National Institute of Technology, Delhi

Mid Semester Examination (Autumn 2023)

Branch:	B. Tech	**Semester:**	I st
Title of the Course:	Introduction to Computer Systems	**Course Code:**	CSBB 102
Time:	1.5Hours	**Maximum Marks:**	25

Q. No.	Questions	Marks	COs	BL	PO
Q1.	Simplify the following Boolean expressions: a) $X + \overline{X}Y + \overline{Y} + (X + \overline{Y})\overline{X}Y$ b) $(X + Y)(\overline{X} + Z)(Y + Z)$ c) $\overline{X\overline{Y}Z} + \overline{X\overline{Y}Z}W + X\overline{Z}$	2+2+1	CO3	L3	2
Q2.	Explain briefly the developments in computer technology based on the (a) Hardware (b) Software (c) Computing characteristics (d) Physical appearance, and (e) Their applications.	5	CO1	L1	1
Q3.	This question carries 5 marks: a) Explain the basic functioning of mechanical and optical mouses with the help of sketches. b) What are the basic components of the OCR devices? Explain each component briefly. c) Which input device is used for playing games? Explain it in detail with the help of a diagram. d) Differentiate between an impact printer and a non-impact printer. Give one example of each. e) State the characteristics based on which the efficiency of a printer can be measured.	5*1=5	CO1	L2	2
Q4.	This question carries 5 marks. a) Convert the binary number 1011.010 into its equivalent in decimal form.	2+1+2	CO3	L3	3

	b) Convert the octal number 4567 into its equivalent in decimal system. c) Convert the decimal number 172.983 into its equivalent in hexadecimal system.				
Q5.	a) Briefly classify the computers based on operations performed and methods used to store and process the data and information. b) Explain briefly the classification of computers based on the size and capability. Also, explain the IPO cycle of a computer system.	2.5+2.5	CO1	L2	2

Blooms Level-Wise Marks Distribution

Course Outcome-Wise Marks Distribution
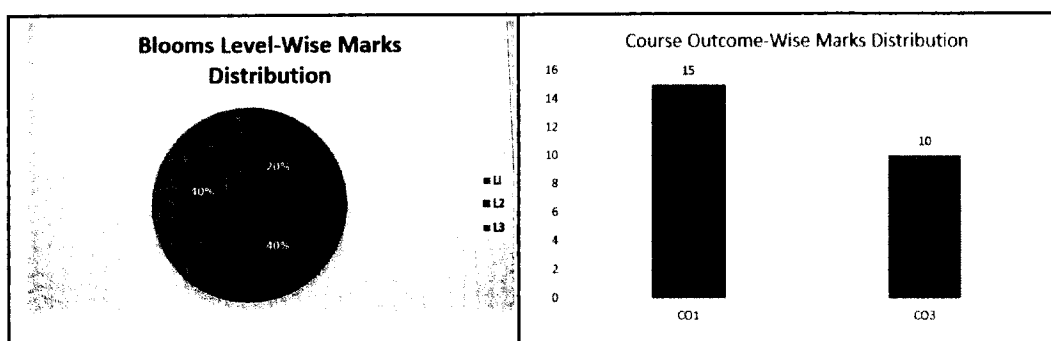
BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes
PO – Program Outcomes;
PI Code – Performance Indicator Code

NATIONAL INSTITUTE OF TECHNOLOGY, DELHI

MID-SEMESTER EXAMINATION

B. Tech (1st Year): Semester-1 (2023)   Course Code: HMBB101

Course Name: Theory and Practices of Human Ethics   Date: 13.10.2023

Time: 1hour 30 minutes   Max. Marks: 25

Instructions: (1) Question no.1 is compulsory for all

(2) Attempt any four out of the five questions from Question No. 2-6.

(3)Each question carries 5 marks.

(4) There are six questions in all.

1 Read the following case study and give answer to the questions that proceeds:

A young civil engineer graduated from an engineering college. He could have easily secured a job. His family was involved in business, but not related to engineering. Due to his family background and being from a well-to-do family, he thought of becoming an entrepreneur and taking up construction contracts. He made a survey of works available and got in touch with worker groups who are generally freelancers taking up jobs as and when they are available. Having got these mechanisms in place, he started bidding for jobs. Most of the jobs were undertaken by the government at that time. He initially got small jobs related to road work. Organizing people and materials for the job and getting the job done satisfactorily and in time was a Herculean task. He faced many difficulties as the workers did not turn up on time, materials needed to be given on credit, etc. Competitive bidding also meant that he had to work on thin margins and could not afford delays. The most difficult part, however, was dealing with the government officials and engineers. His running bills were not getting passed and were delayed for one reason or the other. He talked to other contractors about delays in payment. They advised him to pay some money to the engineer dealing with the work to get his bills passed without delay. Initially he was not happy with this but then decided to give in. After only a few months, he decided that contract jobs were not his cup of

tea and he could not bribe officials for getting his due. His conscience was always nagging him on this. He gave up being an entrepreneur and contractor and decided to take up a salaried job.

