **Scrum is a:**
   A. Tool
   B. Programming language
   C. Agile framework
   D. Database

✅ **Answer: C**

6. **Which role represents customer in Scrum?**
   A. Scrum Master

B. Developer

C. Product Owner

D. Tester

✅ **Answer: C**

---

7. **Which document contains user stories?**
   A. Sprint backlog
   B. Product backlog
   C. Burndown chart
   D. Release plan

✅ **Answer: B**

---

8. **Daily Scrum duration is:**
   A. 5 minutes
   B. 15 minutes
   C. 30 minutes
   D. 1 hour

✅ **Answer: B**

---

9. **Extreme Programming (XP) emphasizes:**
   A. Documentation
   B. Pair programming
   C. Fixed design
   D. Big releases

✅ **Answer: B**

---

10. **Which is an Agile benefit?**
    A. Late testing
    B. Early customer feedback
    C. No planning
    D. No testing

✅ **Answer: B**

---

11. **Jira is primarily used for:**
    A. Coding
    B. Testing only
    C. Project & issue tracking
    D. Deployment

✅ **Answer: C**

---

12. **In Jira, a task is:**
    A. Sprint
    B. Issue
    C. Backlog
    D. Project

✅ **Answer: B**

---

13. **Which Jira entity groups issues?**
    A. Sprint
    B. Task
    C. Project
    D. Sub-task

✅ **Answer: C**

---

14. **Which Agile tool supports CI/CD?**
    A. Jira
    B. Jenkins
    C. Confluence
    D. Trello

✅ **Answer: B**

15. **Agile welcomes:**
    A. No changes
    B. Late requirement changes
    C. Fixed scope
    D. No feedback

✅ **Answer: B**

---

16. **User story format is:**
    A. As a user, I want, so that
    B. If–else
    C. Given–when–then
    D. Input–output

✅ **Answer: A**

---

17. **Sprint backlog is created during:**
    A. Sprint review
    B. Sprint planning
    C. Daily scrum
    D. Retrospective

✅ **Answer: B**

---

18. **Which is NOT a Scrum role?**
    A. Product Owner
    B. Scrum Master
    C. Project Manager
    D. Development Team

✅ **Answer: C**

---

19. **Scrum Master's role is to:**
    A. Assign tasks
    B. Remove impediments
    C. Write code

D. Approve budget

✅ **Answer: B**

---

20. **Agile development prefers:**
    A. Big releases
    B. Frequent small releases
    C. No releases
    D. One-time release

✅ **Answer: B**

---

21. **XP discourages:**
    A. Testing
    B. Refactoring
    C. Big upfront design
    D. Pair programming

✅ **Answer: C**

---

22. **Which ceremony reviews completed work?**
    A. Sprint planning
    B. Daily scrum
    C. Sprint review
    D. Retrospective

✅ **Answer: C**

---

23. **Which Agile artifact shows remaining work?**
    A. Gantt chart
    B. Burndown chart
    C. PERT chart
    D. Flowchart

✅ **Answer: B**

24. **Which tool is used for Agile documentation?**
    A. Git
    B. Jira
    C. Confluence
    D. Docker

✅ **Answer: C**

---

25. **Agile is best suited when:**
    A. Requirements are fixed
    B. Requirements change frequently
    C. No customer available
    D. Large documentation needed

✅ **Answer: B**

🟡 MEDIUM LEVEL (26–50)

26. **Difference between Agile and Waterfall:**
    A. Agile is linear
    B. Agile allows iteration
    C. Waterfall allows change anytime
    D. Both same

✅ **Answer: B**

---

27. **Scrum follows which principle?**
    A. Predictive
    B. Adaptive
    C. Sequential
    D. Rigid

✅ **Answer: B**

28. **Product backlog is owned by:**
    A. Scrum Master
    B. Developer
    C. Product Owner
    D. Client

✅ **Answer: C**

---

29. **Which XP practice improves code quality?**
    A. Refactoring
    B. Big design
    C. Late testing
    D. No documentation

✅ **Answer: A**

---

30. **Velocity in Scrum measures:**
    A. Team speed
    B. Story points completed per sprint
    C. Coding speed
    D. Bugs fixed

✅ **Answer: B**

---

31. **Sprint retrospective focuses on:**
    A. Product
    B. Process improvement
    C. New requirements
    D. Coding

✅ **Answer: B**

---

32. **Which Jira issue type breaks task into smaller units?**
    A. Bug
    B. Story
    C. Sub-task

D. Epic

✅ **Answer: C**

---

33. **Epic in Jira is:**
    A. Small task
    B. Bug
    C. Large user story
    D. Sprint

✅ **Answer: C**

---

34. **Which Agile tool visualizes workflow?**
    A. Jira Kanban board
    B. Jenkins
    C. Git
    D. Maven

✅ **Answer: A**

---

35. **Kanban differs from Scrum by:**
    A. No iterations
    B. Fixed sprint length
    C. Roles mandatory
    D. No visual board

✅ **Answer: A**

---

36. **Which XP practice involves customer continuously?**
    A. Continuous integration
    B. On-site customer
    C. Pair programming
    D. Refactoring

✅ **Answer: B**

37. **Definition of Done ensures:**
   A. Task started
   B. Task planned
   C. Task completed with quality
   D. Task assigned

✅ **Answer: C**

38. **Agile estimation uses:**
   A. Hours only
   B. Lines of code
   C. Story points
   D. Pages

✅ **Answer: C**

39. **Sprint review outcome is:**
   A. Process improvement
   B. Product increment feedback
   C. New sprint plan
   D. Velocity calculation

✅ **Answer: B**

40. **Which Jira feature helps prioritize tasks?**
   A. Labels
   B. Priority field
   C. Comments
   D. Attachments

✅ **Answer: B**

41. **Agile testing happens:**
   A. After development

B. Before development
C. Along with development
D. Only at end

✅ **Answer: C**

---

42. **Which Agile principle focuses on customer satisfaction?**
    A. Early delivery
    B. Documentation
    C. Fixed scope
    D. Strict control

✅ **Answer: A**

---

43. **Scrum recommends team size of:**
    A. 2–3
    B. 3–9
    C. 10–20
    D. Unlimited

✅ **Answer: B**

---

44. **Jira sprint cannot start without:**
    A. Tasks
    B. Backlog
    C. Project
    D. Users

✅ **Answer: A**

---

45. **Which report shows sprint progress?**
    A. Velocity chart
    B. Burndown chart
    C. Pie chart
    D. Histogram

✅ **Answer: B**

---

46. **Which Agile tool manages source code?**
    A. Jira
    B. Git
    C. Confluence
    D. Jenkins

✅ **Answer: B**

---

47. **Extreme Programming promotes:**
    A. Long cycles
    B. Continuous feedback
    C. No testing
    D. Heavy documentation

✅ **Answer: B**

---

48. **Backlog refinement involves:**
    A. Coding
    B. Prioritizing & estimating stories
    C. Testing
    D. Deployment

