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**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

QUESTION BANK

FOR

EEC41010 – MICROCONTROLLER

UNIT	Q NO	QUESTIONS
1	1	What is the bit size of 8051 microcontroller? (a) 4-bit (b) 8-bit (c) 16-bit (d) 32-bit Ans:8-bit
1	2	Which of the following is not a feature of 8051 microcontroller? (a) On-chip ROM (b) I/O Ports (c) External DAC (d) Timers Ans:External DAC
1	3	What is the size of on-chip RAM in 8051? (a) 64 bytes (b) 128 bytes (c) 256 bytes (d) 512 bytes Ans:128 bytes
1	4	Which bus is used to transfer data in the 8051 microcontroller? (a) Data Bus (b) Control Bus (c) Address Bus (d) Serial Bus Ans:Data Bus
1	5	Which register holds the address of the next instruction? (a) SP (b) PC (c) PSW (d) DPTR Ans:PC
1	6	How many ports are available in 8051? (a) 2 (b) 3 (c) 4 (d) 5 Ans:4
1	7	Which of the following is not a port in 8051? (a) P0 (b) P1 (c) P2 (d) P4 Ans:P4
1	8	Which pin is used to fetch code from internal ROM? (a) PSEN (b) ALE (c) EA (d) RST Ans:EA
1	9	What is the function of the PSW register in 8051? (a) Port Status Word (b) Program Store Word (c) Program Status Word (d) Peripheral Status Word Ans:Program Status Word
1	10	Which flag is set when a carry is generated in 8051? (a) OV (b) CY (c) AC (d) RS0 Ans:CY

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1	11	How many general-purpose registers are available in each register bank of 8051? (a) 4 (b) 6 (c) 8 (d) 10 Ans:8
1	12	What is the purpose of the SFRs in 8051? (a) Store external data (b) Control operations (c) Handle interrupts only (d) Store machine code Ans:Control operations
1	13	Which SFR is used to enable or disable all interrupts in 8051? (a) TCON (b) IE (c) IP (d) PSW Ans:IE
1	14	Which memory is used to store programs in 8051? (a) RAM (b) ROM (c) EEPROM (d) Flash Ans:ROM
1	15	What is the role of the ALU in 8051 microcontroller? (a) Data storage (b) Logical operations (c) Arithmetic & Logic operations (d) Interrupt control Ans:Arithmetic & Logic operations
1	16	Which signal is used to indicate that 8051 is accessing external program memory? (a) RD (b) WR (c) PSEN (d) ALE Ans:PSEN
1	17	Which port is used for multiplexed address bus and data bus in 8051? (a) Port 0 (b) Port 1 (c) Port 2 (d) Port 3 Ans:Port 0
1	18	How much on-chip ROM is available in standard 8051? (a) 1 KB (b) 2 KB (c) 4 KB (d) 8 KB Ans:4 KB
1	19	The reset pin RST must be held high for how long to properly reset the 8051? (a) 1 clock cycle (b) 2 machine cycles (c) 2 clock cycles (d) 5 microseconds Ans:2 machine cycles
1	20	Which register is used to hold data for serial communication in 8051? (a) TCON (b) SBUF (c) SCON (d) TMOD Ans:SBUF

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1	21	How many machine cycles are required to execute most 8051 instructions? (a) 1 (b) 2 (c) 3 (d) 4 Ans:2
1	22	What does the ALE signal do in 8051? (a) Activates Timer (b) Latches address (c) Interrupt enable (d) Resets the system Ans:Latches address
1	23	How is external memory interfaced with 8051? (a) Through P1 and P3 (b) Through P0 and P2 (c) Through P2 and P3 (d) Through P1 and ALE Ans:Through P0 and P2
1	24	What is the full form of DPTR? (a) Data Push Transfer Register (b) Data Point Timer Register (c) Data Pointer Register (d) Direct Pointer Register Ans:Data Pointer Register
1	25	Which timer mode in 8051 provides an 8-bit auto-reload? (a) Mode 0 (b) Mode 1 (c) Mode 2 (d) Mode 3 Ans:Mode 2
1	26	Which port in 8051 can only be used as input if used with external memory? (a) Port 0 (b) Port 1 (c) Port 2 (d) Port 3 Ans:Port 0
1	27	What is the function of the TMOD register in 8051? (a) Controls timers (b) Controls ports (c) Controls memory (d) Controls serial comm. Ans:Controls timers
1	28	How many interrupt sources are available in 8051? (a) 3 (b) 5 (c) 7 (d) 9 Ans:5
1	29	What is the size of the Program Counter in 8051? (a) 8-bit (b) 12-bit (c) 16-bit (d) 32-bit Ans:16-bit
1	30	Which register is used to select register banks in 8051? (a) SP (b) PC (c) PSW (d) SCON Ans:PSW

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1	31	If a timer is to be used, which pin and register are primarily involved? (a) TCON and TMOD (b) IE and IP (c) PSW and PC (d) SBUF and SCON Ans:TCON and TMOD
1	32	What is the role of the Stack Pointer in 8051? (a) Points to PSW (b) Points to top of stack (c) Points to RAM bottom (d) Points to ROM Ans:Points to top of stack
1	33	How many SFRs are defined in the 8051 microcontroller? (a) 21 (b) 24 (c) 30 (d) 35 Ans:21
1	34	Which of the following SFRs in 8051 is used for interrupt priority control? (a) TCON (b) IP (c) IE (d) PSW Ans:IP
1	35	Which flag in PSW is set when the result of an arithmetic operation is zero? (a) AC (b) CY (c) OV (d) Z Ans:Z
1	36	What is the function of the CY flag in the PSW register? (a) Carries address (b) Carry out of operation (c) Controls ports (d) Resets memory Ans:Carry out of operation
1	37	To enable serial transmission, which bit in SCON must be set? (a) TI (b) RI (c) SM0 (d) REN Ans:REN
1	38	You want to store temporary values during subroutine calls. Which memory area is used? (a) ROM (b) Stack (c) I/O Ports (d) Timer Ans:Stack
1	39	You need to connect a UART device to 8051. Which pins will you use? (a) P0.0, P0.1 (b) P2.0, P2.1 (c) P3.0, P3.1 (d) P1.0, P1.1 Ans:P3.0, P3.1
1	40	A program counter holds address 1002H. What address will it point to after a 2-byte instruction? (a) 1003H (b) 1004H (c) 1005H (d) 1006H Ans:1006H

