Roll No. : 97013011

GALGOTIAS COLLEGE OF ENGINEERING AND TECHNOLOGY

1, Knowledge Park-II, Greater Noida, U.P.

Continuous Assessment Examination-I : Odd Semester 2022-23

Course/Branch: B.Tech. EC, EEE, EE, IT, AI&ML, AI&DS.
Subject Name: Soft Skills
Subject Code: BAS105

Semester: I
Max. Marks: 40
Time: 90 Minutes

CO-1: Students will be enabled to understand the correct usages of grammar
CO-2: Students will be able to converse well with effective speaking and listening skills in English

Section – A (CO : 1)

Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1. Discuss what you mean by transformation of sentences with respect to English language. Provide adequate examples.

Q.2. What do you understand by 'word formation processes'? Discuss briefly any two of the following processes:

1. Blending 2. Compounding 3. Clipping.

Q.3. Discuss the importance of the use of 'synonyms' and 'antonyms' in formal communication.

Q.4. Write five compound words from your branch of study. Create a sentence using the compound words.

Q.5. Explain subject-verb agreement in English. Explain any four rules of subject-verb agreement with *relevant examples.*

Section – B (CO: 2)

Attempt **any four** questions. **Question no. 6 is compulsory.** (4x5=20)

Q.6. How listening and speaking skills help Engineers at their work place? Elucidate.

Q.7. Discuss the role of 'Note Taking' for a professional.

Q.8. Can one make a presentation effective by reading script? Discuss your opinion.

Q.9. Give reasons to differentiate articulation and pronunciation.

Q.10. What is content and sequencing in effective speech? Explain.

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Continuous Assessment Examination-I : Odd Semester 2022-23

Course/Branch: B.Tech / IT,EC,EEE,EE,AI&DS,AI&ML | **Semester: I**
Subject Name: Engineering Chemistry | **Max. Marks: 40**
Subject Code: BAS-102 | **Time: 90 Minutes**

CO1: On completion of this course, the student will be able to apply fundamental concepts of chemistry in different fields of Engineering. (K3)

CO4: On completion of this course, the student will be able to illustrate different types of impurities in water and its softening techniques. (K3)

Section – A (CO: 1)

Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1(i) Prepare adipic acid via green route synthesis. (2)

(ii) Write a short note on carbon nanotubes. (2)

(iii) List the following molecules/ ions in order of their increasing bond length N_2, N_2^+, and N_2^- (1)

Q.2 Draw the molecular orbital diagram of **CO & O_2** Calculate bond order and predict their magnetic bahaviour.

Q.3 What do you understand by mesomorphic state and illustrate it with the help of vapour pressure-temperature curve? Discuss its classification.

Q.4 Illustrate the twelve basic principles of green chemistry.

Q.5 Draw neat and well labelled diagram to describe the structure of an allotrope of carbon having truncated icosahedron geometry. Also give its preparation, properties and applications.

Section – B (CO: 4)

Attempt **any four** questions. **Question no. 6 is compulsory.** ***(4x5=20)***

Q.6 (i) *Calculate the GCV and NCV of coal having the following compositions* **C=76%, H=8%, S=10%, N=2%, ash=4%** *and latent heat of steam=***587cal/g**. (2)

(ii) Write a short note on any one of the following

(a) reverse osmosis (b) Scales and sludges (c) Calgon conditioning (2)

(iii) Calculate the temporary hardness of water sample of water containing $Mg(HCO_3)_2$ = 93 mg/L, $Ca(HCO_3)_2$ = **162** mg/L, $MgCl_2$ = **87** mg/L and $CaSO_4$ = **126** mg/L. (1)

Q.7 Explain the Zeolite process of water softening? An exhausted zeolite softener was regenerated by passing **200 L of 5%** NaCl solution. How many litres of hard water sample having hardness **800 ppm** can be softened by this softener?

