**Department of English**

**End Semester Examination**

**2022**

***(For the 2nd Semester Students of all the Departments of the Engineering Faculty)***

**ENGUGHU01: Communicative English**

**Full Marks: 80** **Time: 3 Hours**

## Section I

1. Answer **ANY TEN** of the following questions: **2x10=20 Marks**

A. What is code?

B. What is extra-personal communication?

C. Exemplify a Grapevine communication.

D. What is feedback in communication?

E. What is *lingua franca*?

F. Give an example of paralinguistic sound used in communication.

G. Give an example of Horizontal communication.

H. What is the basic difference between general communication and professional communication?

I. What is semantic gap?

J. What is passive listening?

K. Exemplify a barrier in effective listening.

L. How many diphthongs are there in English language?

M. What is phoneme?

N. What is skimming in reading?

O. Give two examples of idioms in English language.

P. What is modal verb? Give an example.

## Section II

2. Answer **ANY FOUR** of the following questions: (word limit 200) **5x4=20 Marks**

A. Distinguish between formal and informal communication.

B. Define body language. Mention some of the gestures we use to communicate.

C. What are the benefits of effective listening?

D. What is monologue?

E. Write a short dialogue between two friends discussing the price hike.

F. What are the important features of close reading?

G. What is a report? Write the characteristics of a good report.

## Section III

3. Answer **ANY FOUR** of the following questions. (word limit 400) **10X4=40 Marks**

A. Define communication. What are the functions of communication? (5+5)

B. Identify the notable barriers of an Effective Communication. Discuss the means to overcome those barriers. (6+4)

C. Define Organizational communication. What are the demerits of Grapevine communication? (5+5)

D. Attaching a resume, write a job application for the post of a teacher in a school. (10)

E. Define and discuss the differences between verbal communication and non-verbal communication. (10)

F. Mention the different presentational strategies of Speaking Skills. (10)

G. You are the sports secretary of your school. Write a letter to Globe Enterprises, a leading firm dealing in sports goods, requesting them to supply their trade catalogue. You may mention the items you intend to buy and ask for a discount on the catalogue prices. (10)

# Aliah University

## End-Semester Examination (Even Semester) - 2022

### *(B.TECH EE and ECE 1st Year 2nd Semester)*

**Subject Name: Programming for Problem Solving** **Full Marks: 80**

**Subject Code: CSEUGES01** **Time: 3hrs**

### Group-A

**(Answer all questions)** **5 × 2 = 10**

1. Define Recursive function.
2. What is void pointer?
3. What is compiler?
4. What is entry checking loop?
5. What is Compilation and Execution of a program?

### Group-B

**(Answer any five questions)** **5*6= 30**

1. Explain basic data types available in C with the help of example.
2. Write a program to swap two integer numbers without using the temporary variable.
3. Explain while and do while loops in C with example.
4. Define Program. Write and explain various steps involved in development of the program.
5. What is Tail recursion? Write a short note on Recursion v/s Iteration.
6. Define Interpreter, Linker and Loader.

### Group-C

**(Answer any four questions)** **4*10 = 40**

1. Explain Call by Value & Call by Reference using Suitable Example. 5+5=10
2. What is a storage class? Explain the different types of storage classes? 2+8=10
3. Write short note on break, continue and switch case. 3+3+4=10
4. What is Structure? Write a program to read and display the information (name, roll no, dob and ph no.) of all the students in the class. 2+8=10
5. Define Union. Differentiate between Structure and Union. Explain how members of a union are accessed using a program code. 2+3+5=10

# B.Tech. Examination-2022

**Electronics and Communication Engineering**
**(Even Semester Regular and Supplementary)**
**Basic Electronics Engineering (ESC ECEUGES01)**

**Full Marks : 80** **Time-3 hrs**

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**(Answer any five)**

1. (i) Compare insulator, semiconductor and metal on the basis of energy band diagram.
   (ii) Explain drift and diffusion current in semiconductor with analytic expression.
   (iii) Explain electron-hole pair generation in intrinsic Si semiconductor at room temperature. (5+8+3)

2. (i) How a p-type semiconductor is formed?
   (ii) Explain the Fermi-Dirac distribution function with graphical interpretation.
   (iii) Show that in n-type semiconductor the Fermi level energy $E_F$ is close to the conduction band edge $E_C$ of the band diagram. (3+8+5)

3. Determine the diode dynamic resistance $r_d$ and cut-in voltage $V_\gamma$ of the forward-bias diode at room temperature with the following parameters :- (symbols have usual meaning)