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1	41	If you want to enable external interrupt 0, which bit in the IE register should be set? (a) EX0 (b) EA (c) ET0 (d) PX0 Ans:EX0
1	42	You want to access external memory. Which ports should be configured? (a) P1 and P3 (b) P2 and P0 (c) P0 and P1 (d) P3 and P2 Ans:P2 and P0
1	43	To execute code from external ROM, what should be the logic level on EA pin? (a) High (b) Low (c) Don't care (d) Tri-state Ans:Low
1	44	Which port must be connected to an address latch (like 74LS373) when using external memory? (a) Port 3 (b) Port 2 (c) Port 0 (d) Port 1 Ans:Port 0
1	45	You need to write a value to Port 1. Which register must be accessed? (a) SBUF (b) TMOD (c) P1 (d) DPTR Ans:P1
1	46	You want to design a system that resets on power failure. Which pin must be pulled high? (a) EA (b) RST (c) PSEN (d) XTAL1 Ans:RST
1	47	To implement a loop counter, which register is ideal to use? (a) A (b) R0 (c) DPTR (d) P1 Ans:R0
1	48	If the stack pointer is 07H, what will it point to after a PUSH operation? (a) 06H (b) 07H (c) 08H (d) 09H Ans:08H
1	49	Which register pair is used to form the 16-bit data pointer? (a) TH0 and TL0 (b) DPH and DPL (c) P0 and P1 (d) R1 and R2 Ans:DPH and DPL
1	50	You want to monitor overflow from arithmetic operations. Which PSW flag should be checked? (a) CY (b) OV (c) AC (d) RS1 Ans:OV

UNIT	Q NO	QUESTIONS
2	1	Which instruction is used to transfer data in 8051? (a) ADD (b) MOV (c) JMP (d) SUB Ans:MOV
2	2	What does ADD A, R1 do in 8051? (a) Logical operation (b) Branch operation (c) Arithmetic operation (d) Rotate operation Ans:Arithmetic operation
2	3	CJNE stands for what? (a) Call (b) Compare & Jump if Not Equal (c) Clear Accumulator (d) Copy and Jump Ans:Compare & Jump if Not Equal
2	4	Which instruction is used for conditional branching? (a) MOV (b) ORL (c) JZ (d) SWAP Ans:JZ
2	5	How many addressing modes are available in 8051? (a) 2 (b) 3 (c) 5 (d) 7 Ans:5
2	6	Which instruction rotates the accumulator right? (a) RR A (b) RL A (c) SWAP A (d) INC A Ans:RR A
2	7	What does SWAP A do? (a) Adds (b) Exchanges nibbles (c) Clears A (d) Shifts A left Ans:Exchanges nibbles
2	8	What type of instruction is ANL A, #55H? (a) Arithmetic (b) Logical (c) Branch (d) Rotate Ans:Logical
2	9	Which instruction clears the carry flag? (a) SETB C (b) CLR C (c) CPL C (d) CLR A Ans:CLR C
2	10	Which instruction causes an unconditional jump? (a) SJMP (b) JZ (c) CJNE (d) MOV Ans:SJMP

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2	11	Which instruction complements the accumulator? (a) CPL A (b) INC A (c) DEC A (d) ANL A, #0 Ans:CPL A
2	12	What is the function of INC DPTR? (a) Clears DPTR (b) Increments DPTR (c) Jumps to address (d) Rotates DPTR Ans:Increments DPTR
2	13	Which instruction is used to multiply in 8051? (a) MUL A, B (b) ADD A, B (c) DIV AB (d) INC A Ans:MUL A, B
2	14	The instruction MOV A, #25H is an example of which addressing mode? (a) Direct (b) Immediate (c) Indirect (d) Register Ans:Immediate
2	15	What does SETB P1.0 do? (a) Clears bit (b) Sets bit (c) Toggles bit (d) Inverts byte Ans:Sets bit
2	16	Which instruction divides A by B? (a) MUL A, B (b) DIV AB (c) SUBB A, B (d) INC A Ans:DIV AB
2	17	MOVC is used to: (a) Copy external data (b) Compare (c) Copy from ROM (d) Clear carry Ans:Copy from ROM
2	18	Which of these is NOT a logical instruction? (a) ORL (b) ANL (c) XRL (d) SUBB Ans:SUBB
2	19	What does JNC stand for? (a) Jump if not clear (b) Jump if no carry (c) Jump no condition (d) Jump with carry Ans:Jump if no carry
2	20	The NOP instruction does what? (a) Clears A (b) No operation (c) Jumps to address (d) Resets port Ans:No operation