✅ **Answer: B**

---

49. **Agile discourages:**
    A. Adaptability
    B. Customer collaboration
    C. Big upfront planning
    D. Iterations

✅ **Answer: C**

---

50. **Jira workflow represents:**
    A. Code flow
    B. Issue life cycle
    C. User flow
    D. Data flow

✅ **Answer: B**

🔴 HARD / TRICKY LEVEL (51–75)

51. **Agile does NOT eliminate planning, it promotes:**
    A. No planning
    B. Continuous planning
    C. Fixed planning
    D. Centralized planning

✅ **Answer: B**

---

52. **Scrum does not define:**
    A. Roles
    B. Artifacts
    C. Engineering practices
    D. Events

✅ **Answer: C**

---

53. **XP complements Scrum by providing:**
    A. Project management
    B. Engineering practices
    C. Documentation standards
    D. Risk analysis

✅ **Answer: B**

54. **Agile scaling becomes difficult when:**
    A. Small teams
    B. Large distributed teams
    C. Clear communication
    D. Automation exists

✅ **Answer: B**

---

55. **Which is NOT an Agile tool?**
    A. Jira
    B. Trello
    C. Jenkins
    D. Oracle

✅ **Answer: D**

---

56. **Sprint backlog changes during sprint:**
    A. Not allowed
    B. Allowed but controlled
    C. Always fixed
    D. Only by manager

✅ **Answer: B**

---

57. **Who decides sprint scope?**
    A. Product Owner alone
    B. Scrum Master
    C. Development Team
    D. Client

✅ **Answer: C**

---

58. **Agile success heavily depends on:**
    A. Tools
    B. Processes
    C. Team collaboration

D. Documentation

✅ **Answer: C**

---

59. **Jira sub-task cannot exist without:**
    A. Sprint
    B. Project
    C. Parent issue
    D. User

✅ **Answer: C**

---

60. **Which practice reduces integration issues?**
    A. Pair programming
    B. Continuous integration
    C. Refactoring
    D. Planning poker

✅ **Answer: B**

---

61. **Agile metrics should be used to:**
    A. Punish teams
    B. Improve processes
    C. Compare teams
    D. Fix scope

✅ **Answer: B**

---

62. **Which ceremony inspects and adapts process?**
    A. Sprint planning
    B. Daily scrum
    C. Sprint retrospective
    D. Sprint review

✅ **Answer: C**

63. **Agile prefers responding to change over:**
    A. Documentation
    B. Following a plan
    C. Customer collaboration
    D. Individuals

✅ **Answer: B**

64. **Case study: changing UI after sprint review shows:**
    A. Poor planning
    B. Agile adaptability
    C. Project failure
    D. Scope creep

✅ **Answer: B**

65. **Agile reduces risk by:**
    A. Long cycles
    B. Early and frequent delivery
    C. Heavy documentation
    D. Fixed scope

✅ **Answer: B**

66. **Scrum Master is NOT responsible for:**
    A. Removing blockers
    B. Coaching team
    C. Assigning tasks
    D. Ensuring Scrum process

✅ **Answer: C**

67. **Which Jira feature supports Agile reporting?**
    A. Dashboards

B. Comments
C. Attachments
D. Labels

✅ **Answer: A**

---

68. **Agile encourages face-to-face communication because:**
    A. Faster and clearer
    B. Cheaper
    C. Less documentation
    D. No emails

✅ **Answer: A**

---

69. **XP testing philosophy is:**
    A. Test after coding
    B. Test before coding (TDD)
    C. No testing
    D. Manual testing only

✅ **Answer: B**

---

70. **Agile delivery focuses on:**
    A. Milestones
    B. Features that add business value
    C. Technical tasks
    D. Documentation

✅ **Answer: B**

---

71. **Which Jira board supports continuous flow?**
    A. Scrum board
    B. Kanban board
    C. Task board
    D. Issue board

✅ **Answer: B**

---

72. **Agile manifesto has:**
   A. 4 values & 12 principles
   B. 12 values & 4 principles
   C. 10 rules
   D. 6 stages

✅ **Answer: A**

---

73. **Agile fails when:**
   A. Customer involved
   B. Team self-organized
   C. Management forces rigid control
   D. Automation used

✅ **Answer: C**

---

74. **Which case study best suits Agile?**
   A. Banking core system
   B. Web application with evolving UI
   C. Satellite software
   D. Nuclear system

✅ **Answer: B**

---

75. **Main goal of Agile methodology is:**
   A. Deliver fast code
   B. Maximize documentation
   C. Deliver customer value continuously
   D. Reduce team size

✅ **Answer: C**

🧠 SESSIONS 19 & 20: DEVOPS & DOCKER – MCQs (45)

🟢 EASY LEVEL (1–15)

1. **DevOps is a combination of:**
   A. Development & Deployment
   B. Development & Operations
   C. Design & Operations
   D. Development & Optimization

✅ **Answer: B**

---

2. **Main goal of DevOps is to:**
   A. Increase documentation
   B. Reduce collaboration
   C. Deliver software faster and reliably
   D. Eliminate testing

✅ **Answer: C**

---

3. **Which is NOT a DevOps phase?**
   A. Plan
   B. Develop
   C. Compile
   D. Deploy

✅ **Answer: C**

---

4. **DevOps encourages:**
   A. Siloed teams

B. Collaboration

C. Manual deployment

D. Delayed feedback

✅ **Answer: B**

---

5. **Containerization means:**
   A. Virtualizing hardware
   B. Packaging application with dependencies
   C. Creating virtual machines
   D. Running OS only

✅ **Answer: B**

---

6. **Docker is a:**
   A. Programming language
   B. Container platform
   C. Database
   D. OS

✅ **Answer: B**

---

7. **Which file is used to create Docker image?**
   A. docker.xml
   B. Docker.config
   C. Dockerfile
   D. docker-compose.yml

✅ **Answer: C**

---

8. **Which command checks Docker version?**
   A. docker info
   B. docker status
   C. docker version
   D. docker check

✅ **Answer: C**

---

9. **Docker image is:**
   A. Running container
   B. Template for container
   C. Virtual machine
   D. OS kernel

✅ **Answer: B**

---

10. **Docker container is:**
    A. Static file
    B. Running instance of image
    C. Backup
    D. Image repository

✅ **Answer: B**

---

11. **Which command lists Docker images?**
    A. docker ps
    B. docker images
    C. docker list
    D. docker show

✅ **Answer: B**

---

12. **Which command lists running containers?**
    A. docker images
    B. docker ps
    C. docker list
    D. docker run

✅ **Answer: B**

---

13. **Which command starts a container?**
   A. docker begin
   B. docker start
   C. docker init
   D. docker up

✅ **Answer: B**

---

14. **Which command stops a container?**
   A. docker halt
   B. docker kill
   C. docker stop
   D. docker end

✅ **Answer: C**

---

15. **Which command removes a container?**
   A. docker rm
   B. docker delete
   C. docker remove
   D. docker clean

