AUTUMN MID SEMETER EXAMINATION-2022
Subject: ENGLISH

Code: HS10001

Full Marks: 20

Time: 1.5 Hrs

Answer any FOUR QUESTIONS including question No. 1 which is compulsory.The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only

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1. Answer the following questions [5×1=5]

(a) Communication comes from the Latin word _____that means 'to share, to impart, or to commune.'
i. Communis
ii. Communion
iii. Communicare
iv. Communic

(b) Paralinguistic communication is so innate to us that we often employ and understand it with little or no _____.
i. Skills
ii. Education
iii. Assistance
iv. Conscious Effort

(c) In rigidly structured organizations, fear or awe of superiors prevents subordinates from speaking frankly. This is an example of a which kind of barrier in communication?

i. Intrapersonal barrier.
ii. Organizational barrier.
iii. Interpersonal barrier.
iv. Cultural barrier.

(d) Why did Della save money to buy Jim an expensive gift?

(e) What did Jim possess that would make King Solomon envious?

2. What are the differences between 'General' and 'Technical' communication? Explain with suitable example. [5]

3. Explain how Gustorics and Olfactics helps in effective communication. [5]

4.Read the following stanza and answer the questions that follow: [5]

He gives his harness bells a shake
To ask if there is some mistake.
The only other sound's the sweep
Of easy wind and downy flake

a) Who is he in the above stanza? (1)
b) What do you mean by the "downy flake"? (1)
c) How many sounds are mentioned in the poem? (3)

5. Define mass communication by providing suitable examples. Explain the characteristics of mass communication. [5]

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B. Tech.
1st Semester
(Regular) SAS-2022

MID SEMETER EXAMINATION-2022
Subject: Differential Equations & Linear Algebra
Code: MA 11001
Sections: B33, B34 & B35

Full Marks: 20 **Time: 1.5 Hrs**

Answer any FOUR QUESTIONS including question No. 1 which is compulsory. The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only

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1. Answer the following questions [5×1=5]

(a). Find the order and degree of the differential equation $y'' = \sqrt{y' + 2x}$.

(b). Find the orthogonal trajectory for $y = cx$. $y = \sqrt{c - x^2}$

(c). Test the exactness of the differential equation $\sin x \cos y dx + \cos x \sin y dy = 0$.

(d). Apply the operator $(D^2 - I)$ on $\sin x$. $-2\sin x$

(e). Check the following functions are linearly independent or not on the given interval $\ln x,\ \ln(x^3), x > 1$. Linea Dependent

2. (a). Solve the *IVP* [3]

$y' = (x + y - 2)^2, \quad y(0) = 2$ $y = \tan x - x + 2$

(b). Find the general solution of the given ODE [2]

$y' + (4/x)y = 8x^3$. $y = x^4 + x^{-4}c$

3. (a). Find the particular solution of the given ODE [3]

$y' + xy = xy^{-1}, y(0) = 3$ $y^2 = 1 + 8e^{-x^2}$

(b). Find an ODE for which the given $y(x)$ is a general solution. [2]

$y(x) = c_1 e^{-x} + c_2 e^{3x}$ $y'' - 2y' - 3y = 0$

4. (a). Test the exactness. If not exact then find an integrating factor and solve [3]

$(x^2 + y^2)dx - 2xydy = 0.$

(b). Find a basis of solutions of the ODE by method of reduction of order [2]

$xy'' + 2y' + xy = 0, \quad y_1 = \frac{\sin x}{x}$.

5. (a). If a wet sheet in a dryer loses its moisture at a rate proportional to its moisture content, and if it loses half of its moisture during the first 10 minute of drying, when will it be practically dry, say, when will it have lost 99% of its moisture? [3]

66.4 min

(b). Find a general solution of the differential equation [2]

$y'' + 8y' + 15y = 0.$ $y_1 = c_1 e^{-3x} + c_2 e^{-5x}$

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B.Tech
1st Semester (Regular)
SAS-2022

AUTUMN MID SEMETER EXAMINATION-2022
Subject: CHEMISTRY
Code: CH-10001

Full Marks: 20 **Time: 1.5 Hrs**

Answer any FOUR QUESTIONS including question No. 1 which is compulsory.The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only

Q1.	Answer the following questions	[5×1=5]
	(a) For a reaction M_2O (s) ⟶ 2M (s) + ½ O_2 (g); ΔH = 30kJmol^{-1} and ΔS = 0.07kJmol^{-1} at 1 atm. Calculate up to which temperature, the reaction would not be spontaneous. (b) In thermodynamics, two very similar terms Heat (Q) and Heat content (H) are used. Explain the significance of the term Q and H. (c) Describe the physical significance chemical potential? (d).5mole of an ideal gas is expanded from 1lit. to 10lit. isothermally at 27 °C. Calculate the heat change. (e) For a reversible process of heat transfer, entropy change is always zero- justify the statement.	
Q2.	Establish Clapeyron-Clausius equation for liquid-vapor equilibrium. On the basis of the equation developed, prove that dp/dT is positive.	[5]
Q3.	3 mole of H_2 gas was mixed with 4 mole of Ar gas. Calculate $(\Delta S)_{mix}$ and $(\Delta G)_{mix}$ at 300K assuming ideal gas behavior.	[5]
Q4.	(a) One mole of a diatomic gas was initially at 25 ^{0}C temperature and 1 atm pressure. The gas was transferred to the state when temperature is 100 ^{0}C and pressure is 10 atm. Calculate the entropy change. (C_v for a diatomic ideal gas is 5R/2). b) If the atmospheric pressure is 540mm of Hg, find the temperatureat which water will boil? Latent heat of vaporization of water is 560cal/g.	[2.5 X 2]
Q5	(a) The vapor pressure of a liquid increase 3 times when the temperature increases from 25 °C to 45 °C. Calculate the enthalpy of vaporization for the liquid. (b) Show that $[\partial(\Delta G/T)/\partial T]_p = -\Delta H/T^2$ where G, H, T, P have their original meanings.	[2.5 X 2]