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2	21	XRL is used for which operation? (a) OR (b) XOR (c) AND (d) NOT Ans:XOR
2	22	What does DAA do after BCD addition? (a) Decimal adjust (b) Divide (c) Multiply (d) Add Ans:Decimal adjust
2	23	What does CLR A do? (a) Sets A (b) Rotates A (c) Clears A (d) Multiplies A Ans:Clears A
2	24	Which instruction uses indirect addressing? (a) MOV A, 30H (b) MOV A, R1 (c) MOV A, @R0 (d) MOV DPTR, #20H Ans:MOV A, @R0
2	25	In MOV A, R0, which addressing mode is used? (a) Direct (b) Register (c) Immediate (d) Indirect Ans:Register
2	26	Which instruction checks bit status and jumps? (a) JB (b) MOV (c) ANL (d) CJNE Ans:JB
2	27	What is the effect of CPL C? (a) Clears carry (b) Sets carry (c) Complements carry (d) Loads carry Ans:Complements carry
2	28	Which instruction transfers control unconditionally? (a) JC (b) SJMP (c) JB (d) JZ Ans:SJMP
2	29	Which register pair is used in MUL A, B? (a) A & DPTR (b) A & R0 (c) A & B (d) B & R1 Ans:A & B
2	30	JZ jumps when: (a) Accumulator = 0 (b) Accumulator = FFH (c) Bit is set (d) Carry is 1 Ans:Accumulator = 0

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2	31	Which instruction sets the carry flag? (a) CLR C (c) SETB C Ans:SETB C
2	32	ANL performs which type of operation? (a) OR (c) AND Ans:AND
2	33	What is the result of MOV A, #0FFH? (a) A = 0FFH (c) A = 0AAH Ans:A = 0FFH
2	34	MOVX is used for accessing: (a) Internal RAM (c) External memory Ans:External memory
2	35	Which instruction clears a specific port bit? (a) CLR Px.y (c) CPL Px.y Ans:CLR Px.y
2	36	Which instruction allows looping for fixed delay? (a) MOV A, #10 (c) INC A Ans:LOOP: DJNZ A, LOOP
2	37	Which instruction is used for BCD to HEX conversion? (a) DAA (c) SWAP A Ans:DAA
2	38	Which instruction toggles a bit? (a) CPL Px.y (c) SETB Px.y Ans:CPL Px.y
2	39	MOV A, @R0 is an example of which addressing mode? (a) Immediate (c) Direct Ans:Indirect
2	40	MOV DPTR, #3000H loads what value? (a) DPTR = 30H (c) A = 3000H Ans:DPTR = 3000H

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2	41	What is the output of ADD A, #25H if A = 10H? (a) 35H (b) 45H (c) 25H (d) 00H Ans:35H
2	42	If MOV R0, #0C0H, and location 0C0H has value 55H, what is MOV A, @R0? (a) A = 0C0H (b) A = 00H (c) A = 55H (d) A = FFH Ans:A = 55H
2	43	Write content of A after MUL AB if A = 02H and B = 04H. (a) A = 08H (b) A = 06H (c) A = 02H (d) A = 10H Ans:A = 08H
2	44	After executing MOV A, #0FFH and CLR A, value of A is: (a) FFH (b) 00H (c) 01H (d) 0FH Ans:00H
2	45	If A = 45H, B = 05H, result of DIV AB will be: (a) A = 09H, B = 0H (b) A = 05H, B = 0H (c) A = 0AH, B = 0H (d) Error Ans:A = 09H, B = 0H
2	46	Result of ANL A, #0F0H if A = 3CH? (a) 30H (b) 0CH (c) 3CH (d) F0H Ans:30H
2	47	Output after executing: MOV A, #0AAH; CPL A (a) 55H (b) AAH (c) FFH (d) 00H Ans:55H
2	48	If MOV A, #64H and ADD A, #9CH, A will be: (a) 00H (b) FFH (c) 60H (d) 90H Ans:00H
2	49	Instruction for adding contents of R2 to A (a) ADD A, R2 (b) MOV A, R2 (c) INC R2 (d) XCH A, R2 Ans:ADD A, R2
2	50	If CJNE A, #20H, LABEL, and A = 20H, what happens? (a) Jumps to LABEL (b) No Jump (c) A is cleared (d) Stack pushed Ans:No Jump

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3	1	How many I/O ports are there in 8051? (a) 2 (b) 3 (c) 4 (d) 5 Ans:4
3	2	Which ports are bit-addressable in 8051? (a) P0 and P2 (b) P1 and P3 (c) P0 and P1 (d) All ports Ans: All ports
3	3	What is the function of TMOD register? (a) Controls serial port (b) Timer mode selection (c) Interrupt flag (d) Bit manipulation Ans:Timer mode selection
3	4	Which register is used to load timer value? (a) IE (b) THx/TLx (c) SCON (d) TCON Ans:THx/TLx
3	5	How many modes does Timer 0 have? (a) 2 (b) 3 (c) 4 (d) 1 Ans:4
3	6	What does SCON stand for? (a) Serial Control (b) Source Control (c) Special Counter (d) Serial Counter Ans:Serial Control
3	7	What is the function of IE register? (a) Controls timers (b) Enables/disables interrupts (c) Stores data (d) Controls RAM Ans:Enables/disables interrupts
3	8	Which interrupt has the highest priority in 8051 by default? (a) Serial (b) Timer 1 (c) External 0 (d) Reset Ans:Reset
3	9	RS232 is a standard for: (a) Parallel communication (b) Serial communication (c) LCD interface (d) EEPROM Ans:Serial communication
3	10	What is the baud rate formula for serial mode 1 in 8051? (a) Baud = Timer $\times$ 12 (b) Baud = $(2 \times TH1)/12$ (c) Baud = $(2^{SMOD} \times 32)/TH1$ (d) Baud = $(2^{SMOD} \times 384)/TH1$ Ans: Baud = $(2^{SMOD} \times 384)/TH1$

