

**B. Tech.**  
**Year: I Semester: II**  
**Test-II (Examination): 2022-23**  
**Ordinary and Partial Differential Equations**

Max Marks: 15

Time: 1 Hr.

Note: Attempt ALL questions. ALL questions carry equal marks.

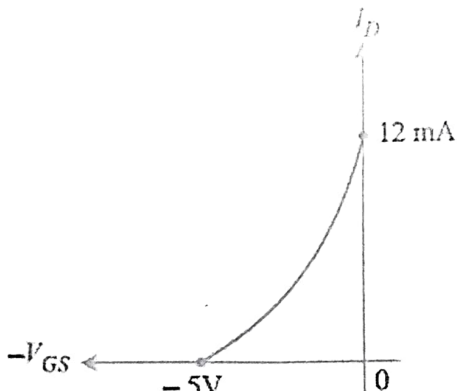
Que1.	Attempt any Two parts of the following. Q. 1 (a) is compulsory.	Marks	CO	BL	PO	PI Code
a)	Solve $(D^3 - 7DD'^2 - 6D'^3)z = x^2 + xy^2 + y^3 + \cos(x - y)$ .	5	6	2/3	1	1.1.1
b)	Solve $x^2 \frac{\partial^2 z}{\partial x^2} - 4xy \frac{\partial^2 z}{\partial x \partial y} + 4y^2 \frac{\partial^2 z}{\partial y^2} + 6y \frac{\partial z}{\partial y} = x^3 y^4$ .	3	6	3	1	1.1.1
c)	Solve $x(x^2 + 3y^2)p - y(3x^2 + y^2)q = 2z(y^2 - x^2)$ .	3	6	3	1	1.1.1
Que 2.	Attempt any Two parts of the following. Q. 2 (a) is compulsory					
a)	A string is stretched and fastened to two points $l$ apart. Motion is started by displacing the string in the form $y = a \sin\left(\frac{\pi x}{l}\right)$ from which it is released at time $t = 0$ . Find the displacement of any point at a distance $x$ from one end at time $t$ .	4	4,5	2/3	1	1.1.1
b)	Solve the differential equation $\frac{\partial u}{\partial t} = \alpha^2 \frac{\partial^2 u}{\partial x^2}$ for the conduction of heat along a rod without radiation, subjected to the following conditions: (i) $u$ is not infinite for $t \rightarrow \infty$ . (ii) $\frac{\partial u}{\partial x} = 0$ for $x = 0, x = l$ , (iii) $u = lx - x^2$ , for $t = 0$ , between $x = 0$ and $x = l$ .	3	4,5	2/3	1	1.1.1
c)	Using method of separation of variables, solve $4 \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u.$ Given $u = 3e^{-y} - e^{-5y}$ , when $x = 0$ .	3	4,5	3	1	1.1.1

## FUNDAMENTALS OF ELECTRONIC ENGINEERING

Time: 1 Hrs.

Max. Marks: 10

Note: Attempt all questions.

Q. No.	Questions	Marks	CO	BL	PI
1.	Attempt any two parts of the following. Q1(a) is compulsory.	05			
1(a)	 <p>i) The fig. shows the transfer characteristic curve of a JFET. Write the equation for drain current.</p> <p>ii) A JFET has a drain current of 5 mA. If <math>I_{DSS} = 10</math> mA and <math>V_{GS}(\text{off}) = -6</math> V, find the value of (i) <math>V_{GS}</math> and (ii) <math>V_P</math>.</p>	3	CO2	L5, L6	1.3.1
1(b)	<p>i) The data sheet for an E-MOSFET gives <math>I_{D(on)} = 500</math> mA at <math>V_{GS} = 10</math> V and <math>V_{GS(th)} = 1</math> V. Determine the drain current for <math>V_{GS} = 5</math> V.</p> <p>ii) Draw the basic construction, drain characteristics and symbols for Enhancement type and depletion type MOSFETs? (only diagrams)</p>	2	CO1	L1, L5	1.3.1
1(c)	<p>i) Minimize and draw the logic circuit for the following output:  <math>Y(A, B, C) = A'B'C + A'BC + AB'</math></p> <p>ii) Solve the following using K-map  <math>F(A, B, C, D) = \sum(0, 2, 5, 7, 8, 10, 13, 15) + d(4, 6, 12, 14)</math></p>	2	CO3	L5	1.3.1
2.	Attempt any two parts of the following. Q2(a) is compulsory.	5			
2(a)	<p>Explain ideal differential amplifier with proper diagram and define its any four ideal characteristics. Derive the expression for:</p> <p>i. Differential Gain <math>A_d</math></p> <p>ii. Common mode Gain <math>A_c</math></p>	3	CO4	L1, L2	1.3.1
2(b)	<p>An Op-Amp is used in following modes with <math>R_1 = 2\text{ k}\Omega</math> and <math>R_f = 200\text{ k}\Omega</math>, <math>V_i = 20\text{ mV}</math> and <math>V_{cc} = \pm 12</math> V. Find <math>V_o</math> in each case.</p> <p>i. Inverting mode      ii. Non-inverting mode</p>	2	CO4	L3, L5	1.3.1
2(c)	<p>Draw a schematic diagram of Cathode Ray Tube (CRT) and explain its structure along with its main components.</p>	2	CO6	L1	1.3.1

CO= Course Outcomes (as per the syllabus made for BEC-105 according to NEP)

BL= Bloom Taxonomy (1- Remembering, 2- Understanding, 3 - Applying, 4 - Analysing, 5 -Evaluating, 6 - Creating)

PI- Program Indicator (Reference to Examination Reform AICTE (Page 15) - Program Outcome-1.3 Demonstrate competence in engineering fundamentals, Program Indicator- 1.3.1 Apply fundamental engineering concepts to solve engineering problems)

**B. Tech.**  
**Year: I, Semester: II**  
**Test-II (Examination): 2022-2023**  
**FUNDAMENTALS OF COMMUNICATION SYSTEMS**

Time: 1 Hr.