   $I_S = 1\ nA$, $\eta = 2$, near the region where the diode current is 3 $mA$. (8+8)

4. (i) Show that equilibrium concentrations of electrons ($n_0$) and holes ($p_0$) in a semiconductor can be expressed as :- (symbols have usual meaning)

   (a) $n_0 = N_c e^{-\left(\frac{E_C - E_F}{KT}\right)}$ (b) $p_0 = N_v e^{-\left(\frac{E_F - E_V}{KT}\right)}$

   (ii) Show that the product of electron and hole concentrations under equilibrium is constant and can be expressed as :- $n_0 p_0 = n_i^2$. (symbols have usual meaning) (6+6+4)

5. (i) Explain the formation of the depletion region and barrier potential $V_0$ in a p-n junction diode under equilibrium.
   (ii) Explain with suitable diagram the forward bias and reverse bias characteristics of p-n junction diode. (4+4+4+4)

6. (i) Explain the operation of the clipper circuit with the input shown in Fig. 1, assuming the diode as ideal diode.
   (ii) Find out the changes in the output voltage waveform if the diode is a real one with cut in voltage $v_\gamma$ and diode dynamic resistance $r_d$ after estimating the output voltage expression.
   (iii) Draw and explain the output of the clamper circuit shown in Fig. 2 with the given sinusoidal input voltage. (5+5+6)

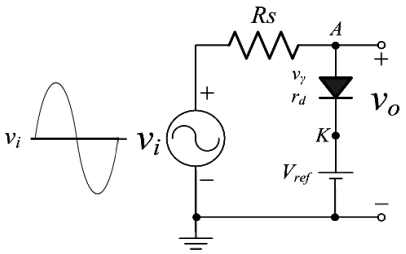


Fig. 1

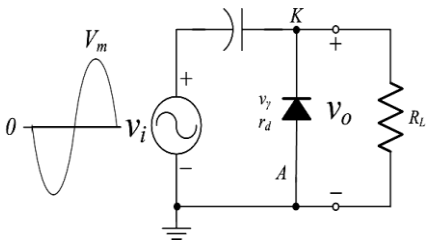


Fig. 2

7. (i) Explain the forward bias and reverse bias characteristics curve of p-n junction diode from Shockley diode equation.
(ii) Establish that for Si p-n junction diode at room temperature the diode dynamic resistance $r_d \approx \frac{26\ \text{mV}}{\text{I}}$ (symbols have usual meaning) (5+5+8)

8. (i) Explain the operation of half wave rectifier circuit with a output waveform diagram.
(ii) Show that the output DC voltage ($V_{dc}$) and ripple factor ($\Gamma$) of half wave rectifier output is
(a) $V_{dc} = \frac{V_m}{\pi}$ (b) $\Gamma = 121\ \%$ (4+5+3+4)

9. (i) Explain different current components in a p-n-p transistor in active region with a suitable diagram.
(ii) Establish the relation between current amplification factors α and β.
(iii) Briefly explain the CB, CE and CC mode operation in a transistor. (6+4+6)

10. (i) Determine $V_L$, $I_L$,$I_Z$ and $I_R$ for the network of Fig. 3 if $R_L = 180\ \Omega$ .
(ii) Determine the minimum value of $R_L$ to ensure that the Zener diode is in the "on "state.
(iii) Determine the value of $R_L$ that will establish maximum power conditions for the Zener diode. (8+4+4)

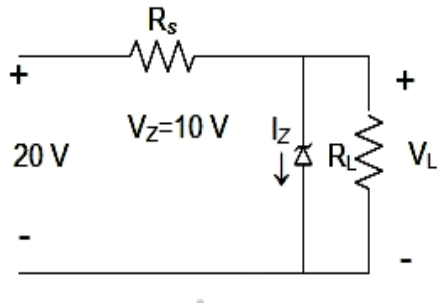


Fig. 3

11. Design a voltage regulator using Zener diode that will maintain an output voltage of 20 V across a 1 KΩ load with an input that will vary between 30 V and 50 V. Determine the proper value of $R_S$ and the maximum current $I_{ZM.}$ (8+8)

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# ALIAH UNIVERSITY

**Name of the Examination: Semester(II)** **Session: 2021-22**

**Subject: Engineering Chemistry** **Course code: CHMUGBS01**

**Duration: 3 Hrs** **Full Marks: 80**

**(Use Separate Answer Sheet for Each Group)**

**Group A**

1. Explain the following terms (***any TEN***): (i) State function (ii) Adiabatic process (iii) Molar heat capacity (iv) Reversible expansion (v) Enthalpy (vi) Intensive property (vi) Path function (vii) Internal energy (viii) Isochoric process (ix) Homegenous system (x) Isolated system (xi) Cyclic process 2.5x10