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3	11	Timer 1 mode 1 in 8051 is a: (a) 8-bit auto reload (b) 16-bit timer (c) Split timer mode (d) Baud generator Ans:16-bit timer
3	12	What is the function of TCON register? (a) Serial control (b) Timer control (c) Port configuration (d) Stack pointer Ans:Timer control
3	13	Which timer mode divides timer into two 8-bit timers? (a) Mode 1 (b) Mode 0 (c) Mode 2 (d) Mode 3 Ans: Mode 3
3	14	How many interrupts does 8051 support? (a) 3 (b) 4 (c) 5 (d) 6 Ans:5
3	15	Which bit in IE register enables all interrupts? (a) EA (b) EX0 (c) ET0 (d) ES Ans:EA
3	16	What is the address of IE (Interrupt Enable) register? (a) A8H (b) 88H (c) 98H (d) B8H Ans: A8H
3	17	What does TI flag in SCON indicate? (a) Transmit buffer full (b) Timer interrupt (c) Timer overflow (d) External interrupt Ans:Transmit buffer full
3	18	RI flag in SCON is used to: (a) Enable reception (b) Indicate byte received (c) Enable interrupt (d) Reset timer Ans:Indicate byte received
3	19	In which register is baud rate controlled in mode 1? (a) TH0 (b) TH1 (c) TCON (d) IE Ans:TH1
3	20	What does the MOV SBUF, A instruction do? (a) Moves A to timer (b) Loads A into port (c) Sends A to serial buffer (d) Stops execution Ans:Sends A to serial buffer

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3	21	What should be done before enabling interrupts globally? (a) Clear IE (b) Load IP (c) Enable individual bits (d) Load TMOD Ans:Enable individual bits
3	22	What does SCON bit SM0 and SM1 control? (a) Timer mode (b) Serial mode (c) Interrupt mode (d) Baud rate Ans:Serial mode
3	23	What is the bit-address of TCON register? (a) 88H (b) 89H (c) 87H (d) 90H Ans:88H
3	24	The function of INT0 is to: (a) Reset 8051 (b) Enable UART (c) External interrupt 0 (d) Clear accumulator Ans:External interrupt 0
3	25	Which flag is set when timer overflows? (a) OV (b) TF (c) RI (d) TI Ans:TF
3	26	The baud rate doubles when SMOD bit is: (a) Cleared (b) Set (c) Reset (d) Unused Ans:Set
3	27	Timer 0 and Timer 1 can operate in: (a) Only Mode 0 (b) Mode 0 & 1 (c) Modes 0–3 (d) Mode 1 only Ans:Modes 0–3
3	28	What is the function of the TR1 bit in TCON register? (a) Enables Timer 0 (b) Enables Timer 1 (c) Disables Timer 1 (d) Controls baud Ans:Enables Timer 1
3	29	What does the flag TF1 signify? (a) Timer 1 overflow (b) Serial transfer (c) Timer 0 full (d) Interrupt Ans:Timer 1 overflow
3	30	Which of the following is the correct serial communication register? (a) SBUF (b) TCON (c) P0 (d) TMOD Ans:SBUF

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3	31	Which port pins are used for serial transmission and reception? (a) P1.0 and P1.1 (b) P2.0 and P2.1 (c) P3.0 and P3.1 (d) P0.0 and P0.1 Ans:P3.0 and P3.1
3	32	In 8051, how many bits are used for interrupt vector addresses? (a) 8 (b) 11 (c) 13 (d) 16 Ans:11
3	33	The baud rate in Mode 1 is calculated using: (a) Timer 0 (b) Timer 1 (c) External clock (d) P1 Ans:Timer 1
3	34	Which register holds the serial input/output data? (a) TCON (b) TMOD (c) SBUF (d) IE Ans:SBUF
3	35	What happens when the RI flag is set? (a) A byte is received (b) A byte is sent (c) Timer starts (d) Interrupt is cleared Ans:A byte is received
3	36	Which interrupt can be masked using the IE register? (a) Reset (b) Serial (c) External 1 (d) All of the above Ans: All of the above
3	37	Write an instruction to start Timer 0 in mode 1. (a) MOV TMOD, #01H (b) SETB TR1 (c) MOV TMOD, #10H (d) SETB TR0 Ans: SETB TR0
3	38	Which register must be loaded to set Timer 1 in Mode 2? (a) TMOD (b) TCON (c) TH1 (d) SBUF Ans:TMOD
3	39	You want to generate a 1ms delay using Timer 0 in Mode 1 with 12MHz clock. What count value should you load? (a) $65536 - 12000 = 53536 = D120H$ (b) 0000H (c) FFFFH (d) 1234H Ans:65536 - 12000 = 53536 = D120H
3	40	To transmit a byte via serial port, which register is used? (a) TMOD (b) SBUF (c) TH0 (d) TCON Ans:SBUF

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3	41	If Timer 1 is used for baud rate, what must TH1 be set to for 9600 baud? (a) FDH (b) FAH (c) F3H (d) FFH Ans:FDH
3	42	Write the instruction to enable External Interrupt 0. (a) SETB EX1 (b) SETB EX0 (c) SETB IE.0 (d) CLR EX0 Ans:SETB EX0
3	43	Write the instruction to move value 55H into Port 2. (a) MOV A, #55H (b) MOV P2, A (c) MOV P2, #55H (d) SETB P2 Ans:MOV P2, #55H
3	44	What is the sequence to send a byte using serial port? (a) Write SBUF, wait for RI (b) Write SBUF, wait for TI (c) Read SBUF, clear TI (d) Set IE, wait for TF1 Ans:Write SBUF, wait for TI
3	45	To check if a byte is received over serial, which flag is used? (a) TF0 (b) RI (c) TI (d) TR1 Ans:RI
3	46	In Timer Mode 2, what is the maximum count value? (a) 256 (b) 127 (c) 65535 (d) 1000 Ans:256
3	47	To handle multiple interrupts efficiently, what is needed? (a) Nested interrupts (b) Interrupt priority (c) Timer reset (d) Stack full Ans:Interrupt priority
3	48	Which instruction will clear Timer 0 Overflow flag (TF0)? (a) CLR TR0 (b) CLR TF0 (c) MOV TMOD, #00H (d) CLR TCON Ans:CLR TF0
3	49	How to configure Timer 1 in Mode 2 and start it? (a) MOV TMOD, #20H; SETB TR1 (b) MOV TMOD, #02H; SETB TR0 (c) MOV TMOD, #21H; SETB TR0 (d) SETB TR1 Ans:MOV TMOD, #20H; SETB TR1
3	50	After enabling serial interrupt, which flag must be cleared in ISR? (a) TF1 (b) TI or RI (c) IE (d) TCON Ans:TI or RI