Max Marks: 10

Note: Attempt ALL questions. ALL questions carry equal marks.

Q1.	Attempt any Two parts of the following. Q. 1 (a) is compulsory.	Marks	CO	BL	PO	PI Code
a)	Differentiate between the following: i) FDM and TDM ii) Analog Modulation and Digital Modulation iii) PAM and PPM	3	CO4	1,2	1,2	1.3.1
b)	State the sampling theorem and define Nyquist rate. i) Find Nyquist rate and Nyquist interval for the following signal $x(t) = \sin(8\pi \times 10^3 t)$ . ii) What is the suitable value for the sampling rate if the highest frequency component of a speech signal needed for telephonic communication is about 3.1 kHz.	2	CO4, 5	1,3	1,2	1.3.1
c)	Explain Pulse Code Modulation in brief with proper diagrams.  Also define crosstalk.	2	CO4	1,4	1,2	1.3.1
Q2.	Attempt any Two parts of the following. Q. 1 (a) is compulsory.					
a)	What do you understand by signal to noise ratio and figure of merit. Discuss with proper mathematical expressions.  Also define Atmospheric noise and Modulation noise.	3	CO5, 6	1,2	1,2	1.3.1
b)	Briefly explain the effect of noise on signal performance. Also list the types of noise.	2	CO5	1,2, 4	1,2	1.3.1
c)	Explain GSM architecture in detail with suitable diagram.	2	CO6	1,2	1,2	1.3.1

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



**B. Tech. (Electronic & Communication Engineering)****Year : 1<sup>st</sup> Semester : II****Test-II (Examination): 2022-2023****BASIC PROGRAMMING SKILLS****Time: 1 Hr.****Max Marks: 10****Note: Attempt ALL questions.**

Q1	Attempt any Two parts of the following. Q.1 (a) is compulsory. (Unit-III)	Marks	CO	BL	PO	PI Code
a)	Explain the declaration and initialization of 1-D array? Write a C program to read n numbers in an array and split the array into two arrays even and odd such that the array even contains all the even numbers and other is odd. So the output will be— (eg. Original array is 7,9,4,6,5,3,2,10,18,1 Odd array is 7,9,5,3,1 Even array is 4,6,2,10,18 )	3	3	1,2,3	1,2	1.4.1
b)	How string is declared and initialized? Write a C program to check whether the given string is palindrome or not without using built-in function.	2	2	1	1	1.4.1
c)	Define recursion. Write a C program to check whether given number is prime or not using recursion.	2	2	1,2	1	1.4.1
Q2	Attempt any Two parts of the following. Q. 2(a) is compulsory. (Unit-IV)					
a)	What is structure? Explain the C syntax of structure declaration. Write a program to maintain a record of “n” employee detail using an array of structures with three fields(id, name , salary) and print the details of employees whose salary is above 5000.	3	3	1,2,3	1,2	1.4.1
b)	Explain the concept of Call by value and Call by reference with suitable example.	2	2	1,2	1	1.4.1
c)	What is a pointer? Write a C program to find the sum and mean of all elements in an array using pointer.	2	2	2	1,2	1.4.1

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

Subject Code	BHM-104
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Roll No.														
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B.Tech. (1<sup>st</sup> Year)  
 Year: 2022-23, Semester: Even  
 Test-2 (Minor Examination)  
 Human Values & Professional Ethics

Time: 1 Hr

Max. Marks:20

Note: Attempt all questions. All questions carry equal marks.

Q1.	Attempt any two parts of the following. Q1(a) is compulsory	Marks	CO	BL	PO
a)	What do you understand by ethics as the science of morality?	6	1	2	8
b)	How ethics is complementary to religion?	4	4	1	8
c)	What is ethics? Discuss about its origin.	4	2	3	8

Q2.	Attempt any two parts of the following. Q2(a) is compulsory				
a)	What is Professional Ethics. What is its relevance at workplace?	6	2	4	8
b)	Discuss about various ethical approaches.	4	1	5	8
c)	Through light on relevance of business and corporate ethics	4	5	5	8

Subject Code: BHM-155

Roll No

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**B. Tech.**  
**Year: 1<sup>st</sup> Semester: 2<sup>nd</sup>**  
**Test-II Examination, 2022-2023**  
**Engineering Economics**

**Time: 1 Hrs.**

**Max. Marks: 20**

**Note:** Attempt **ALL** questions. Each question carries equal marks.

**Q1.** Attempt any **TWO** parts of the following. **Q. 1(a)** is compulsory.

- a) Define fixed cost, variable cost, average cost, and marginal cost in the context of production. (6)
- b) What is opportunity cost and how is it relevant to decision-making in production? (4)
- c) Explain the difference between short-run and long-run cost. (4)

**Q2.** Attempt any **TWO** parts of the following. **Q. 2 (a)** is compulsory.

- a) What is national income, and how is it measured in an economy? Discuss the main methods used to calculate national income. (6)
- b) Compare and contrast the characteristics of perfect competition and imperfect competition in the market structure. (4)
- c) How is a monopoly different from other market structures, and what are the potential implications for consumer welfare? (4)