✅ **Answer: A**

🟡 MEDIUM LEVEL (16–30)

16. **DevOps lifecycle includes:**
   A. Plan, Code, Build, Test, Release, Deploy, Operate, Monitor
   B. Only development
   C. Only operations
   D. Coding & testing

✅ **Answer: A**

---

17. **Which tool is used for CI in DevOps?**
    A. Docker
    B. Git
    C. Jenkins
    D. Ansible

✅ **Answer: C**

---

18. **Difference between VM and container:**
    A. Containers include full OS
    B. Containers share host OS kernel
    C. VMs are faster
    D. Containers need hypervisor

✅ **Answer: B**

---

19. **Which Docker command creates and runs container?**

```
docker run nginx
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

20. **Dockerfile instruction to copy files:**
    A. MOVE
    B. ADD / COPY
    C. PASTE
    D. TRANSFER

✅ **Answer: B**

---

21. **Which Dockerfile instruction sets base image?**
    A. RUN

B. CMD
C. FROM
D. ENTRYPOINT

✅ **Answer: C**

---

22. **Which command builds Docker image?**

```
docker build -t myapp .
```

A. Correct
B. Wrong

✅ **Answer: A**

---

23. **Which Dockerfile instruction runs during build time?**
    A. CMD
    B. ENTRYPOINT
    C. RUN
    D. EXPOSE

✅ **Answer: C**

---

24. **Which Dockerfile instruction runs when container starts?**
    A. RUN
    B. CMD
    C. FROM
    D. COPY

✅ **Answer: B**

---

25. **Which Docker command attaches terminal to container?**
    A. docker attach
    B. docker exec
    C. docker connect

D. docker join

✅ **Answer: B**

---

26. **Which command copies files to container?**

```
docker cp index.html container:/usr/share/nginx/html
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

27. **Which Docker command removes image?**
    A. docker rm
    B. docker delete
    C. docker rmi
    D. docker clean

✅ **Answer: C**

---

28. **Docker container lifecycle starts with:**
    A. Build
    B. Pull
    C. Create
    D. Run

✅ **Answer: C**

---

29. **Which command shows all containers (stopped + running)?**
    A. docker ps
    B. docker ps -a
    C. docker list
    D. docker images

✅ **Answer: B**

---

30. **Which Docker component stores images?**
    A. Container
    B. Docker Hub / Registry
    C. Kernel
    D. Volume

✅ **Answer: B**

🔴 HARD / TRICKY LEVEL (31–45)

31. **DevOps reduces failure rate by:**
    A. Longer cycles
    B. Automation & monitoring
    C. Manual testing
    D. No deployment

✅ **Answer: B**

---

32. **Docker uses which OS feature?**
    A. Hypervisor
    B. Namespaces & cgroups
    C. BIOS
    D. Virtual memory

✅ **Answer: B**

---

33. **Which Dockerfile instruction defines default executable?**
    A. CMD
    B. RUN
    C. COPY
    D. FROM

✅ **Answer: A**

34. **Difference between CMD and ENTRYPOINT:**
    A. Same
    B. ENTRYPOINT cannot be overridden easily
    C. CMD runs at build time
    D. ENTRYPOINT copies files

✅ **Answer: B**

---

35. **Which command runs container in detached mode?**

```
docker run -d nginx
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

36. **Which Docker command logs container output?**
    A. docker show
    B. docker logs
    C. docker output
    D. docker status

✅ **Answer: B**

---

37. **Container stops when:**
    A. Host stops
    B. Main process exits
    C. Image removed
    D. Network fails

✅ **Answer: B**

38. **Which Docker command executes command inside running container?**

```
docker exec -it container bash
```

A. Correct
B. Wrong

✅ **Answer: A**

---

39. **Docker images are built using:**
    A. Layers
    B. Threads
    C. Processes
    D. Virtual disks

✅ **Answer: A**

---

40. **Which instruction exposes port in Dockerfile?**
    A. PORT
    B. EXPOSE
    C. OPEN
    D. MAP

✅ **Answer: B**

---

41. **DevOps promotes infrastructure as:**
    A. Hardware
    B. Code
    C. Software only
    D. Manual scripts

✅ **Answer: B**

---

42. **Which Docker command stops and removes container?**
    A. docker stop + docker rm

B. docker kill
C. docker clean
D. docker rmi

✅ **Answer: A**

---

43. **Which phase ensures feedback in DevOps?**
    A. Plan
    B. Monitor
    C. Build
    D. Deploy

✅ **Answer: B**

---

44. **Which Docker command pulls image from registry?**
    A. docker fetch
    B. docker pull
    C. docker clone
    D. docker get

✅ **Answer: B**

---

45. **Main advantage of Docker over VM:**
    A. More memory usage
    B. Faster startup & lightweight
    C. Full OS isolation
    D. Slower deployment

✅ **Answer: B**

🧠 SESSION 21: YAML, DOCKER SWARM & KUBERNETES – MCQs (45)

🟢 EASY LEVEL (1–15)

1. **YAML stands for:**
   A. Yet Another Markup Language
   B. Yet Another Modeling Language
   C. Your Application Modeling Language
   D. Yaml Ain't Markup Language

✅ **Answer: D**

---

2. **YAML is mainly used for:**
   A. Programming
   B. Configuration files
   C. Database queries
   D. Compiling code

✅ **Answer: B**

---

3. **Which symbol is used for comments in YAML?**
   A. //
   B. <!-- -->
   C. #
   D. /* */

✅ **Answer: C**

---

4. **Which indentation is used in YAML?**
   A. Tabs only
   B. Spaces only
   C. Tabs & spaces
   D. No indentation

✅ **Answer: B**

---

5. **Docker Swarm is used for:**
   A. Image creation
   B. Container orchestration
   C. Container build
   D. Image registry

✅ **Answer: B**

---

6. **Which command initializes Docker Swarm?**
   A. docker swarm start
   B. docker swarm init
   C. docker init swarm
   D. docker start swarm

✅ **Answer: B**

---

7. **Docker Stack is used to deploy:**
   A. Single container
   B. Multiple services
   C. Images only
   D. Networks only

✅ **Answer: B**

---

8. **Kubernetes is a:**
   A. Container runtime
   B. Container orchestration platform
   C. Programming language
   D. CI tool

✅ **Answer: B**

---

9. **Which command checks Kubernetes cluster info?**
   A. kubectl status
   B. kubectl cluster-info
   C. kubectl info
   D. kubectl get cluster

✅ **Answer: B**

---

10. **Which file format is commonly used in Kubernetes?**
    A. XML
    B. JSON
    C. YAML
    D. TXT

✅ **Answer: C**

---

11. **Kubernetes cluster consists of:**
    A. Only master
    B. Only worker nodes
    C. Master & worker nodes
    D. Containers only

✅ **Answer: C**

---

12. **Which component schedules pods?**
    A. kubelet
    B. kube-proxy
    C. kube-scheduler
    D. etcd

✅ **Answer: C**

---

13. **Which is the smallest deployable unit in Kubernetes?**
    A. Container
    B. Pod
    C. Node

D. Service

✅ **Answer: B**

---

14. **Which command lists pods?**
    A. kubectl show pods
    B. kubectl get pods
    C. kubectl list pods
    D. kubectl describe pods

✅ **Answer: B**

---

15. **Kubernetes Dashboard is used for:**
    A. CLI access
    B. Monitoring & managing cluster via UI
    C. Building images
    D. CI/CD

✅ **Answer: B**

🟡 MEDIUM LEVEL (16–30)

16. **YAML uses key-value pairs separated by:**
    A. =
    B. :
    C. ->
    D. ::

✅ **Answer: B**

---

17. **Which is valid YAML list syntax?**