(a) Give your viewpoint about the experience of this young engineer.

(b) What according to you should be the supreme goal or goals of studying engineering ethics?

© Do you think such cases are a reason as to why engineers do not become entrepreneurs?

2. How was Big Five discovered and what are the big five dimensions of personality given by this model? Elaborate on each dimension in detail.

3. "The actual action on the gene is dependent on the availability of environment." In this context, discuss the role of environment factors in the formation of personality.

4. Differentiate between the following(ANY TWO):

(a) Internal and External Locus of Control Traits

(b) Field dependent and Field independent Traits

(c) Ethics and Human Values

Support your answer with some examples.

5. Describe how organizations operate as open systems? Explain how organization are invaluable to society, in terms of significant role played by them at the organizational level?

6. Discuss the issue of 'functional chimney problem' in context of functional structures?

What do you mean by organization and what are the basics components of the formal structure in an organization?

National Institute of Technology, Delhi

Examination: B. Tech. Mid Semester Examination October 2023 (Autumn Semester)

Branch	: CSE, ECE, EEE	Semester	: 1st
Title of the Course	: Advanced Calculus	Course Code	: MALB 101

Time: One and Half Hours **Maximum Marks: 25**
Note : All sections are compulsory.

Course Outcomes: Student will be able to:		Cognitive Levels
CO1	Understand the theory and methods of Differential, Integral and Vector Calculus	Understanding Level-II
CO2	Apply different methods for solving problems in Differential, Integral and Vector Calculus	Applying Level-III
CO3	Analyze sequence and series for its convergence. Analyse function for continuity and differentiability. Analyse curves and surfaces for concavity, inflection points, maxima and minima. Compare different integration techniques for finding area and volume.	Analyzing Level-IV
CO4	Evaluate extreme points for function of several variables. Evaluate limits. Evaluate limit of sequences and sum of some convergent series. Evaluate multiple integrals in rectangular, polar, cylindrical, and spherical coordinates.	Evaluating Level-V
CO5	Create power series. Formulate problems on maxima and minima. Combine vector differential calculus and vector integral calculus. Construct counter-examples for theorems and arguments. Formulate problems on integral and vector calculus.	Creating Level-VI

Q.No.	Question	Marks	CO	BL
1	It is given that for the function $f(x) = x^3 + bx^2 + ax$, $x \in [1,3]$, the Rolle's theorem holds with $c = 2 + \dfrac{1}{\sqrt{3}}$. Evaluate the values of a and b.	3	CO4	L5
2	Compute the interval where function is increasing or decreasing and locate the extreme values for the function $f(x) = (x-2)^3(x-3)^2$.	3	CO2	L3
3	Analyse the ranges of values of x for which the curve $y = x^4 - 6x^3 + 12x^2 + 4x + 10$ is concave up or down. Also, find inflection points (if any).	3	CO3	L4

4	Let a function $f(x, y)$ is defined as $$f(x,y) = \begin{cases} (x^2 + y)\sin\left(\dfrac{1}{x^2 + y^2}\right), & if\ (x,y) \neq (0,0) \\ 0,\ if\ (x,y) = (0,0) \end{cases}$$ Evaluate $f_x(0,0)$ and $f_y(0,0)$ (if they exist), else prove that it do not exist.	4	CO4	L5
5	Analyse and sketch the curve for $f(x) = \dfrac{x^3 + 1}{x^2}$ providing all features (including symmetry, increasing/decreasing, maxima/ minima, concavity, inflections, asymptotes).	4	CO3	L4
6	Create the linearisation of the functions at $x = 0$ (a) $f(x) = \dfrac{1}{1 + \tan x}$ (b) $f(x) = \sqrt{1 + x} + \sin x - \dfrac{1}{2}$	4	CO5	L6
7	Apply $\epsilon - \delta$ definition to prove the limit or show that the limit does not exist (at origin) (a) $f(x,y) = \begin{cases} \dfrac{xy^2}{x^2 + y^2}, & (x,y) \neq (0,0) \\ 0,\ (x,y) = (0,0) \end{cases}$ (b) $f(x,y) = \dfrac{y}{x^2 - y}$, where $y \neq x^2$	4	CO2	L3