Q.8 With the help of neat diagram discuss the principle and working of bomb calorimeter. A **0.95 g** sample of solid fuel was completely combusted in the excess of oxygen using bomb calorimeter. The rise in temperature of water in calorimeter was **2.5°C**. Calculate the High calorific value of the fuel. If water taken in calorimeter is **1500 g** and water equivalent of calorimeter is **800 g**.

Q.9 List the raw materials which can be utilized for the Bio-gas manufacturing. How is biogas obtained from cattle dung.

Q.10 (i) Calculate the lime **(90% pure)** and soda **(85% pure)** needed for softening **90,000L** of water containing the following salts: **$CaSO_4$ = 13.6mg/L, $MgCl_2$ = 9.5mg/L, $MgCO_3$ = 8.4mg/L, $Ca(HCO_3)_2$ = 16.2mg/L, HCl = 73.0mg/L, $NaHCO_3$ = 8.1mg/L.**

(ii) 50 mL of standard water containing **1 mg** of pure $CaCO_3$/mL consumed **25 mL of EDTA. 50 mL** of a water sample consumed **25 mL** of same EDTA solution using EBT as indicator. Calculate the total hardness of the water sample in ppm.

OR

(i) 100 mL of a raw water sample on titration with **N/50** H_2SO_4 required **11.8 mL** of acid to phenolphthalein end point and **16.2 mL** of acid to methyl orange end point. Determine the type and extent of alkalinity.

(ii) Calculate the minimum amount of air required for complete combustion of **500kg** of fuel Containing **C = 80%, H = 6%, O = 5%, S= 2%** and rest nitrogen by weight.

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Continuous Assessment Examination-I : Odd Semester 2022-23

Course/Branch: IT/AI-DS/AI-ML/ECE/EE/EEE | **Semester: I**
Subject Name: Fundamental of Mechanical Engineering | **Max. Marks: 40**
Subject Code: BME101 | **Time: 90 Minutes**

CO_1: Apply the concept of force resolution and stress and strain to solve basic problems K2
CO_2: Understand the construction details and working of internal combustion engines, electric vehicle and hybrid vehicles. K3

Section – A (CO : 1)

Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1 Determine the support reactions for the loaded beam shown in fig-1.

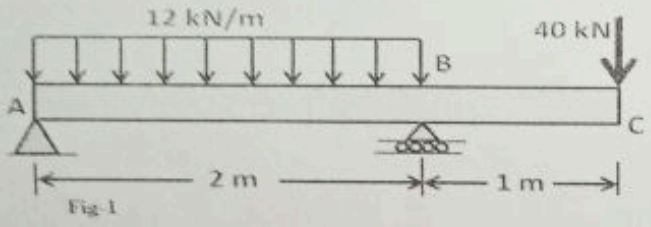

Fig-1

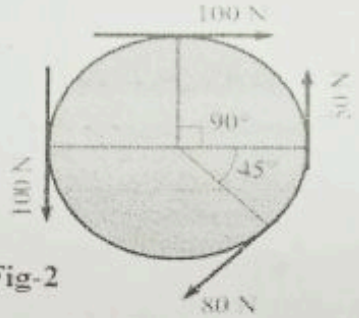

Fig-2

OR

Determine the resultant of the four forces acting tangentially to the circle of 2 m radius as shown in the fig-2. Also find the location of the resultant with respect to the center of the circle.

Q.2 State and explain the principle of transmissibility of forces and Varignon's theorem?

Q.3 What is free body diagram? Also write down the conditions for equilibrium of concurrent and non-concurrent coplanar forces

Q.4 Define Hook's law and Poisson's ratio. Draw and explain important terms in stress-strain diagram for ductile materials.

Q.5 Prove the relation, $E=2G(1+\mu)$

Section – B (CO : 2)

Attempt **any four** questions. **Question no. 6 is compulsory.** **(4x5=20)**

Q.6 What are the components of internal combustion Engine? Discuss them in brief with schematic Diagram.