```
ports:
  - 80
```

```
   - 443
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

18. **Docker Swarm manager node is responsible for:**
    A. Running containers only
    B. Scheduling and orchestration
    C. Image building
    D. Networking only

✅ **Answer: B**

---

19. **Which command deploys stack in Docker Swarm?**

```
docker stack deploy -c docker-compose.yml mystack
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

20. **Kubernetes configuration is stored in:**
    A. kube.yaml
    B. etcd
    C. docker config
    D. registry

✅ **Answer: B**

---

21. **Which command creates resource from YAML?**
    A. kubectl run
    B. kubectl create -f file.yaml

C. kubectl deploy
D. kubectl build

✅ **Answer: B**

---

22. **Difference between Pod and Container:**
    A. Same
    B. Pod can contain multiple containers
    C. Container contains pod
    D. Pod runs on host OS

✅ **Answer: B**

---

23. **Which Kubernetes object exposes application?**
    A. Pod
    B. Node
    C. Service
    D. Volume

✅ **Answer: C**

---

24. **Which service type exposes app externally?**
    A. ClusterIP
    B. NodePort
    C. Headless
    D. Internal

✅ **Answer: B**

---

25. **Which command describes pod details?**
    A. kubectl logs
    B. kubectl get pod
    C. kubectl describe pod
    D. kubectl exec

✅ **Answer: C**

---

26. **Which Kubernetes component runs on every node?**
    A. API server
    B. etcd
    C. kubelet
    D. scheduler

✅ **Answer: C**

---

27. **Which YAML field defines container image?**

```
spec:
  containers:
  - name: app
    image: nginx
```

A. Correct
B. Wrong

✅ **Answer: A**

---

28. **Kubernetes Dashboard requires:**
    A. SSH
    B. Token / authentication
    C. Docker login
    D. GitHub access

✅ **Answer: B**

---

29. **Which command accesses Kubernetes Dashboard?**
    A. kubectl open dashboard
    B. kubectl proxy
    C. kubectl dashboard
    D. kubectl ui

✅ **Answer: B**

---

30. **Which tool manages Kubernetes via CLI?**
    A. docker
    B. kubectl
    C. helm
    D. swarm

✅ **Answer: B**

🔴 HARD / TRICKY LEVEL (31–45)

31. **YAML is indentation-sensitive because:**
    A. Faster parsing
    B. Replaces brackets
    C. Improves readability
    D. Mandatory syntax

✅ **Answer: B**

---

32. **Incorrect YAML indentation leads to:**
    A. Warning only
    B. Runtime error
    C. Parsing error
    D. Ignored config

✅ **Answer: C**

---

33. **Docker Swarm service ensures:**
    A. One container only
    B. Desired state of replicas
    C. Manual scaling
    D. No fault tolerance

✅ **Answer: B**

34. **Kubernetes automatically restarts pods using:**
    A. kube-proxy
    B. Controller manager
    C. etcd
    D. kubelet only

✅ **Answer: B**

35. **Which Kubernetes object manages pod replicas?**
    A. Pod
    B. Service
    C. Deployment
    D. Namespace

✅ **Answer: C**

36. **Scaling pods is achieved by:**

