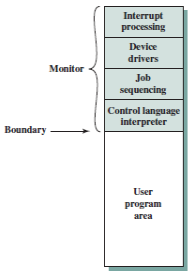
	ITER, SIKSHA 'O' ANUSANDHAN (Deemed to be University)	**Assignment**

Branch	**Computer Science and Engineering**	Programme	**B.Tech**
Course Name	**Computer Organization and Architecture**	Semester	**IV**
Course Code	**EET 2211**	Academic Year	**2023/Even**
Solution Assignment-5	**Topic-Operating system support, Processor structure and function, Reduced Instructionset computers**	**GP-1**	

Learning Level (LL)	**L1**: Remembering	**L3:** Applying	**L5**: Evaluating
	L2: Understanding	**L4**: Analyzing	**L6**: Creating

Q's	Questions	COs	LL
1	What is an operating system? Solution: • **An OS is a program that controls the execution of application programs and acts as an interface between applications and the computer hardware.** • **Popular OS include LINUX OS, WINDOWS OS, VMS, OS/400, Z/OS etc.** • **OBJECTIVES: (i) Convenience** **(ii) Efficiency** • **ASPECTS OF OS: (i) The OS as a user/computer interface** **(ii) The OS as a resource manager.**	**CO2**	**L1**
2	List and briefly define the key services provided by an OS. **Solution:** **Program creation:** The operating system provides a variety of facilities and services, such as editors and debuggers, to assist the programmer in creating programs. **Program execution:** A number of tasks need to be performed to executea program. Instructions and data must be loaded into main memory, I/O devices and files must be initialized, and other resources must be prepared. **Access to I/O devices:** Each I/O device requires its own peculiar set of instructions or control signals for operation. **Controlled access to files:** In the case of files, control must include an understanding of not only the nature of the I/O device (disk drive, tapedrive) but also the file format on the storage medium. **System access:** In the case ofa shared or public system, the operating system controls access to the system as a whole and to specific system resources. **Error detection and response:** A variety oferrors can occur while a computer system is running. **Accounting:** A good operating system will collect usage statistics for various resources and monitor performance parameters such as response time.	**CO2**	**L1**
3	List and briefly define the major types of OS. **Solution:** **Interactive System: refer theory** **Batched system: refer theory**	**CO2**	**L1**

4	Describe the work of Operating System as Resource Manager **Solution:** **Refer theory**	**CO2**	**L1**
5	Explain the memory layout for a resident monitor. **Solution:**  ✓ **The portion of monitor always present in the main memory and available for execution is known as resident monitor.** ✓ **The monitor reads in jobs one at a time from the input device.** ✓ **Now the current job is placed in the user program area and the control is passed to this.** ✓ **After completion of the job the control is returned to the monitor which reads the next job.** ✓ **The result of each job are printed out for delivery to the user.** ✓ **The monitor handles the scheduling problem as well as the job setup time.** ✓ **Each job instruction is included in a JCL(job control language) – a special type of programming language used to provide instructions to the monitor.**	**CO2**	**L2**
6	Explain the difference between uni-programming and multiprogramming **Solution:** **Refer Theory**	**CO6**	**L2**
7	If the last operation performed on a computer with an 8-bit word was an addition in which the two operands were 00000010 and 00000011, what would be thevalue of the following flags? ■ Carry ■ Zero ■ Parity ■ Sign **Solution:** **Operands are 00000010 and 00000011** **The operation to be performed: Addition** **00000010** **+** **00000011** **00000101** **The value of Carry flag bit = 0** **Zero flag bit = 0** **Parity flag bit = 0** **Sign flag bit = 0**	**CO6**	**L2**
8	A microprocessor is clocked at a rate of 5 GHz. a. How long is a clock cycle? b. What is the duration of a particular type of machine instruction consisting of three clock cycles?	**CO6**	**L2**

	Solution: **F= 5GHz** **T = 1/f = 1/5 GHz = 0.2 ns** **Duration for three clock cycles = 3 x 0.2 ns = 0.6 ns**		
9	Explain the different operating modes of ARM processor. Solution: **Refer Theory**	**CO6**	**L1**
10	Define and explain the CPSR register of ARM processor **Solution:** **Refer Theory**	**CO6**	**L1**
11	Briefly explain the register organization of ARM processor. **Solution:** **Refer Theory**	**CO6**	**L1**
12	Discuss the addressing modes of ARM processor with suitable examples. **Solution:** **Refer Theory**	**CO6**	**L1**

13	LDR R0,=0X4532ABCD
	MOV R1,#0X40
	ADD R0,R1,R0
	STR R0,[R1]
	MY_EXIT B MY_EXIT
	
	Determine the content of registers and memory locations.
	Solution:
	
	R0 = 0x4532AC0D
	R1=0X40
	MEMORY LOCATION =0X40
	CONTENT OF THE MEMORY LOCATION 0X40 IS 0X4532AC0D
		CO6	**L2**

14.	WAP to count the number of zeros in a 32-bit number using ARM assembly language. **Program:** **LDR R0,=0X4532ABCD** **MOV R1,#0X20** **MOV R2,#00** **BCK: ANDS R3,R0,#1** **BNE FWD** **ADD R2,R2,#1** **FWD: MOV R0,R0,LSR #1** **SUBS R1,R1,#1** **BNE BCK** **MY_EXIT: B MY_EXIT**	**CO6**	**L2**