Bloom's Level wise Marks Distribution

● Level 3   ● Level 4   ● Level 5   ● Level 6

Course Outcome wise Marks Distribution
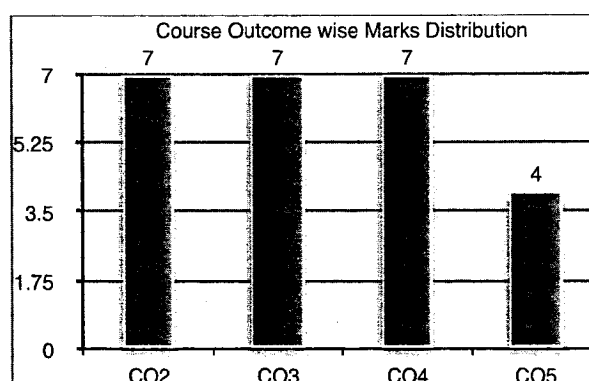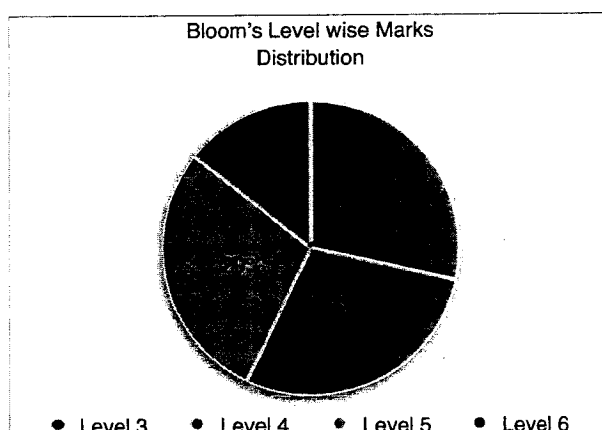
राष्ट्रीय प्रौद्योगिकी संस्थान दिल्ली
NATIONAL INSTITUTE OF TECHNOLOGY DELHI
(शिक्षा मंत्रालय, भारत सरकार के अधीन एक स्वायत्त संस्थान)
(An autonomous Institute under the aegis of Ministry of Education (Shiksha Mantralaya), Govt. of India)
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Name of the Examination: Mid-Semester Examination
(Autumn Semester 2023)

Branch	**CSE-I/CSE-II/EE**	**Semester**	**1st**
Title of the Course	**Engineering Visualization**	**Course Code**	**MEBB-162**
Time: 1.5 Hours		**Maximum Marks**	**25**

Note: All the questions are compulsory and need to be answered. Assume suitable data if required.

Q.No	Questions	Marks	CO	BL	PO
1.	a) Describe the significance of engineering visualization with examples. b) Discuss the curve used to design the shape of the cooling towers of nuclear reactors.	02 02	CO1	L2	01
2.	An area of playground, 144 sq cm on a map represents an area of 36 sq km on the field. Calculate the RF of the scale of the map.	02	CO1	L3	02
3.	Construct a diagonal scale of RF = 3:200 showing meters, decimeters and centimeters. The scale should measure up to 6 meters. Show a distance of 4.56, 5.86 and 2.64 meters. Illustrate the drawing steps of scale.	06	CO2	L3	02
4.	Draw a curve if the distance of focus from the directrix is 70 mm and the eccentricity is 3/4. Also draw a tangent and normal at any point on it. Write the procedures used for drawing this curve.	06	CO-2	L3	03
5.	A circle of 40 mm diameter which rolls outside another circle of 150 mm diameter for one revolution. Draw the curve and also tangent and normal at any point on it. Write the essentials steps used in drawing.	07	CO-2	L3	03

*************************************THE END***

Branch: CSE (B.Tech)
Title of the Course: Problem solving and computer programming
Time: 1 hours 30 min

Semester: I
Course Code: CSBB 101
Maximum Marks: 25

Q.no	Question	Marks	CO	BL	PO
1. There are 6 questions of 25 marks and 2 pages 2. Attempt all questions					
	Section I: Short Answer Questions				
1.a)	Differentiate between variable and keywords as well as variable declaration and variable definition. Also write the rules for naming a variable in C.	1	1	2	
1.b)	Memory space is required depends on the type of data. Justify the given statement.	1	2	3	
1.c)	We can skip the function declaration statement in case the function is defined before being used. Do you agree with the given statement. Justify your answer	1	3	2	
1.d)	Determine the valid Variable names. If invalid, explain why? a) record3 b) $tax c) name_and_address d) 123-45-6789	2	2	2	
	Section II				
2.	What is a switch statement, and when is it used in programming. Illustrated with an example	3	1	1	
3.	With the help of a program show the key difference between a while loop and a do-while loop	3	2	2	
4.	For the program given below, Draw a clear Flow Chart and write the output if the value for **i** entered by the user is **372**. Assume size of **int** is 2bytes.	3	1,2	3	

```c
#include<stdio.h>
int main( )
{
    unsigned int i, j, temp, result = 0;
    scanf("%d", &i );
    for( j = 0;  j < ( sizeof(int) * 8 );  j++ )
    {
        temp = ( ( i & ( 1 << j ) ) >> j );
        printf("%d ", temp );
        if( ! temp )
            continue ;
        result += temp;
    }
    printf("\nResult = %d", result );
    return 0;
}
```

5.	Specify the error(s) (if any) in each of the following. Describe in maximum 2 sentences otherwise.
	   a) for(;;) break;
	   b) switch(5) case 2: ;
	   c) (++i)++;
		6	2	4	

6.	Consider an N digit number K. Square it and add the right N digits to the left N or $N-1$ digits. If the resultant sum is K, then K is called a Kaprekar number. For example, 9 & 297 are Kaprekar numbers, as $9^2 = 81$, 8+1 =9 and 297^2 =88209, 88+209 =297. Write a program to print first 15 Kaprekar Numbers.	5	2	3	