```
kubectl scale deployment app --replicas=3
```

A. Correct
 B. Wrong

✅ **Answer: A**

37. **Difference between Swarm and Kubernetes:**
    A. Both same
    B. Kubernetes is more feature-rich
    C. Swarm is complex
    D. Kubernetes is simpler

✅ **Answer: B**

38. **Kubernetes uses declarative approach meaning:**
    A. Manual commands
    B. Define desired state
    C. Sequential execution
    D. No YAML

✅ **Answer: B**

---

39. **Which Kubernetes object provides load balancing?**
    A. Pod
    B. Node
    C. Service
    D. ConfigMap

✅ **Answer: C**

---

40. **Dashboard deployment creates resources in:**
    A. default namespace
    B. kube-system namespace
    C. app namespace
    D. user namespace

✅ **Answer: B**

---

41. **Which command shows all services?**
    A. kubectl get svc
    B. kubectl list services
    C. kubectl show svc
    D. kubectl describe svc

✅ **Answer: A**

42. **YAML supports multiple documents separated by:**
    A. ---
    B. ===
    C. ###
    D. :::

✅ **Answer: A**

43. **Which Kubernetes feature provides self-healing?**
    A. Docker
    B. Pod replication
    C. CI/CD
    D. Volumes

✅ **Answer: B**

44. **Which component acts as Kubernetes entry point?**
    A. kubelet
    B. kube-proxy
    C. API Server
    D. etcd

✅ **Answer: C**

45. **Best use case for Kubernetes:**
    A. Single container app
    B. Large-scale microservices deployment
    C. Desktop application
    D. Static website only

✅ **Answer: B**

🧪 SESSION 22: SOFTWARE TESTING – MCQs (45)

🟢 EASY LEVEL (1–15)

1. **Software testing is the process of:**
   A. Writing code
   B. Finding and fixing bugs
   C. Executing software to find defects
   D. Deploying software

✅ **Answer: C**

---

2. **Main objective of software testing is to:**
   A. Prove software is bug-free
   B. Improve code speed
   C. Identify defects
   D. Reduce documentation

✅ **Answer: C**

---

3. **Why is testing important?**
   A. Increases coding time
   B. Ensures quality and reliability
   C. Removes need of developers
   D. Avoids deployment

✅ **Answer: B**

---

4. **Verification means:**
   A. Are we building the right product?
   B. Are we building the product right?

C. Is software bug-free?
D. Is testing complete?

✅ **Answer: B**

---

5. **Validation means:**
   A. Checking design documents
   B. Static testing
   C. Are we building the right product?
   D. Code review

✅ **Answer: C**

---

6. **Which activity comes under Verification?**
   A. Testing
   B. Code execution
   C. Reviews & inspections
   D. Debugging

✅ **Answer: C**

---

7. **Which activity comes under Validation?**
   A. Requirement review
   B. Code review
   C. Executing test cases
   D. Design inspection

✅ **Answer: C**

---

8. **Quality Assurance focuses on:**
   A. Product
   B. Process
   C. Defects
   D. Code

✅ **Answer: B**

---

9. **Quality Control focuses on:**
   A. Process improvement
   B. Preventing defects
   C. Identifying defects in product
   D. Planning

✅ **Answer: C**

---

10. **Testing is a part of:**
    A. QA
    B. QC
    C. Management
    D. Development only

✅ **Answer: B**

---

11. **Which of the following is a testing principle?**
    A. Testing guarantees zero defects
    B. Early testing saves cost
    C. More testing means no bugs
    D. Testing replaces development

✅ **Answer: B**

---

12. **Exhaustive testing means:**
    A. Testing all combinations
    B. Testing is impossible
    C. Testing main paths only
    D. Skipping testing

✅ **Answer: A**

13. **Which principle says defects cluster together?**
    A. Pesticide paradox
    B. Defect clustering
    C. Error guessing
    D. Pareto principle

✅ **Answer: B**

---

14. **Testing should start:**
    A. After coding
    B. After deployment
    C. As early as possible
    D. After integration

✅ **Answer: C**

---

15. **Who performs testing?**
    A. Only testers
    B. Only developers
    C. Developers and testers
    D. Managers

✅ **Answer: C**

🟡 MEDIUM LEVEL (16–30)

16. **Difference between QA and QC:**
    A. Both are same
    B. QA is process-oriented, QC is product-oriented
    C. QC is process-oriented
    D. QA finds bugs

✅ **Answer: B**

---

17. **Which is NOT a testing objective?**
    A. Detect defects
    B. Prevent defects
    C. Increase customer confidence
    D. Prove software is perfect

✅ **Answer: D**

---

18. **Static testing includes:**
    A. Unit testing
    B. System testing
    C. Code review
    D. Execution

✅ **Answer: C**

---

19. **Dynamic testing requires:**
    A. Documentation
    B. Code execution
    C. Reviews
    D. Inspections

✅ **Answer: B**

---

20. **Which principle states testing shows presence of defects?**
    A. Pesticide paradox
    B. Absence-of-errors fallacy
    C. Defect clustering
    D. Testing shows presence of defects

✅ **Answer: D**

---

21. **Absence-of-errors fallacy means:**
    A. No bugs = success
    B. Bug-free software may still be useless
    C. More tests remove bugs

D. Testing unnecessary

✅ **Answer: B**

---

22. **Which testing level validates user requirements?**
    A. Unit testing
    B. Integration testing
    C. System testing
    D. Acceptance testing

✅ **Answer: D**

---

23. **Which activity ensures process improvement?**
    A. Testing
    B. QC
    C. QA
    D. Debugging

✅ **Answer: C**

---

24. **Which testing concept is industry widely used?**
    A. Shift-left testing
    B. Late testing
    C. No testing
    D. Random testing

✅ **Answer: A**

---

25. **Shift-left testing focuses on:**
    A. Testing at end
    B. Early testing
    C. Manual testing only
    D. No automation

✅ **Answer: B**

26. **Which principle says repeating same tests reduces effectiveness?**
    A. Defect clustering
    B. Pesticide paradox
    C. Early testing
    D. Error guessing

✅ **Answer: B**

27. **Who is responsible for quality in Agile?**
    A. Tester only
    B. QA team only
    C. Entire team
    D. Manager

✅ **Answer: C**

28. **Which document defines what to test?**
    A. Code
    B. Test Plan
    C. Bug report
    D. Build

✅ **Answer: B**

29. **Which testing ensures software meets business needs?**
    A. Unit testing
    B. Integration testing
    C. System testing
    D. Validation testing

✅ **Answer: D**

30. **Which testing is done without executing code?**
    A. Functional testing

B. Dynamic testing
C. Static testing
D. Regression testing

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (31–45)

31. **Testing can show defects but cannot prove their absence because:**
    A. Time is limited
    B. Exhaustive testing is impossible
    C. Developers hide bugs
    D. Tools are weak

✅ **Answer: B**

---

32. **Difference between verification and validation:**
    A. Both same
    B. Verification is static, validation is dynamic
    C. Validation is static
    D. Both dynamic

✅ **Answer: B**

---

33. **Which principle supports Pareto rule (80/20)?**
    A. Pesticide paradox
    B. Defect clustering
    C. Error guessing
    D. Early testing

✅ **Answer: B**

---

34. **Which testing principle is violated if testing is done late?**
    A. Defect clustering
    B. Early testing

C. Absence-of-errors fallacy
D. Pesticide paradox

✅ **Answer: B**

---

35. **Quality Assurance aims to:**
    A. Find bugs
    B. Prevent bugs
    C. Fix bugs
    D. Report bugs

✅ **Answer: B**

---

36. **Quality Control is mainly:**
    A. Preventive
    B. Corrective
    C. Process-driven
    D. Management-driven

✅ **Answer: B**

---

37. **Testing is considered part of QC because it:**
    A. Improves process
    B. Audits process
    C. Detects defects in product
    D. Plans quality

✅ **Answer: C**

---

38. **If software meets requirements but users are unhappy, it fails due to:**
    A. Verification
    B. Validation
    C. QC
    D. QA

✅ **Answer: B**

---

39. **Which industry testing trend emphasizes automation + CI/CD?**
    A. Waterfall testing
    B. DevOps testing
    C. Manual testing
    D. Big-bang testing

✅ **Answer: B**

---

40. **Which concept integrates testing with development?**
    A. Shift-right testing
    B. Shift-left testing
    C. End testing
    D. No testing

✅ **Answer: B**

---

41. **Which statement is TRUE?**
    A. QA = Testing
    B. Testing = QC
    C. QC ⊂ QA
    D. QA ⊂ Testing

✅ **Answer: C**

---

42. **Which testing principle suggests focusing on risky areas?**
    A. Defect clustering
    B. Error guessing