UNIT	Q NO	QUESTIONS
4	1	What is the primary use of IC 8255? (a) ADC conversion (b) Motor control (c) Parallel I/O (d) Serial I/O Ans:Parallel I/O
4	2	How many ports does 8255 have? (a) One (b) Two (c) Three (d) Four Ans:Three
4	3	The control word register of 8255 is used to: (a) Store data (b) Program the ports (c) Access memory (d) Clear interrupts Ans:Program the ports
4	4	Which mode of 8255 allows bidirectional data transfer? (a) Mode 0 (b) Mode 1 (c) Mode 2 (d) BSR Ans:Mode 2
4	5	Which port in 8255 can be used bit-wise in BSR mode? (a) Port A (b) Port B (c) Port C (d) All ports Ans:Port C
4	6	Which of the following is not an interfacing device? (a) LCD (b) Relay (c) ALU (d) Stepper Motor Ans:ALU
4	7	Which pin of 8051 is typically used to interface a relay? (a) P0.0 (b) P1.1 (c) P2.7 (d) Any I/O pin Ans: Any I/O pin
4	8	Which device converts analog signal to digital? (a) DAC (b) Relay (c) Sensor (d) ADC Ans:ADC
4	9	PWM technique is used in 8051 for controlling: (a) Relays (b) DC Motors (c) LEDs (d) Memory Ans:DC Motors
4	10	LCD interfacing typically uses how many data lines? (a) 1 (b) 2 (c) 4 or 8 (d) 16 Ans:4 or 8

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4	11	Which command is used to clear LCD display? (a) 0x01 (b) 0x02 (c) 0x08 (d) 0x10 Ans:0x01
4	12	The seven-segment display shows digits using: (a) LED segments (b) LCD crystals (c) Binary LEDs (d) Relays Ans:LED segments
4	13	Stepper motor rotates in steps based on: (a) Voltage level (b) Clock signal (c) Control pulses (d) PWM Ans:Control pulses
4	14	What does DAC stand for? (a) Digital-Analog Converter (b) Direct Access Code (c) Digital Arithmetic Control (d) None Ans:Digital-Analog Converter
4	15	What is the advantage of sensor interfacing with microcontrollers? (a) Faster memory (b) Wireless I/O (c) Real-time input (d) Low power usage Ans:Real-time input
4	16	In 8051, interfacing ADC requires: (a) No conversion (b) Driver IC (c) Control signals (d) Pulse generator Ans:Control signals
4	17	Which IC is used for ADC interfacing in microcontroller circuits? (a) 808 (b) 8255 (c) 74161 (d) LM35 Ans:808
4	18	Keyboard interfacing typically uses: (a) Matrix scanning (b) UART (c) PWM (d) SPI Ans:Matrix scanning
4	19	What is a common feature of devices interfaced via 8255? (a) Serial output (b) Digital input/output (c) Analog signal (d) Optical sensing Ans:Digital input/output
4	20	Which of the following uses PWM for interfacing? (a) Keypad (b) Relay (c) LCD (d) DC Motor Ans: DC Motor

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4	21	To generate PWM on 8051, which module is typically used? (a) Timer (b) UART (c) ADC (d) SPI Ans:Timer
4	22	In LCD interfacing, RS pin is used to: (a) Reset display (b) Register select (c) Control brightness (d) Refresh pixels Ans:Register select
4	23	EN (Enable) pin of LCD is used for: (a) Brightness (b) Backlight (c) Latching data (d) Refresh signal Ans:Latching data
4	24	In 8255, Port A can be used in: (a) Mode 0 only (b) Mode 2 only (c) Modes 0,1,2 (d) Mode 1 only Ans:Modes 0,1,2
4	25	How many modes does 8255 support? (a) 1 (b) 2 (c) 3 (d) 4 Ans:3
4	26	What is the role of ALE in ADC interfacing? (a) Data latch (b) Signal conversion (c) Address Latch Enable (d) Reset pin Ans:Address Latch Enable
4	27	Which of the following is used for interfacing analog sensors? (a) DAC (b) ADC (c) LCD (d) Stepper Motor Ans:ADC
4	28	Which of the following is essential in keyboard interfacing? (a) PWM signal (b) Row-column scanning (c) ADC (d) SPI Ans:Row-column scanning
4	29	The main control signal for ADC0808 is: (a) PWM (b) SOC (c) TI (d) RS Ans:SOC
4	30	What kind of output does a DAC produce? (a) Digital output (b) Analog voltage (c) PWM (d) Frequency pulses Ans:Analog voltage

