

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

5x4=20 Marks

Q. Answer **ANY FOUR** of the following questions: (word limit 200)

- 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

10X4=40 Marks

Q. Answer **ANY FOUR** of the following questions. (word limit 400)

- 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)

Aliyah University
End-Semester Examination- 2022
(BTech CSE 2nd Semester)
Paper Name: Programming for Problem Solving
Paper Code: CSEUGES01

Full Marks: 80
Time: 3 Hrs

Group - A

(10X1=10)

✓ Fill in the blanks-

- a) C compiler follows _____ approach.
- b) A header file keeps _____ of library functions.
- c) '2xy' is valid variable name in C compiler. _____ [True/ False]
- d) A declaration: float a, b; occupies _____ Bytes of memory.
- e) Operators in C have precedence and it determines which operator is _____.
- f) An instruction: a*=3; means a = _____.
- g) Scanf() can't read _____ string, gets() can do it.
- h) IDE provides _____, _____ and _____.
- i) What is the answer of: -5%-3? _____
- j) A control character for an address is %_____

Group - B
(Answer any 6 questions)

(6X5=30)

- 2. Mention differences between pre-increment and post-increment with suitable example.
- 3. Differentiate 'auto' and 'static' storage classes with examples.
- 4. Explain the basic string standard functions with proper examples.
- 5. How while() and do-while() loops are different from one another? Explain with example.
- 6. Write a C program to insert some integer values in an Array and then print the average of them.
- 7. Write a program in C to find out maximum and minimum number out of three integer values, by using conditional operator. *

8. ✓ Write down outputs for the programs below: (give explanation)

✓

```
#include<stdio.h>
#include<conio.h>
int main()
{
    int i,j;
    for(i=1;i<4;i++)
        for(j=1; j<3;j++)
    {
        if(i==j)
            break;
        printf("%d %d\n",i,j);
    }
    return 0;
}
```

✓

```
#include<stdio.h>
#include<conio.h>
int main()
{
    int i,j;
    for(i=1;i<4;i++)
        for(j=1; j<3;j++)
    {
        if(i==j)
            continue;
        printf("%d %d\n",i,j);
    }
    return 0;
}
```

Group - C
(Answer any 4 questions)

(10X4=40)

9. a) Define Recursion. Write a program in C to find out Greatest Common Divisor between two integer values by using recursion. (5*2=10)
b) Write a C program to print the following pattern:

1
1 2 3
1 2 3 4 5

10. a) Write a C program to check whether a number is palindrome or not. (4+1+2+3=10)
b) Define function. What are the advantages and disadvantages of using function? Give solution to overcome the disadvantages of using a function. Explain with example.

11. a) Discuss output differences between "Call by value" and "Call by reference" for swapping two integer numbers. (5*2=10)
b) Write a program in C to sort the array (mentioned below) in ascending order -

34	23	45	4	67	17	7
----	----	----	---	----	----	---

12. a) Write a note on - Switch and case. What is the role of 'break' in switch-case? Explain with example.
b) Write a program in C to add first 'n' prime numbers and print the result. (Use separate function for prime number checking) (5*2=10)

13. a) Define Pointer. Write a program in C to get reverse of a string, using pointers. (2+5+3=10)
b) Write short notes on – relational operators and logical operators in C programming.

-----END-----

Answer any five questions

5x16=80 Marks

a)
 b)
 c)

Define i) charge ii) electric current iii) power iv) network
State the steps to solve an electric circuit problem by the Thevenin's Theorem.
For the circuit shown in Fig. 1 find V_{CE} and V_{AG} .

4 Marks
3 Marks
4 Marks

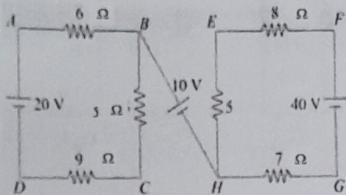


Fig. 1

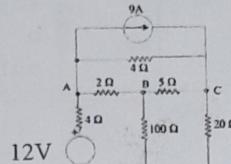


Fig. 2

d)

Use nodal analysis to determine the voltage across 5 ohm resistance and the current in the 12V source.
(Refer. to Fig. 2)

5 Marks

e)
 f)

What is an ideal transformer? Derive the condition of maximum efficiency for a single phase transformer using common notations.

5 Marks

In a 50 kVA 2000/200V, 50 Hz single phase transformer, the iron and copper losses are found to be 800 W and 400 W at the full load and unity p.f, respectively. Calculate the efficiency of the transformer with same power factor at i) full load and ii) one third of load.

6 Marks

Draw the phasor diagrams for different type of loads in an ideal transformer.

5 Marks

g.)
 h)

Define phasor and phase angle. Explain different phasor for a single phase circuit with relevant diagrams.

6 Marks

An alternating voltage is given by $V=230\sin 314t$. Calculate i) frequency, ii) maximum value, iii) average value, iv) RMS value.