    C. Early testing
    D. Exhaustive testing

✅ **Answer: B**

---

43. **Which activity ensures compliance with standards?**
    A. Testing
    B. QC
    C. QA
    D. Debugging

✅ **Answer: C**

---

44. **Software testing in industry is continuous because:**
    A. Software never finishes
    B. New changes introduce defects
    C. Testing is cheap
    D. Developers want testing

✅ **Answer: B**

---

45. **Ultimate goal of software testing is to:**
    A. Find maximum bugs
    B. Delay release
    C. Deliver quality software
    D. Replace development

✅ **Answer: C**

🧪 SESSION 23: STLC, V-MODEL & TESTING TYPES – MCQs (45)

🟢 EASY LEVEL (1–15)

1. **STLC stands for:**
   A. Software Test Life Cycle
   B. System Test Logic Cycle
   C. Software Technical Life Cycle
   D. System Testing Level Cycle

✅ **Answer: A**

---

2. **STLC defines:**
   A. Development process
   B. Testing phases
   C. Deployment steps
   D. Maintenance steps

✅ **Answer: B**

---

3. **First phase of STLC is:**
   A. Test execution
   B. Test planning
   C. Requirement analysis
   D. Test closure

✅ **Answer: C**

---

4. **V-Model is an extension of:**
   A. Agile
   B. Spiral
   C. Waterfall
   D. RAD

✅ **Answer: C**

---

5. **In V-Model, testing activities start:**
   A. After coding
   B. Parallel with development
   C. After deployment

D. At end

✅ **Answer: B**

---

6. **Manual testing is:**
   A. Done using tools
   B. Performed without automation tools
   C. Done only by machines
   D. Obsolete

✅ **Answer: B**

---

7. **Automation testing is useful when:**
   A. Tests change frequently
   B. Regression tests are repeated
   C. UI is unstable
   D. Requirements unclear

✅ **Answer: B**

---

8. **Which is an automation testing tool?**
   A. Jira
   B. Selenium
   C. Git
   D. Docker

✅ **Answer: B**

---

9. **Black-box testing focuses on:**
   A. Internal code
   B. Logic paths
   C. Input–output behavior
   D. Code coverage

✅ **Answer: C**

10. **White-box testing requires knowledge of:**
    A. UI design
    B. Database only
    C. Internal code
    D. User requirements

✅ **Answer: C**

11. **Grey-box testing is a combination of:**
    A. Manual & automation
    B. Functional & non-functional
    C. Black-box & white-box
    D. Unit & system testing

✅ **Answer: C**

12. **Functional testing validates:**
    A. Performance
    B. Security
    C. Business requirements
    D. Load

✅ **Answer: C**

13. **Non-functional testing focuses on:**
    A. Features
    B. User stories
    C. Quality attributes
    D. Code logic

✅ **Answer: C**

14. **Which document defines scope of testing?**
    A. Use case

B. Test plan
C. Bug report
D. Test script

✅ **Answer: B**

---

15. **Test cases are derived from:**
    A. Code
    B. Test plan
    C. Requirements / use cases
    D. Bug reports

✅ **Answer: C**

🟡 MEDIUM LEVEL (16–30)

16. **STLC phase where test strategy is defined:**
    A. Test execution
    B. Test planning
    C. Requirement analysis
    D. Test design

✅ **Answer: B**

---

17. **Test case document contains:**
    A. Code
    B. Input, steps, expected result
    C. Project plan
    D. Test summary

✅ **Answer: B**

---

18. **In V-Model, system testing corresponds to:**
    A. Requirement phase
    B. Design phase

C. Coding phase
D. Implementation phase

✅ **Answer: B**

---

19. **Which testing is best suited for early defect detection?**
    A. System testing
    B. Acceptance testing
    C. White-box testing
    D. Regression testing

✅ **Answer: C**

---

20. **Automation testing is NOT suitable when:**
    A. Regression testing
    B. Performance testing
    C. UI changes frequently
    D. Repetitive tests

✅ **Answer: C**

---

21. **Which tool supports automation testing for web apps?**
    A. Selenium
    B. JMeter
    C. Jira
    D. GitHub

✅ **Answer: A**

---

22. **Black-box testing technique example:**
    A. Statement coverage
    B. Branch coverage
    C. Equivalence partitioning
    D. Path testing

✅ **Answer: C**

---

23. **White-box testing technique example:**
    A. Boundary value analysis
    B. Decision table
    C. Statement coverage
    D. Use case testing

✅ **Answer: C**

---

24. **Functional testing includes:**
    A. Load testing
    B. Stress testing
    C. Smoke testing
    D. Scalability testing

✅ **Answer: C**

---

25. **Non-functional testing includes:**
    A. Regression testing
    B. Usability testing
    C. Unit testing
    D. Integration testing

✅ **Answer: B**

---

26. **Test plan is usually prepared by:**
    A. Developer
    B. Tester / Test Lead
    C. Client
    D. End user

✅ **Answer: B**

---

27. **Use cases describe:**
    A. Internal logic
    B. User interactions with system
    C. Database schema
    D. Code structure

✅ **Answer: B**

---

28. **Sprint-based testing in Agile means:**
    A. Testing at end
    B. Continuous testing per sprint
    C. No testing
    D. Only manual testing

✅ **Answer: B**

---

29. **Regression testing ensures:**
    A. New features added
    B. Old functionality still works
    C. Performance improved
    D. UI improved

✅ **Answer: B**

---

30. **Which testing validates complete system behavior?**
    A. Unit testing
    B. Integration testing
    C. System testing
    D. White-box testing

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (31–45)

31. **Difference between STLC and SDLC:**
    A. Both same
    B. STLC focuses on testing activities
    C. SDLC focuses on testing only
    D. STLC replaces SDLC

✅ **Answer: B**

---

32. **V-Model advantage is:**
    A. No testing
    B. Late testing
    C. Early test planning
    D. No documentation

✅ **Answer: C**

---

33. **Automation testing improves:**
    A. Requirement clarity
    B. Test execution speed & reliability
    C. UI design
    D. User experience

✅ **Answer: B**

---

34. **Grey-box testing is most suitable for:**
    A. Unit testing
    B. Security testing
    C. Integration testing
    D. Acceptance testing

✅ **Answer: C**

---

35. **Functional testing does NOT include:**
    A. Unit testing
    B. System testing
    C. Load testing

D. Acceptance testing

✅ **Answer: C**

---

36. **Non-functional testing does NOT focus on:**
   A. Performance
   B. Scalability
   C. Security
   D. Business logic

✅ **Answer: D**

---

37. **Which testing is derived from use cases?**
   A. White-box testing
   B. Black-box testing
   C. Unit testing
   D. Static testing

✅ **Answer: B**

---

38. **Test plan answers which question?**
   A. How to code?
   B. What to test and how?
   C. Who will deploy?
   D. Where to store code?

✅ **Answer: B**

---

39. **Test cases written per sprint help in:**
   A. Big-bang testing
   B. Continuous validation
   C. Delayed feedback
   D. No documentation

✅ **Answer: B**

40. **Automation testing cannot completely replace manual testing because:**
    A. Tools are expensive
    B. Exploratory testing needs human thinking
    C. Automation is slow
    D. Automation fails always

✅ **Answer: B**

41. **White-box testing mainly ensures:**
    A. UI correctness
    B. Requirement fulfillment
    C. Code coverage & logic correctness
    D. User satisfaction

✅ **Answer: C**

42. **Which testing checks performance under extreme load?**
    A. Load testing
    B. Stress testing
    C. Smoke testing
    D. Sanity testing

✅ **Answer: B**

43. **Functional testing failure means:**
    A. Performance issue
    B. Feature not working as expected
    C. Memory leak
    D. Scalability issue

✅ **Answer: B**

44. **Best testing approach in Agile projects:**
    A. Testing after development

B. Continuous testing
C. No documentation
D. Manual testing only

✅ **Answer: B**

---

45. **Ultimate purpose of STLC is to:**
   A. Delay release
   B. Reduce developer work
   C. Ensure quality software delivery
   D. Increase test cases

✅ **Answer: C**

🤖 SESSIONS 24 & 25: SELENIUM – MCQs + CODE (45)

🟢 EASY LEVEL (1–15)

1. **Selenium is mainly used for:**
   A. API testing
   B. Performance testing
   C. Automation testing of web applications
   D. Unit testing

✅ **Answer: C**

---

2. **Which Selenium component interacts with browser?**
   A. Selenium IDE
   B. Selenium Grid
   C. WebDriver

D. TestNG

✅ **Answer: C**

---

3. **Which IDE is commonly used with Selenium Java?**
   A. NetBeans
   B. IntelliJ
   C. Eclipse
   D. VS Code

✅ **Answer: C**

---

4. **Which statement loads ChromeDriver?**