UNIT	Q NO	QUESTIONS
4	31	LCDs typically operate in which voltage range? (a) 2–5V (b) 9–12V (c) 12–24V (d) 24–36V Ans:2–5V
4	32	How is a seven-segment display interfaced to 8051? (a) Through DAC (b) Through ADC (c) Direct I/O port (d) RS232 port Ans:Direct I/O port
4	33	Which of these is not required in LCD interfacing? (a) VSS (b) VDD (c) PWM (d) RS Ans:PWM
4	34	The segment 'g' in a 7-segment display is controlled via: (a) Single I/O pin (b) SPI (c) PWM (d) UART Ans:Single I/O pin
4	35	Relay interfacing requires: (a) Voltage divider (b) Optocoupler or transistor driver (c) ADC (d) Buzzer Ans:Optocoupler or transistor driver
4	36	Interfacing a DC motor with PWM allows control of: (a) Voltage only (b) On/off state (c) Speed (d) Phase Ans:Speed
4	37	For displaying 'E' on a seven-segment display, which segment stays OFF? (a) a (b) b (c) c (d) d Ans:c
4	38	You want to connect a temperature sensor to 8051. What component is needed? (a) DAC (b) 8255 (c) ADC (d) Relay Ans:ADC
4	39	To display "2" on a 7-segment display, which segments must be active? (a) a, b, g, e, d (b) a, b, c, d, g (c) a, c, d, e, g (d) a, b, c, e, f Ans:a, b, g, e, d
4	40	A stepper motor needs 4 pulses for one rotation. How many pulses for 5 rotations? (a) 10 (b) 5 (c) 20 (d) 4 Ans:20

UNIT	Q NO	QUESTIONS
4	41	If Port A of 8255 is set to Mode 2, what type of communication can occur? (a) Unidirectional (b) Analog (c) Bidirectional (d) Serial only Ans: Bidirectional
4	42	To control an LCD using 4-bit mode, how many data pins are needed? (a) 4 (b) 8 (c) 2 (d) 1 Ans: 4
4	43	Which signal must be toggled to latch a command into an LCD? (a) RS (b) RW (c) EN (d) VSS Ans: EN
4	44	If a key is pressed in row 2 and column 3 of a keypad, the key is: (a) Key at (1,3) (b) Key at (2,3) (c) Key at (3,2) (d) Invalid Ans: Key at (2,3)
4	45	To interface a relay, which transistor configuration is typically used? (a) PNP (b) NPN with flyback diode (c) MOSFET (d) SCR Ans: NPN with flyback diode
4	46	A DAC produces 5V for input 0xFF. What voltage is expected at input 0x80? (a) 2.5V (b) 5V (c) 1V (d) 4V Ans: 2.5V
4	47	Which of the following sequences will rotate a stepper motor clockwise? (a) 1000→0100→0010→0001 (b) 0001→0010→0100→1000 (c) 1010→0101→1010→0101 (d) Random pulses Ans: 0001→0010→0100→1000
4	48	When ADC0808 receives a SOC signal, what happens? (a) Stops conversion (b) Starts conversion (c) Sends data (d) Disables interrupts Ans: Starts conversion
4	49	In LCD interfacing, what must be done after sending a command? (a) Power down LCD (b) Delay for execution (c) Send data (d) Reset controller Ans: Delay for execution
4	50	To scan a keyboard, microcontroller should: (a) Read ADC (b) Monitor serial port (c) Send row signal and read column (d) Control PWM Ans: Send row signal and read column

UNIT	Q NO	QUESTIONS
5	1	Arduino is based on which type of microcontroller? (a) PIC (b) 8051 (c) AVR (d) ARM Ans:AVR
5	2	What is the function of the Arduino IDE? (a) Hardware design (b) Program uploading (c) Software development (d) Data storage Ans:Program uploading
5	3	Which language is used to program Arduino boards? (a) Java (b) C/C++ (c) Python (d) Assembly Ans:C/C++
5	4	What does IoT stand for? (a) Internet on Things (b) Integrated of Things (c) Internet of Things (d) Input of Technology Ans:Internet of Things
5	5	Which of these is a common application of IoT? (a) Washing machine (b) Smart home (c) CRT TV (d) Bluetooth headset Ans:Smart home
5	6	What is a NodeMCU used for in IoT? (a) Display interface (b) Cloud processing (c) Wi-Fi communication (d) Power regulation Ans:Wi-Fi communication
5	7	The Arduino Uno operates at which voltage? (a) 3.3V (b) 5V (c) 9V (d) 12V Ans:5V
5	8	In IoT architecture, the sensing layer includes: (a) Actuators (b) Controllers (c) Sensors (d) Power circuits Ans:Sensors
5	9	Which of these is not an IoT protocol? (a) MQTT (b) HTTP (c) USB (d) CoAP Ans:USB
5	10	The Arduino Uno has how many digital I/O pins? (a) 14 (b) 6 (c) 8 (d) 28 Ans:14

UNIT	Q NO	QUESTIONS
5	11	What is the main role of an actuator in IoT? (a) Sensing data (b) Sending data (c) Controlling hardware (d) Processing data Ans:Controlling hardware
5	12	Which pin on Arduino is used for analog input? (a) D0–D13 (b) PWM pins (c) A0–A5 (d) Reset pin Ans:A0–A5
5	13	Cloud computing in IoT is primarily used for: (a) Data collection (b) Wireless control (c) Data storage and analysis (d) Input from sensors Ans:Data storage and analysis
5	14	What is the function of setup() in Arduino code? (a) Main loop (b) Initialization (c) Sleep mode (d) Reset function Ans:Initialization
5	15	What is the primary benefit of using Arduino in prototyping? (a) Costly hardware (b) Fast development (c) Complex architecture (d) Manual compilation Ans:Fast development
5	16	In IoT, which layer interacts with cloud services? (a) Sensing layer (b) Network layer (c) Application layer (d) Device layer Ans:Application layer
5	17	The ATmega328 microcontroller has how many bits? (a) 8-bit (b) 16-bit (c) 32-bit (d) 64-bit Ans:8-bit
5	18	The IoT device that sends sensor data to the cloud is called: (a) Client (b) Gateway (c) Controller (d) Sink node Ans:Gateway
5	19	Which of these is a feature of Arduino Uno? (a) Dual-core processor (b) Built-in Wi-Fi (c) USB interface (d) Touchscreen Ans:USB interface
5	20	An IoT system's ethics focuses mainly on: (a) Cost management (b) Data privacy and security (c) Hardware reuse (d) Signal strength Ans:Data privacy and security