***Answer any ~~Three~~(2)***

2. (a) Deduce the equation of work for reversible isothermal expansion of an ideal gas. (b) Prove that work done is more in reversible process than that of irreversible process. 2.5+2.5
3. (a) Establish the relation between $\Delta H$ and $\Delta U$. (b) For the reaction $H_2F_2\ (g) \rightarrow H_2\ (g) + F_2\ (g)$. Calculate $\Delta H$ for the reaction. 2.5+2.5
4. (a) Derive $C_p\ dq_p/dt$ and $C_v\ dq_v/dt$. (b) Establish their relation for the ideal gas. 2.5+2.5
5. (a) What is Joule Thomson phenomenon? (b) Prove that for the Joule Thomson phenomenon, $\Delta H\ 0$. 2.5+2.5

**Group B**

***Answer any Nine (9)*** 9×5= 45

6. Write short notes on:
   (a) Bakelite
   (b) Teflon

7. Give a brief account of:
   (a) Vulcanization of rubber
   (b) Polythene

8. Explain the following with suitable reactions
   (a) Phenol formaldehyde resin
   (b) Polystyrene

9. How are the following polymers prepared ? Mention their uses
   (a) PVC
   (b) LDPE

10. Write informative notes on the mechanism of radical polymerisation with suitable example

11. (a) What is meant by degree of polymerization ?

(b) Distinguish between addition & condensation polymerisation with example

12. (a) How is the crepe rubber obtained from latex ?
(b) Give the structural unit of gutta percha

13. Why are silicones called inorganic polymers? Discuss the synthetic procedure of linearchain silicones

14. Write note on conducting polymers with reference to oxidative or p-doping with mechanism

15. (a) How will you prepare Styrene-Butadiene Rubber (SBR). Mention its uses
(b) What is Ziegler-Natta catalyst ?

16. Write short notes on:
(a) Compounding of rubber
(b) Conducting polyaniline

17. What do you mean by green chemistry. Give its importance

18. (a) What is meant by degree of polymerisation ?
(b) How will you prepare polystyrene using anionic addition polymerisation method ?

**ALIAH UNIVERSITY**
**DEPARTMENT OF MATHEMATICS AND STATISTICS**
**SPRING SEMESTER END EXAMINATION, 2022**
**PAPER MATUGBS02 ( ENGINEERING MATHEMATICS - II)**

**Full Marks 80** **Time 3 hrs.**

**Use separate answer scripts for each group.**

**Group – A (40 Marks)**

**Answer any eight questions:- (5x8=40)**

1. Express $\begin{pmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 5 & 6 & 7 \end{pmatrix}$ as the sum of a symmetric and a skew symmetric matrix.

2. Show that $\begin{vmatrix} 1 & a & a^2 \\ a^2 & 1 & a \\ a & a^2 & 1 \end{vmatrix}$ is a perfect square. Verify the result for $a = 3$.

3. Find characteristic equation and eigenvalues of the matrix $\begin{pmatrix} 1 & -1 & 0 \\ 1 & 2 & -1 \\ 3 & 2 & -2 \end{pmatrix}$.

4. State Cayley Hamilton theorem. Use Cayley Hamilton theorem to find $A^{50}$, where $A = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$

5. Show that $\begin{vmatrix} 1 & \cos x - \sin x & \cos x + \sin x \\ 1 & \cos y - \sin y & \cos y + \sin y \\ 1 & \cos z - \sin z & \cos z + \sin z \end{vmatrix} = 2 \begin{vmatrix} 1 & \cos x & \sin x \\ 1 & \cos y & \sin y \\ 1 & \cos z & \sin z \end{vmatrix}$

6. If a, b, c are real numbers, prove that $a^2 + b^2 + c^2 \geq ab + bc + ca$.

7.Apply elementary row operation to reduce the following matrix to a row echelon matrix

$$\begin{pmatrix} 2 & 0 & 4 & 2 \\ 3 & 2 & 6 & 5 \\ 5 & 2 & 10 & 7 \\ 0 & 3 & 2 & 5 \end{pmatrix}$$

8.Solve the following system of equations by Cramer's method

$x+2y-3z = 1$
$2x-y+z = 4$
$x+3y = 5$ .