```
WebDriver driver = new ChromeDriver();
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

5. **Which locator finds element by unique identifier?**
   A. name
   B. className
   C. id
   D. tagName

✅ **Answer: C**

---

6. **Which command opens a URL?**

```
driver.get("https://example.com");
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

7. **Which method types text into text box?**

```
sendKeys()
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

8. **Which locator finds multiple elements usually?**
   A. id
   B. name
   C. className
   D. xpath

✅ **Answer: C**

---

9. **Which locator uses XML path?**
   A. id
   B. name
   C. XPath
   D. tagName

✅ **Answer: C**

---

10. **Which Selenium command clicks button?**

```
element.click();
```

A. Correct
B. Wrong

✅ **Answer: A**

---

11. **Which method closes current browser window?**
   A. quit()
   B. close()
   C. stop()
   D. end()

✅ **Answer: B**

---

12. **Which method closes all browser windows?**
   A. close()
   B. quit()
   C. exit()
   D. shutdown()

✅ **Answer: B**

---

13. **Radio button selection uses:**
   A. sendKeys()
   B. click()
   C. submit()
   D. clear()

✅ **Answer: B**

---

14. **Checkbox selection is done using:**
   A. select()
   B. choose()
   C. click()
   D. tick()

✅ **Answer: C**

15. **Which Selenium class handles dropdowns?**
    A. Dropdown
    B. Select
    C. Option
    D. List

✅ **Answer: B**

🟡 **MEDIUM LEVEL (16–30)**

16. **Select dropdown option by visible text:**

```
Select s = new Select(element);
s.selectByVisibleText("India");
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

17. **Which locator is fastest?**
    A. XPath
    B. CSS Selector
    C. id
    D. className

✅ **Answer: C**

---

18. **Which XPath is absolute?**
    A. `//input[@id='u']`
    B. `/html/body/div/input`
    C. `//*[@name='u']`
    D. `//div/input`

✅ **Answer: B**

---

19. **Which XPath is relative?**
    A. `/html/body/form/input`
    B. `//input[@type='text']`
    C. `/div/input`
    D. `/html/input`

✅ **Answer: B**

---

20. **Keyboard actions are performed using:**
    A. Robot
    B. Actions
    C. Keys
    D. Keyboard

✅ **Answer: B**

---

21. **Example of keyboard action:**

```
Actions a = new Actions(driver);
a.sendKeys(Keys.ENTER).perform();
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

22. **Mouse actions are handled by:**
    A. Select
    B. Actions
    C. Event
    D. Mouse

✅ **Answer: B**

---

23. **Right-click action method is:**
    A. click()
    B. doubleClick()
    C. contextClick()
    D. rightClick()

✅ **Answer: C**

---

24. **Double-click action uses:**

```
a.doubleClick(element).perform();
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

25. **Which method clears text box?**
    A. reset()
    B. delete()
    C. clear()
    D. remove()

✅ **Answer: C**

---

26. **Multi-select dropdown requires:**
    A. isMultiple()
    B. allowMultiple()
    C. selectMultiple()
    D. enableMulti()

✅ **Answer: A**

---

27. **Check if checkbox is selected:**

```
element.isSelected();
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

28. **Which method submits a form?**
    A. click()
    B. submit()
    C. send()
    D. post()

✅ **Answer: B**

---

29. **Test suite in Selenium usually groups:**
    A. Browsers
    B. Test cases
    C. Drivers
    D. URLs

✅ **Answer: B**

---

30. **Which framework is commonly used with Selenium?**
    A. Maven
    B. TestNG
    C. Docker
    D. Jenkins

✅ **Answer: B**

🔴 **HARD / TRICKY LEVEL (31–45)**

31. **Difference between close() and quit():**
    A. Same
    B. close() closes one window, quit() closes all
    C. quit() closes one
    D. Both close current

✅ **Answer: B**

---

32. **Which locator is most fragile?**
    A. id
    B. name
    C. XPath (absolute)
    D. CSS

✅ **Answer: C**

---

33. **Dynamic XPath example is:**

```
//input[contains(@id,'user')]
```

A. Correct
B. Wrong

✅ **Answer: A**

---

34. **Implicit wait applies to:**
    A. Single element
    B. Entire session
    C. One command
    D. Thread only

✅ **Answer: B**

---

35. **Which wait is better for dynamic elements?**
    A. Thread.sleep

B. Implicit wait
C. Explicit wait
D. No wait

✅ **Answer: C**

---

36. **Explicit wait example:**

```
WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10));
wait.until(ExpectedConditions.visibilityOf(element));
```

A. Correct
B. Wrong

✅ **Answer: A**

---

37. **StaleElementReferenceException occurs when:**
   A. Element not found
   B. Page refreshed
   C. XPath wrong
   D. Browser closed

✅ **Answer: B**

---

38. **Which command switches to alert?**

```
driver.switchTo().alert();
```

A. Correct
B. Wrong

✅ **Answer: A**

39. **Which command switches to frame?**
    A. driver.frame()
    B. driver.switchTo().frame()
    C. driver.changeFrame()
    D. driver.selectFrame()

✅ **Answer: B**

---

40. **Best locator strategy priority is:**
    A. XPath → id
    B. id → name → CSS → XPath
    C. XPath only
    D. tagName first

✅ **Answer: B**

---

41. **Which exception occurs if element not found?**
    A. TimeoutException
    B. NoSuchElementException
    C. WebDriverException
    D. NullPointerException

✅ **Answer: B**

---

42. **Which Selenium feature supports parallel testing?**
    A. WebDriver
    B. Selenium IDE
    C. Selenium Grid
    D. Eclipse

✅ **Answer: C**

---

43. **Which interaction selects multiple items?**

```
Actions a = new Actions(driver);
```

```
a.keyDown(Keys.CONTROL).click(e1).click(e2).keyUp(Keys.CONTROL).perform();
```

A. Correct
B. Wrong

✅ **Answer: A**

---

44. **Why Page Object Model is used?**
    A. Faster execution
    B. Reduce code duplication & improve maintainability
    C. UI design
    D. Performance testing

✅ **Answer: B**

---

45. **Best Selenium practice is:**
    A. Hard-coded waits
    B. Absolute XPath
    C. Explicit waits + Page Object Model
    D. No framework

✅ **Answer: C**

🚀 SESSION 26: JENKINS & DELIVERY PIPELINE – MCQs (40)