UNIT	Q NO	QUESTIONS
5	21	You want to turn on an LED when temperature exceeds 30°C in Arduino. What logic is applied? (a) if(temp > 30) (b) while(temp < 30) (c) delay(30) (d) loop(temp == 30) Ans:if(temp > 30)
5	22	Which function runs repeatedly in Arduino code? (a) setup() (b) init() (c) loop() (d) main() Ans:loop()
5	23	Which of the following is an open-source microcontroller platform? (a) Raspberry Pi (b) Arduino (c) PIC (d) 8051 Ans:Arduino
5	24	Which component enables IoT devices to connect to the Internet? (a) Sensor (b) Actuator (c) Wi-Fi module (d) ADC Ans:Wi-Fi module
5	25	What is the purpose of the TX pin on Arduino? (a) Receive data (b) Transmit data (c) Transfer voltage (d) Trace code Ans:Transmit data
5	26	What is the function of the RX pin on Arduino? (a) Read analog values (b) Reset board (c) Receive serial data (d) Power on Ans:Receive serial data
5	27	The IoT system uses sensors mainly for: (a) Controlling devices (b) Sending messages (c) Collecting data (d) Processing data Ans:Collecting data
5	28	What does the digitalWrite() function do in Arduino? (a) Reads input (b) Outputs analog signal (c) Sets pin HIGH/LOW (d) Delays program Ans:Sets pin HIGH/LOW
5	29	What is the baud rate of Arduino Uno's serial communication by default? (a) 4800 (b) 9600 (c) 19200 (d) 115200 Ans:9600
5	30	What is analogRead() used for in Arduino? (a) Write digital output (b) Read analog voltage (c) Read digital input (d) Delay signal Ans:Read analog voltage

UNIT	Q NO	QUESTIONS
5	31	An IoT gateway functions primarily as: (a) Sensor device (b) Actuator (c) Communication bridge (d) Display controller Ans:Communication bridge
5	32	What does the delay() function do in Arduino? (a) Delays in microseconds (b) Delays code execution (c) Pauses analog signals (d) Turns off pins Ans:Delays code execution
5	33	In Arduino, which of the following is NOT a valid data type? (a) int (b) bool (c) char (d) digit Ans:digit
5	34	The function pinMode(13, OUTPUT) does what? (a) Reads pin 13 (b) Sets pin 13 as input (c) Sets pin 13 as output (d) Blinks LED Ans:Sets pin 13 as output
5	35	The architecture of IoT includes which of the following layers? (a) Sensing, network, application (b) Network only (c) Control and reset (d) Code and storage Ans:Sensing, network, application
5	36	Which of the following is a feature of Arduino Uno? (a) Built-in camera (b) Analog input pins (c) Onboard GPS (d) Relay control board Ans:Analog input pins
5	37	What happens if you forget to use pinMode() for an output pin? (a) Nothing (b) Pin works normally (c) Pin won't function correctly (d) Code runs faster Ans:Pin won't function correctly
5	38	You want to blink an LED connected to pin 9 of Arduino. Which function is used to output HIGH to pin 9? (a) pinMode(9, INPUT) (b) digitalRead(9) (c) digitalWrite(9, HIGH) (d) analogRead(9) Ans:digitalWrite(9, HIGH)
5	39	In Arduino, to measure temperature using an LM35 sensor, which function should be used? (a) digitalWrite() (b) analogRead() (c) pinMode() (d) analogWrite() Ans:analogRead()
5	40	If an IoT device must send data every 5 seconds, which Arduino function helps achieve this? (a) analogRead() (b) delay(5000) (c) digitalRead() (d) millis() Ans:delay(5000)

UNIT	Q NO	QUESTIONS
5	41	To control a motor using PWM on pin 6 in Arduino, which function is used? (a) digitalWrite() (b) analogWrite(6, value) (c) pinMode() (d) pwmOut() Ans:analogWrite(6, value)
5	42	You want to read data from a DHT11 humidity sensor connected to Arduino. What must be done first? (a) Call loop() (b) Include the DHT library (c) Use a battery (d) Set analog pin Ans:Include the DHT library
5	43	Which command initializes serial communication in Arduino at 9600 baud rate? (a) Serial.print(9600) (b) Serial.begin(9600) (c) Serial.init() (d) Serial.connect() Ans:Serial.begin(9600)
5	44	In an IoT project, if Wi-Fi is needed, which board is most suitable? (a) Arduino Uno (b) ATmega16 (c) NodeMCU (d) 8051 Ans:NodeMCU
5	45	You are using an LDR sensor in an IoT system. What value will analogRead() return in bright light? (a) Near 0 (b) Near 512 (c) Near 1023 (d) Negative value Ans:Near 1023
5	46	Which function displays sensor data on serial monitor in Arduino? (a) Serial.begin() (b) Serial.print() (c) digitalWrite() (d) analogWrite() Ans:Serial.print()
5	47	To connect Arduino to a cloud IoT platform, which module is commonly used? (a) L298N (b) ESP8266 (c) MAX232 (d) LM393 Ans:ESP8266
5	48	You are interfacing a relay with Arduino. What is required for safe operation? (a) Direct GPIO (b) Buzzer (c) Transistor as switch (d) Capacitor only Ans:Transistor as switch
5	49	In a smart irrigation system using IoT, which sensor is primarily used? (a) IR sensor (b) DHT11 (c) Soil moisture sensor (d) Gas sensor Ans:Soil moisture sensor
5	50	Which command should be used to continuously check for sensor value in Arduino? (a) if condition in loop() (b) digitalWrite() once (c) setup() only (d) delay(10000) Ans:if condition in loop()