Q.7 Explain the working of Four Stroke Diesel Engine with schematic diagram.

Q.8 Distinguish between SI & CI Engines

Q.9 Distinguish between Two Stroke & Four Stroke Engines.

Q.10 Distinguish Electrical Vehicle & Hybrid Electrical Vehicles. Also write the advantages and disadvantages of Electrical Vehicles.

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Continuous Assessment Examination-I : ODD Semester 2022-23

Course/Branch: IT,AIDS,AIML ,ECE,EE,EEE
Subject Name: Fundamentals of Electronics Engg.
Subject Code: BEC101

Semester: I
Max. Marks: 40
Time: 90 Minutes

CO 1 : Comprehend PN junction diodes and apply its concept for different applications
CO 2 : Interpret construction and operation of BJT, FET and MOFET

Section – A (CO : 1)

Attempt **any four** questions. **Question no. 1 is compulsory.** **(4x5=20)**

Q.1 Explain the construction , working and V-I characteristics of PN junction diode. Label clearly the knee voltage, break down voltage and reverse saturation current.

Q.2 Draw the circuit and discuss the working of full wave bridge rectifier with suitable input -output waveforms. Derive the PIV of bridge rectifier?

Q.3. Find and sketch V_0 for following clipper network shown in figure 1, Vi is sinusoidal sine wave.

Q.4 Find and sketch Vo for clamper network shown below in figure 2.

Q.5 Determine V_L, I_R , I_Z , and I_L for the network shown in figure 3 for R_L= 150 ohms. Repeat if R_L= 350ohms.

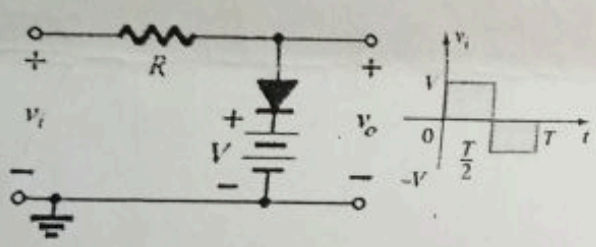

Figure 1.

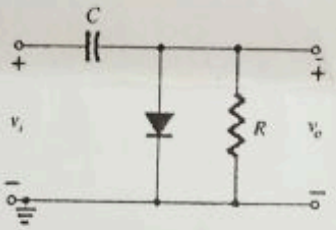

Figure 2.

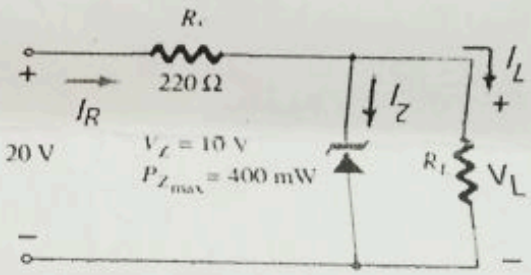

Figure 3.

Section – B (CO : 2)

Attempt **any four** questions. **Question no. 6 is compulsory.** **(4x5=20)**

Q.6 Draw the common emitter circuit and sketch the input and output characteristics. Also explain active region, cutoff region and saturation region by indicating them on the characteristic curve.

Q.7 a) In a common base connection, current amplification factor is 0.9. If the emitter current is 1mA, estimate the value of base current.

b) In a common base connection, the emitter current is 1mA. If the emitter circuit is open, the collector current is 50 μA, estimate the total collector current. Given that $\alpha = 0.92$.

Q.8 Explain the construction and working of N-channel JFET. Draw the drain characteristic and transfer curve.