🟢 EASY LEVEL (1–15)

1. **Delivery pipeline refers to:**
   A. Manual deployment

B. Automated process from code to production
C. Only testing phase
D. Only build phase

✅ **Answer: B**

---

2. **Jenkins is a:**
   A. Version control tool
   B. CI/CD automation tool
   C. Container platform
   D. Testing framework

✅ **Answer: B**

---

3. **Jenkins is written in:**
   A. Python
   B. Java
   C. C++
   D. JavaScript

✅ **Answer: B**

---

4. **Jenkins is primarily used for:**
   A. Coding
   B. Automation of build, test, deploy
   C. Monitoring servers
   D. Managing databases

✅ **Answer: B**

---

5. **Default Jenkins port is:**
   A. 3000
   B. 8080
   C. 9090
   D. 8000

✅ **Answer: B**

---

6. **Jenkins job that defines stages as code is:**
   A. Freestyle job
   B. Pipeline job
   C. Maven job
   D. Matrix job

✅ **Answer: B**

---

7. **Which file defines Jenkins pipeline as code?**
   A. pom.xml
   B. Dockerfile
   C. Jenkinsfile
   D. build.gradle

✅ **Answer: C**

---

8. **Jenkins master is responsible for:**
   A. Running builds only
   B. Scheduling jobs & managing agents
   C. Running tests only
   D. Writing code

✅ **Answer: B**

---

9. **Slave node in Jenkins is also called:**
   A. Worker
   B. Executor
   C. Agent
   D. Runner

✅ **Answer: C**

---

10. **Which command starts Jenkins service (Linux)?**
    A. start jenkins
    B. service jenkins start
    C. systemctl start jenkins
    D. Both B and C

✅ **Answer: D**

---

11. **Jenkins uses which browser to unlock first time?**
    A. Firefox only
    B. Chrome only
    C. Any browser
    D. CLI only

✅ **Answer: C**

---

12. **Which plugin is required for Maven projects?**
    A. Git plugin
    B. Maven Integration plugin
    C. Docker plugin
    D. Selenium plugin

✅ **Answer: B**

---

13. **Which tool is used to manage Java dependencies?**
    A. Jenkins
    B. Maven
    C. Git
    D. Selenium

✅ **Answer: B**

---

14. **Selenium tests in Jenkins are usually triggered:**
    A. Manually
    B. After build stage
    C. Before coding

D. After deployment

✅ **Answer: B**

---

15. **Pipeline stages are executed:**
    A. Randomly
    B. Sequentially by default
    C. In parallel always
    D. Only manually

✅ **Answer: B**

🟡 **MEDIUM LEVEL (16–30)**

16. **Which Jenkins pipeline syntax is recommended?**
    A. Scripted
    B. Declarative
    C. XML
    D. JSON

✅ **Answer: B**

---

17. **Declarative pipeline starts with:**

```
pipeline {
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

18. **Which block defines Jenkins agent?**

```
agent any
```

A. Correct

B. Wrong

✅ **Answer: A**

---

19. **Which stage usually comes first in pipeline?**
    A. Test
    B. Build
    C. Deploy
    D. Monitor

✅ **Answer: B**

---

20. **Jenkins integrates with Git using:**
    A. Maven
    B. Git plugin
    C. Docker plugin
    D. Selenium Grid

✅ **Answer: B**

---

21. **Which Jenkins feature distributes load?**
    A. Pipeline
    B. Agents (slave nodes)
    C. Jobs
    D. Plugins

✅ **Answer: B**

---

22. **Add slave node requires:**
    A. Only IP address
    B. SSH or JNLP connection
    C. Docker image
    D. GitHub token

✅ **Answer: B**

---

23. **Which command builds Maven project?**

```
mvn clean install
```

A. Correct
B. Wrong

✅ **Answer: A**

---

24. **pom.xml contains:**
    A. Jenkins stages
    B. Project dependencies & build config
    C. Selenium scripts
    D. Git config

✅ **Answer: B**

---

25. **Which Jenkins plugin publishes test reports?**
    A. Surefire / JUnit plugin
    B. Docker plugin
    C. Git plugin
    D. Node plugin

✅ **Answer: A**

---

26. **Pipeline stage example:**

```
stage('Test') {
  steps {
    sh 'mvn test'
  }
}
```

A. Correct
 B. Wrong

✅ **Answer: A**

---

27. **Which Jenkins job supports SCM polling?**
   A. Freestyle
   B. Pipeline
   C. Both A and B
   D. None

✅ **Answer: C**

---

28. **Which trigger runs job on code commit?**
   A. Build periodically
   B. Poll SCM / Webhook
   C. Manual trigger
   D. Timer

✅ **Answer: B**

---

29. **Which Jenkins view shows pipeline flow visually?**
   A. Classic view
   B. Blue Ocean
   C. List view
   D. Grid view

✅ **Answer: B**

---

30. **Jenkinsfile should be stored in:**
   A. Jenkins server
   B. Local system
   C. Source code repository
   D. Maven repo

✅ **Answer: C**

🔴 HARD / TRICKY LEVEL (31–40)

31. **Pipeline as Code advantage is:**
    A. Faster builds
    B. Version controlled pipeline
    C. No plugins required
    D. No scripting

✅ **Answer: B**

32. **Which pipeline supports parallel execution?**

```
parallel {
  stage('UnitTest') { steps { sh 'mvn test' } }
  stage('UI Test') { steps { sh 'mvn verify' } }
}
```

A. Correct
 B. Wrong

✅ **Answer: A**

33. **Selenium integration with Jenkins requires:**
    A. Selenium Grid mandatory
    B. Maven + WebDriver dependencies
    C. Docker compulsory
    D. Kubernetes only

✅ **Answer: B**

34. **Jenkins agent executes:**
    A. UI
    B. Pipeline scripts
    C. Build steps

D. Job configuration

✅ **Answer: C**

---

35. **If agent goes down, Jenkins:**
    A. Crashes
    B. Queues job or assigns to other agent
    C. Deletes job
    D. Stops permanently

✅ **Answer: B**

---

36. **Best practice for credentials in Jenkins:**
    A. Hard-code in Jenkinsfile
    B. Store in Git
    C. Use Jenkins Credentials Manager
    D. Use environment variables in code

✅ **Answer: C**

---

37. **Which Maven phase runs Selenium tests?**
    A. compile
    B. test
    C. package
    D. deploy

✅ **Answer: B**

---

38. **Delivery pipeline failure early is beneficial because:**
    A. Saves time and cost
    B. Delays release
    C. Reduces testing
    D. Avoids automation

✅ **Answer: A**

39. **Which Jenkins plugin helps visualize pipeline stages?**
    A. Git
    B. Blue Ocean
    C. Maven
    D. NodeJS

✅ **Answer: B**

40. **End-to-end CI/CD pipeline includes:**
    A. Code → Build → Test → Deploy
    B. Build → Code → Test
    C. Test only
    D. Deploy only

✅ **Answer: A**