9. Find the inverse of A = $\begin{pmatrix} 1 & 1 & 2 \\ 2 & 4 & 4 \\ 3 & 3 & 7 \end{pmatrix}$.

10. Apply matrix method to show that $x = 3, y = 1, z = 2$ is a solution of the system of equations $2x + 3y + z = 11$, $x + y + z = 6$ and $5x - y + 10z = 34$.

11. If $\alpha,\beta,\gamma$ are roots of the equation $x^3 + px^2 + qx + r = 0$, find the value of $\alpha^2\beta^2 + \beta^2\gamma^2 + \gamma^2\alpha^2$ in terms of p, q and r.

12. Prove that the intersection of two subspaces of a vector space V over a field F is a subspace of V.

13.Find mod z and arg z and express z in polar form where z = -1+i. (1+1+3)

14.Prove that the set of vectors {(1,2,2), ( 2,1,2), (2,2,1)} is linearly independent in $R^3$.

15. Find the rank of $\begin{pmatrix} 1 & 2 & 1 & 0 \\ 2 & 4 & 8 & 6 \\ 3 & 6 & 6 & 3 \end{pmatrix}$.

16. When is an n x n matrix called a row reduced Echelon Matrix? Give example of it.

**Group – B(40 Marks)**

1.Answer the following questions: 1X5 = 5

(a) Under what condition the following differential equation $(2ax + by + g)dx + (2fy + cx + h)dy = 0$ is exact?

(b) Find the integrating factor of the differential equation :

$$x\cos x\frac{dy}{dx} + (x\sin x + \cos x)y = 1.$$

(c) Find the complementary function of the differential equation:
$\frac{d^3y}{dx^3} + 2\frac{d^2y}{dx^2} + \frac{dy}{dx} = e^{2x}$.

(d) Find the complementary function of the differential equation:
$\frac{d^2y}{dx^2} - 4y = \sin 2x$.

(e) If $y_1 = e^x$ and $y_2 = e^{2x}$, then find the Wronskian $W(y_1, y_2)$ of $y_1$ and $y_2$.

2. Solve **ANY THREE** of the following differential equations: 5X3=15

(a) $\left(y^2e^{xy^2}+4x^3\right)dx+\left(2xye^{xy^2}-3y^2\right)dy=0.$

(b) $3e^x\tan y\,dx+(1-e^x)sec^2ydy=0.$

(c) $(y^4-2x^3y)dx+(x^4-2xy^3)dy=0.$

(d) $\frac{dy}{dx}=\frac{y-x+1}{y+x+5}$.

(e) $x(1-x^2)\frac{dy}{dx}+(2x^2-1)y=ax^3$ , $a$ being a fixed constant.

(f)$\frac{dy}{dx}+\frac{y}{x}\log_e y=\frac{y}{x^2}(\log_e y)^2$ .

3. Solve **ANY TWO** of the following differential equations: 5X2=10

(a)$\frac{d^3y}{dx^3}-3\frac{d^2y}{dx^2}+3\frac{dy}{dx}-y=xe^x+e^x.$

(b) $\frac{d^2y}{dx^2}-2\frac{dy}{dx}+2y=5\cos x$ , given that $y=\frac{dy}{dx}=0$, when $x=0.$

(c) $x^2\frac{d^2y}{dx^2}+2x\frac{dy}{dx}-y=3e^x\cos(\log_e x)$ .

(d) $x^2\frac{d^2y}{dx^2}+5x\frac{dy}{dx}+4y=x^4.$

4. Answer **ANY ONE** of the following questions: 6+4=10

(a) (i) Using the Method of variation of parameters, find the general solution of the differential equation: $\frac{d^2y}{dx^2}+a^2y=\tan ax$ .

(ii) Find the eigenvalues $\lambda_n$and the corresponding eigenfunctions $y_n$ for the differential equation$\frac{d^2y}{dx^2}+\lambda y=0\quad(\lambda>0)$ satisfying the boundary conditions $y(0)=0$ and $y(\pi)=0.$

(b) (i) Using the Method of Undetermined Coefficients, find the general solution for the differential equation: $\frac{d^2y}{dx^2}-4\frac{dy}{dx}+y=x^2-2x+2.$

(ii) Find the eigenvalues $\lambda_n$ and the corresponding eigenfunction for the differential equation $\frac{d^2y}{dx^2}+\lambda y=0\quad(\lambda>0)$ satisfying the boundary conditions $y(0)=0$ and $\frac{dy}{dx}=0$ at $x=\pi.$

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