4 Marks

i)

A series RLC circuit has 25Ω resistance, 0.2 mH inductance and $66.3\mu\text{F}$ capacitance and is connected to a 240V, 60Hz supply. Find (i) the current, (ii) the power factor and (iii) the voltage drop across each element of the circuit.

6 Marks

j.)
 k)

Draw the connection diagrams of D.C Generator for different type of excitations.

5 Marks

A DC long shunt compound generator delivers a load current of 10A at 420V. The resistance of the armature, series field and shunt field are 0.03Ω , 0.015Ω and 150Ω , respectively. Calculate the emf induced in the armature. Allow a brush voltage drop of 1V/brush.

6 Marks

Sketch the O.C.C of D.C shunt generator.

2 Marks

What is the significance of back EMF in a DC motor?

3 Marks

l.)
 m)
 n)

Derive the condition for maximum power transfer from a source to resistive load.

5 Marks

What is DC motor? Derive the expression of torque for a DC motor.

6 Marks

Write a short note on series resonance.

5 Marks

6. a) State Norton's theorem and find current using Norton's theorem through a load of 8 ohm in the circuit shown in Fig. 3 $2 \times 8 = 16$ Marks

b) In the network shown in Fig. 4, find the value of R such that maximum possible power will be transferred to R_L . Find also the value of the maximum power and the power supplied by source under this conditions.

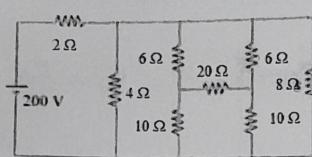


Fig. 3

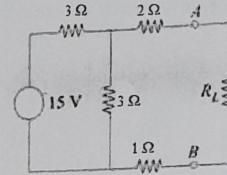


Fig. 4

Use separate answer scripts for each group of questions

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.

$$\begin{vmatrix} 1 & a & a^2 \\ a^2 & 1 & a \\ a & a^2 & 1 \end{vmatrix}$$

2. Show that 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

$$\begin{vmatrix} \cos x - \sin x & \cos x + \sin x \\ \cos y - \sin y & \cos y + \sin y \\ \cos z - \sin z & \cos z + \sin z \end{vmatrix} = 2 \begin{vmatrix} \cos x & \sin x \\ \cos y & \sin y \\ \cos z & \sin z \end{vmatrix}$$

6. If a, b, c are real numbers, prove that

$$a^2 + b^2 + c^2 \geq ab + bc + ca.$$

8. Solve the following system of equations by Cramer's method $x+2y-3z = 1$; $2x-y+z = 4$; $x+3y=5$.

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

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

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

12. Prove that the intersection of two subspaces of a vector space 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 \mathbb{R}^3 .

15. Find the rank of

$$\begin{pmatrix} 1 & 2 & 1 & 0 \\ 2 & 4 & 8 & 6 \\ 3 & 6 & 6 & 3 \end{pmatrix}$$

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 it 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:

$$\frac{d^2y}{dx^2} + 2 \frac{dy}{dx} + \frac{dy}{dx} = e^{2x}.$$

(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 .

3. Solve ANY TWO 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) $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} - y = 3e^x \cos x$.

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

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

2. Solve ANY THREE differential equations: 5X3=15

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

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

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

4. Answer ANY ONE question: 6+4=10

(a) (i) Using the Method of variation of parameters, find the general solution of the differential equation:

$$\frac{d^2y}{dx^2} + a^2 y = \tan ax.$$

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

(iii) Using the Method of Undetermined Coefficients, find the general solution for the differential equation:

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

(iv) Find the eigenvalues λ and the corresponding eigenfunction for the differential equation

$$\frac{d^2y}{dx^2} + \lambda y = 0$$
 ($\lambda > 0$) satisfying the boundary conditions

$$y(0) = 0$$
 and $\frac{dy}{dx} = 0$ at $x = \pi$.

ALIAH UNIVERSITY

Name of the Examination: Semester(II)
Subject: Engineering Chemistry
Duration: 3 Hrs

Session: 2021-22
Course code: CHMUGGE01
Full Marks: 80

(Use Separate Answer Sheet for Each Group)

Group A

- ✓ 1. Explain the following terms (any TEN): (a) State function (b) Adiabatic process (c) Molar heat capacity (d) Reversible expansion (e) Enthalpy (f) Intensive property (g) Path function (h) Internal energy (i) Isochoric process (j) Homeogenous system (k) Isolated system (l) Cyclic process

Answer any Three(3)

- ✓ 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.
- ✓ 3. (a) Establish the relation between ΔH and ΔU . (b) For the reaction $H_2F_2(g) \rightarrow H_2(g) + F_2(g)$. Calculate ΔH for the reaction.
- ✓ 4. (a) Derive $C_p = dq_p/dt$ and $C_v = dq_v/dt$. (b) Establish their relation for the ideal gas.
- ✓ 5. (a) What is Joule Thomson phenomenon? (b) Prove that for the Joule Thomson phenomenon, $\Delta H = 0$.

Group B

Answer any Eight (8)

$8 \times 5 = 40$

- ✓ 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 linear chain 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 ?