Q.9 Given I_{DSS} = 9 mA and V_P = -4 V, determine I_D when:

a) V_{GS} = 0 V

b) V_{GS} = -2 V

c) V_{GS} = -4 V

d) V_{GS} = -6 V

Q.10 Differentiate between:

a) JFET vs MOSFET

b) Depletion type MOSFET vs Enhancement type MOSFET

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Continuous Assessment Examination-I : Odd Semester 2022-23

Course/Branch: B.Tech /ALL | **Semester: I**
Subject Name: Engineering Mathematics-I | **Max. Marks: 40**
Subject Code: BAS103 | **Time: 90 Minutes**

CO_1 : Remember the basics of matrices and apply the concept of rank for solving linear simultaneous equations

CO_2 : Apply the concept of differentiation to find nth derivative, Leibnitz theorem, partial derivatives, and total derivatives.

28½ Expected marks
27½ Marks expected

Section – A (CO : 1)

Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1 (i) prove that the matrix $\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$ is unitary. 2½

(ii) If the matrix $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$, then find the Eigen values of $A^3 + 5A + 8I$. 2

Q.2 For what values of λ and μ the system of linear equations: 4

$x + y + z = 6,\ x + 2y + 5z = 10, 2x + 3y + \lambda z = \mu$ has

(i)a unique solution (ii) no solution (iii) infinite solution. Also find solution for $\lambda = 2$ and $\mu = 8$.

Q.3 Find the values of λ for which the vectors (1 , -2, λ), (2, -1, 5) and (3, -5 ,7 λ) are linearly dependent.

Q.4 Find the Eigen values and corresponding Eigen vectors of the matrix $\begin{bmatrix} 1 & -6 & -4 \\ 0 & 4 & 2 \\ 0 & -6 & -3 \end{bmatrix}$. 2½

Q.5 Find the characteristic equation of the matrix $\begin{bmatrix} 4 & 3 & 1 \\ 2 & 1 & -2 \\ 1 & 2 & 1 \end{bmatrix}$ Hence find A^{-1}. 5

Also find matrix represented by $A^7 - 6A^6 + 6A^5 - 11A^4 + A^2 + A - I$.

Section – B (CO : 2)

Attempt **any four** questions. **Question no. 6 is compulsory.** (4x5=20)

Q.6 i) Find the nth derivative of $\log(ax + x^2)$. 2½

ii) Find the nth derivative of $x^2 \sin x$ at $x = 0$.

Q.7 If $u = f(r,s)$ and $r = x + y, s = x - y$ show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 2\frac{\partial u}{\partial r}$ 5

Q.8 If $u = f(r)$, where $r^2 = x^2 + y^2$, Prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f''(r) + \frac{1}{r}f'(r)$.

Q.9 State and Prove Euler's theorem. Also verify deduction Euler's theorem for $u = \log(\frac{x^4+y^4}{x+y})$.

Q.10 If $y = e^{m \cos^{-1} x}$, Prove that $(1-x^2)y_{n+2} - (2n+1)y_{n+1} - (n^2 + m^2)y_n = 0$. 4

Hence find y_n when $x = 0$

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GALGOTIAS COLLEGE OF ENGINEERING AND TECHNOLOGY

1, Knowledge Park-II, Greater Noida, U.P.

Continuous Assessment Examination-I : Even Semester 2022-23

Course/Branch: B.Tech (EC, IT, AI&ML, AI&DS, EEE, EE) **Semester: II**
Subject Name: Programming for Problem Solving **Max. Marks: 40**
Subject Code: BCS 201 **Time: 90 Minutes**

CO1: To develop simple algorithms for arithmetic and logical problems.

