

NATIONAL INSTITUTE OF BUSINESS MANAGEMENT

Diploma in Software Engineering 23.1

Introduction to Computer Science - Exam Paper

Instructions: Answer ALL questions

Time Allocated: 3 hours

02nd of May 2023

Question 01 (20 Marks)

- i. Convert the following numbers to their Binary equivalents.
a) 70_{10} b) $B02_{16}$ c) 34_8 d) 220_{16} **(08 Marks)**
- ii. Convert the following numbers to their Decimal equivalent.
a) 101111_2 b) 56_8 c) $4A_{16}$ d) 12_{16} **(08 Marks)**
- iii. Perform the following binary operations.
a) $1011011 / 101$
b) $101001 * 101$ **(04 Marks)**

Question 02 (10 Marks)

- i. Perform the following calculations using one's complement method. (Use 8-bit format)
 $(50_{10}) + (-92_{10})$ **(03 Marks)**
- ii. Perform the following calculations using two's complement method (Use 8-bit format)
 $(70_{10}) + (-24_{10})$ **(03 Marks)**
- iii. Represent $+250.125$ in IEEE 754 32-bit representation **(02 Marks)**
- iv. What is represented by the following ASCII Hexadecimal code?
 $49\ 20\ 4C\ 6F\ 76\ 65\ 20\ 6D\ 79\ 20\ 4C\ 69\ 66\ 65$ **(02 Marks)**

Question 03 (10 Marks)

Draw a **flowchart** to accept a series of numbers that end with -99 and to output the number of **even numbers, odd numbers, and zeros** in the number series.

Question 04 (10 Marks)

“RAY’s” is a pharmacy and they offer loyalty discounts according to the amount of purchase the customers make.

Write a **Pseudocode** to get the **Customer’s Name** and **Bill Amount** as inputs and **calculate** and **print** the **Loyalty Discount** and **Final Bill** received by each customer.

Bill Amount	Loyalty Discount
Less than 5000	05%
Less than 7000	10%
Greater than or equal to 7000	15%

$$\text{Final Bill} = \text{Bill Amount} - (\text{Bill Amount} * \text{Loyalty Discount})$$

Question 05 (10 Marks)

- 1) Explain what a software is with examples. Give examples representing each category of software. **(4 Marks)**
- 2) Why is software maintenance difficult compared to hardware? **(3 Marks)**
- 3) How does hardware differ from software? Give at least 3 other characteristics **(3 Marks)**

Question 06 (20 Marks)

1. Briefly explain PAN and LAN **(4 Marks)**
2. Consider the following IP: **(4 Marks)**
192.168.100.10
255.255.255.0
a) What is the class of this IP?
b) What is the network part in this address
3. Briefly explain the OSI Presentation layer **(4 Marks)**
4. Why is an IP Address referred to as Logical Address and MAC Address as a Physical Address **(4 Marks)**
5. State two differences between a Switch and a Router. **(4 Marks)**

Question 07 (10 Marks)

- 1) 1. List 4 components of the system unit **(2 Marks)**
- 2) 2. What is the function of the ROM chip **(2 Marks)**
- 3) 3. A PSU label had AC-240V and 450W. What does it mean? **(2 Marks)**
- 4) 4. Briefly explain the two types of CPU sockets used in a motherboard **(4 Marks)**

Question 08 (10 Marks)

Choose the appropriate answer from the answers given. Each question is given 1 mark.

- 1) Which of the following is a key consideration when designing multimedia content?
 - a) The length of the content
 - b) The amount of text used
 - c) The target audience and their preferences
 - d) The use of only one type of media in the content

- 2) Which of the following is **NOT** a key multimedia design principle?
- a) Proportion
 - b) Contrast
 - c) Repetition
 - d) Complexity
- 3) Which of the following is an example of applying the multimedia design principle of contrast?
- a) Using a monochromatic color scheme
 - b) Using similar font styles for headings and body text
 - c) Placing a large, bold image next to a small, subtle image
 - d) Using a symmetrical layout
- 4) What is the multimedia design principle that involves selecting and arranging visual elements to create a **sense of harmony**?
- a) Contrast
 - b) Proportion
 - c) Unity
 - d) Alignment
- 5) A key consideration when designing a button in UI design is?
- a) The button should blend in with the background
 - b) The button should be small and hard to see
 - c) The button should be easy to identify and use
 - d) The button should have a complex shape
- 6) What is typography in graphic design?
- a) The use of color to convey a message
 - b) The arrangement of visual elements on a page
 - c) The use of typefaces and fonts to communicate a message
 - d) The manipulation of images and graphics
- 7) What is the principle of multimedia design that refers to using visual elements to guide the viewer's eye through a composition?
- a) Unity
 - b) Hierarchy

- c) Balance
- d) Alignment
- 8) Which of the following is a common typeface used for body text in printed materials?
(Ex: newspapers)
- a) Helvetica
- b) Times New Roman
- c) Comic Sans
- d) Brush Script
- 9) Which of the following colors is associated with calmness, trust, and stability?
- a) Red
- b) Blue
- c) Yellow
- d) Green
- 10) Which of the following is a common cultural association with the color white?
- a) Purity and innocence
- b) Danger and warning
- c) Wealth and prosperity
- d) Power and authority

ASCII CHART

	000	001	010	011	100	101	110	111
0000	NULL	DLE		0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EDT	DC4	\$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[k	{
1100	FF	FS	,	<	L	\	l	
1101	CR	GS	-	=	M]	m	}
1110	SO	RS	.	>	N	^	n	~

1111	SI	US	/	?	O	_	o	DEL
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