UNIT NO	PART B/C	Q. NO	QUESTION
1	B	1	List the main features of 8051 microcontroller.
1	B	2	Write short notes on oscillator and clock circuit in 8051.
1	B	3	Explain the role of ALE pin in 8051.
1	B	4	Write the function of each port in 8051.
1	B	5	Describe the structure of PSW register.
1	B	6	Explain the use of DPTR register in 8051.
1	B	7	State the function of RS1 and RSO bits in the flag register of Intel 8051 microcontroller?
1	B	8	Write a short note on interrupt structure of 8051.
1	B	9	Explain the function of accumulator in 8051.
1	B	10	Write short notes on external memory interfacing with 8051.
2	B	1	State the difference between MOV and MOVC instructions.
2	B	2	Explain the classification of 8051 instructions.
2	B	3	Write a short note on immediate and direct addressing modes.
2	B	4	Explain register indirect addressing with an example.
2	B	5	Differentiate between jump, call, and return instructions.
2	B	6	Write an ALP for 16-bit addition.
2	B	7	Write an ALP for 8-bit multiplication.
2	B	8	Write short notes on BCD to HEX conversion.
2	B	9	Write a program to find the smallest of three numbers.
2	B	10	Explain bit manipulation instructions with two examples.
3	B	1	Write an ALP for generating a delay using a register.
3	B	2	What is meant by serial port programming?
3	B	3	List any two interfacing techniques of 8051.
3	B	4	Explain the steps to configure Timer 0 in mode 1.
3	B	5	Write a program to toggle P1.0 continuously using timer delay.
3	B	6	Explain the function of TMOD register with bit format.
3	B	7	Write a short note on SCON register.
3	B	8	Draw the block diagram of RS232 and explain its connection with 8051.
3	B	9	Explain the operation of SBUF register.
3	B	10	Write a short note on IE and IP registers.
4	B	1	Explain the modes of operation of 8255.
4	B	2	Draw the block diagram of 8255.
4	B	3	Explain the interfacing of 8051 with a relay.
4	B	4	Write short notes on seven segment display interfacing.

4	B	5	Explain the principle of LCD interfacing with 8051.
4	B	6	Write a short note on keyboard interfacing with 8051.
4	B	7	Explain the interfacing of stepper motor with 8051.
4	B	8	Explain ADC interfacing with 8051.
4	B	9	Explain DAC interfacing with 8051.
4	B	10	Write short notes on PWM-based DC motor control.
5	B	1	Draw the block diagram of Arduino Uno.
5	B	2	Write short notes on features of Arduino.
5	B	3	Explain the role of digital and analog pins in Arduino.
5	B	4	Write a short note on IoT architecture.
5	B	5	Explain the role of sensors and actuators in IoT.
5	B	6	Write a short note on IoT services.
5	B	7	Explain three applications of IoT in real life.
5	B	8	Write a short note on IoT ethics.
5	B	9	Explain the role of Arduino in IoT applications.
5	B	10	Explain how IoT can be used in smart agriculture.
1	C	1	Explain the architecture of the Intel 8051 with a neat block diagram and describe the functions of each block.
1	C	2	Explain the internal memory organization of the Intel 8051 including RAM, ROM, SFRs and external memory.
1	C	3	Draw and explain the pin diagram of 8051 and describe the function of each pin.
1	C	4	Explain the Special Function Registers (SFRs) of 8051 including PSW, ACC, B register, SP, DPTR, IE and IP.
1	C	5	Discuss the control signals of 8051 (ALE, PSEN, EA) and explain their importance in system design.
2	C	1	Explain arithmetic and logical instructions of 8051 with suitable examples.
2	C	2	Explain the different addressing modes of 8051 with suitable examples.
2	C	3	Write an assembly language program for 16-bit addition and explain the logic.
2	C	4	Write an assembly language program for :I. 8-bit multiplication II. BCD to HEX conversion
2	C	5	Explain branching and bit manipulation instructions with examples.
3	C	1	Explain the I/O ports of 8051 and discuss bit addressing with suitable examples.
3	C	2	Explain the Timer/Counter of 8051, its SFRs and different modes of operation.
3	C	3	Explain Serial Communication in 8051 with SFRs and describe the RS232 standard.
3	C	4	Explain the interrupt structure of 8051 including interrupt sources, vector

			addresses, IE and IP registers.
3	C	5	Explain 8051 Serial Port Programming and its interfacing with RS232.
4	C	1	Explain IC 8255 with block diagram and describe its modes of operation.
4	C	2	Explain the relay and sensor interfacing with 8051.
4	C	3	Explain interfacing of seven segment LED and LCD with 8051.
4	C	4	Explain ADC and DAC interfacing with 8051.
4	C	5	Explain DC motor interfacing using PWM and stepper motor interfacing with 8051.
5	C	1	Explain Arduino with block diagram, features and applications. Refer to Arduino Uno.
5	C	2	Explain the architecture of IoT with neat diagram.
5	C	3	Discuss IoT services and applications in detail.
5	C	4	Explain IoT ethics and security issues.
5	C	5	Compare 8051 and Arduino in terms of architecture, features and applications.