AUTUMN MID SEMETER EXAMINATION-2022
Subject: Basic Electronics
Code: EC-10001

Full Marks: 20 **Time: 1.5 Hrs**

Answer any FOUR QUESTIONS including question No. 1 which is compulsory.The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only

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1. Answer the following questions **[5×1=5]**

(a)Define forbidden energy gap.

(b) Distinguish between extrinsic and intrinsic type of semiconductor.

(c) Write mass action law and define all its parameters.

(d) What do you mean by equivalent circuit. Briefly explain the diode equivalent circuit.

(e) Define static and dynamic resistance of PN junction dode .

2. (a) Explain the biasing conditions of diode with proper diagram. **[3+2]**
(b) Why Si and Ge are commonly used semiconductor.

3. (a) Explain how zener diode is used as voltage regulator.Also draw its V-I characteristics. **[3+2]**
(b) Write the diode equation and define all the parameters.

4. Differentiate between half wave rectifier and center tap full wave rectifier. Find the efficiency and ripple factor for center tap full wave rectifier. **[5]**

5. (a)What is an ideal diode? How it is different from normal Si/Ge diode? Explain the behavior of ideal diode and Si diode in terms of characteristics curve.

(b)A center tap full wave rectifier has load resistance of 1 KΩ and the necessary input voltage is $200\sin(120\pi t)$ V. Determine (i) peak, average and rms value of load current (ii) dc output voltage (iii) PIV of each diode (iv) efficiency (v) output frequency. (Assume diodes to be ideal diode) **[3+2]**

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dipo'

dopels

dopels

AUTUMN REPEAT MID-SEMESTER EXAMINATION-2022

School of Electrical Engineering

Kalinga Institute of Industrial Technology

1st Semester

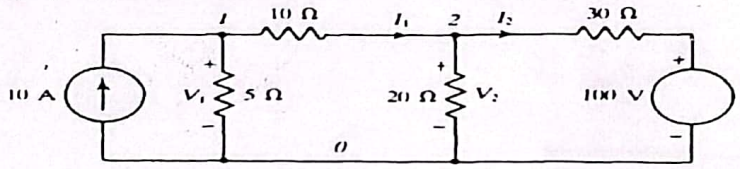
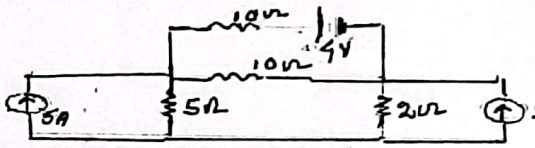
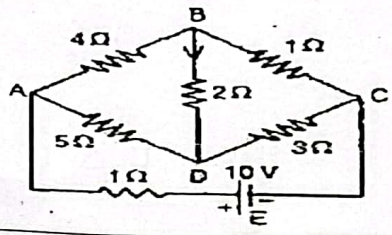
Subject: Basic Electrical Engineering (EE 10002)

Time: 1.5 hours **Full Marks: 20**

Answer any FOUR questions including question No.1 which is compulsory.

The figures in the right-hand side indicate full marks.

All parts of a question should be answered at one place only.

Question No	Question	CO Mapping	Marks
Q1.	Answer the following questions.		[1x5]
a	Define linear and Non-linear Network.	1	
b	Define Kirchhoff's current and voltage law.	1	
c	Define Time Period and Cycle in a sinusoidal waveform.	2	
d	If 3 resistances of each 30 Ω are connected in star. Find the delta resistances.	1	
e	An alternating voltage is given by V = 100 sin 314t volts. Its rms value will be ?	2	
Q.2	Solve for the current in the 5 Ω resistor of the network by superposition Theorem? 	1	[5]
Q.3	Solve for the current through the 2 ohm resistor using Nodal analysis?  2.75	1	[5]
Q.4	Determine the total current delivered by the battery using Delta-star conversion?  2.51A	1	[5]
Q.5	An alternating voltage having an RMS value of 100 V varying sinusoidally having a frequency of 60 Hz. Write the equation for the instantaneous value of voltage and find its value at 0.02 second. Find its value at 0.012 second after passing through its positive maximum value.	2	[5]

134.45, 26.81 Volt

$V_{rms} = \frac{V_m}{\sqrt{2}}$

$\omega t + \frac{\pi}{2}$ cos ωt