CO2: To translate the algorithms to programs & execution in C language

Q.NO	KL, CO	Question	Marks
SECTION A (CO:1)			
Attempt **any four** questions. **Question no. 1 is compulsory.**			(4x5=20)
Q.1	K2, CO1	Describe the following-a) Pseudo code b) Compiler c) Interpreter d) Linker e) Utility Programs	5
Q.2	K3,CO1	Draw the block diagram of computer and explain each of the components in brief.	5
Q.3	K3,CO1	Draw the block structure of operating System. Explain at least five functions of an operating System.	5
Q.4	K2,CO1	Explain the different components of C Language with examples.	5
Q.5	K3,CO1	Write the structure of C program and list the types of errors occurred in any C program.	5

Q.NO	KL, CO	Question	Marks
SECTION B (CO:2)			
Attempt **any four** questions. **Question no. 6 is compulsory.**			**(4x5=20)**
Q.6	K3, CO2	Draw a flowchart and write a c program to make a simple calculator using switch-case method.	5
Q.7	K3,CO2	Explain the type conversion in c with suitable examples.	5
Q.8	K3,CO2	Explain the characteristics of an algorithm. Write an algorithm to swapping of two numbers.	5
Q.9	K3,CO2	Explain the following operators with example- a) Logical Operators b) Bitwise Operators c) Ternary Operator d) sizeof() operator e) Assignment Operator.	5
Q.10	K3,CO2	Write a program and flowchart to compare three numbers and print the largest number.	5

CO- Course Outcomes mapped with respective question
KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1 – Remember K2 – Understand K_3 – Apply K_4 – Analyze K_5 – Evaluate K_6 – Create

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GALGOTIAS COLLEGE OF ENGINEERING AND TECHNOLOGY

Knowledge Park-II, Greater Noida, U.P.

Continuous Assessment Examination-I : Even Semester 2022-23

Course/Branch: B. Tech./ AIML, AIDS/CSE,IT/EEE,ECE
Subject Name: Fundamentals of Electrical Engineering
Subject Code: BEE201

Semester: II
Max. Marks: 40
Time: 90 Minutes

CO 1 : Apply Kirchhoff's laws and network theorems in solving DC circuits. (K3)
CO 2 : Understand the steady state behaviour of single phase and three phase AC circuits. (K2)

Section – A (CO : 1)

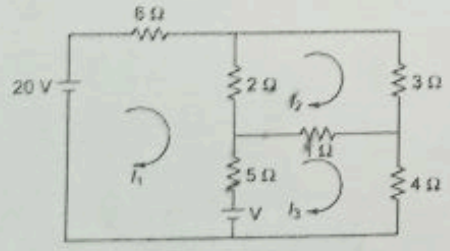
Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1 Explain the following with the help of suitable circuit diagram/graph: (i) V-I characteristics of Ideal and Practical Current Source (ii) Unilateral and Bilateral Elements (iii) Active and Passive Elements (iv) Kirchhoff's Law

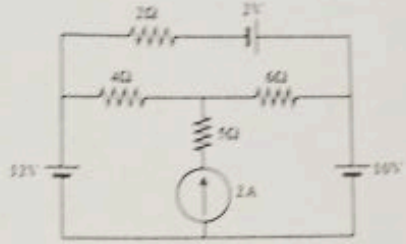
Q.2 Find the value of current flowing through 4 ohm resistor shown in the given figure using nodal analysis.

Q.3 A circuit consists of two parallel resistors, having resistances of 20 ohm and 30 ohm respectively, and is connected in series with a 15 ohm resistor. If the current through 15 ohm resistor is 3 A, find (i) current through 20 ohm and 30 ohm resistors, (ii) the voltage across the whole circuit, and (iii) total power.

Q.4 Using mesh analysis method, determine the voltage V which cause the current I_1 to be zero in the circuit given below:



Q.5 Using mesh analysis method, find the current through all the branches in the circuit given below:

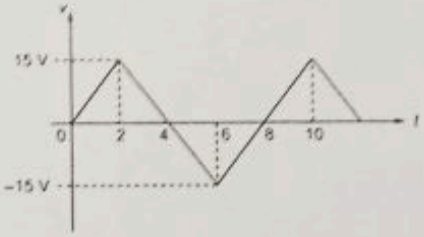


Section – B (CO : 2)

Attempt **any four** questions. **Question no. 6 is compulsory.** (4x5=20)

Q.6 In ac circuit, the current is given by: $i(t) = 141.4\sin(628t + 60°)$ A. If voltage of the circuit is the reference quantity, determine: (i) power factor (ii) rms value of voltage (iii) frequency of the voltage (iv) max. value of voltage and (v) time period.

Q.7 Find the average value and the rms value of the waveforms shown in the given Figure:



Q.8 Two currents i_1 and i_2 are given by the expressions $i_1 = 10\sin\left(\omega t + \frac{\pi}{4}\right)$ and $i_2 = 8\sin\left(\omega t - \frac{\pi}{3}\right)$. Find (i) $i_1 + i_2$, and (ii) $i_1 - i_2$. Express the answers in the form of $i = I_m\sin(\omega t \pm \phi)$.

Q.9 In a purely inductive circuit, prove from first principles, that the current lags behind applied voltage by quarter of a cycle and also show that the average power demand is zero.

Q.10 A series RLC circuit consisting of a resistance of 20Ω, inductance of 0.2H and capacitance of 150μF is connected across a 230V, 50 Hz source. Calculate: (i) The impedance (ii) The current (iii) The magnitude and nature of power factor (iv) The frequency of supply to be adjusted to make power factor unity.

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Continuous Assessment Examination-I :Even Semester 2022-23

Course/Branch: B. Tech/EC/EEE/EE/IT//AI & DS/AI&ML
Subject Name: Engineering Physics
Subject Code: BAS-201

Semester: II
Max. Marks: 40
Time: 90 Minutes

CO1: Understand the concepts of quantization at atomic scale and the need of quantum mechanics.(K2)
CO4: Comprehendthe concepts and applications of fiber optics and LASER.(K2)

Section – A(CO:1)

Attempt **any four** questions. **Question no. 1 is compulsory.** (4x5=20)

Q.1 **a)** Why are matter waves associated with a particle generated only when it is in motion. (1)
b) What is Compton effect? Distinguish between modified and unmodified x-ray. (2)
c)What is wave function? Discuss the physical significance of a wave function. (2)

Q.2 Write the assumptions of Planck's theory of black body radiation. Describe the Davisson-Germer experiment in detail.

Q.3 What is de-Broglie hypothesis? Derive time independent Schrodinger wave equation.

Q.4 Solve the Schrodinger wave equation for a particle in one dimensional box. Obtain energy eigen values and normalized wave function of the particle

Q.5 **a)** Calculate kinetic energy of an electron if its de-Broglie wavelength is equal to 5500Å Given that mass of electron= 9.1×10^{-31}kg, Planck's constant= 6.626×10^{-34}J.sec
b)A particle is confined to one dimensional infinite potential wall of width 2Å. It is found that when the energy of the particle is 230 eV, its eigen function has five antinodes. Find the mass of the particle.

Section – B(CO:4)

Attempt **any four** questions. **Question no. 6 is compulsory.** **(4x5=20)**

Q.6 **a)**Define spontaneous and stimulated emission of radiation, population inversion, meta-stable state. **(2)**
b) A step index fiber has core refractive index 1.466, cladding refractive index 1.460. If the operating wavelength of the ray is $0.85\mu m$ and diameter of core is $50\mu m$.Calculate NA and number of modes supported by the fiber. **(3)**

Q.7 What is acceptance angle and acceptance cone? Derive an expression for acceptance angle and numerical aperture of an optical fiber.

Q.8 Explain the construction and working of He-Ne laser with the help of a well labeled diagram. Why He-Ne laser is superior to ruby laser.

Q.9 Discuss different types of fiber depending on refractive index profile and number of modes.

Q.10 **a)**Ruby laser has two states at 27^0C. If it emits light of wavelength 6000Å, then calculate the relative population ratio.(Boltzmann constant K= 8.6×10^{-5}eV/K).
b)The optical power after propagating through a fiber that is 500m long is reduced to 25% of its original value. Calculate Fiber loss in dB/km.