

**Part 3 Practical Examination, 2020**

**Bankim Sardar College Centre**

**Subject: PHSG      Paper 4B      Time: 2 hrs.      Full Marks:50**

**Module I**

**Answer any one question from the following. Each question carries 25 marks.**

1. Write down a program in C/Fortran to sort a few numbers in ascending order.
2. Write down a program in C/Fortran to sum a G.P. Series term by term.
3. Write down a program in C/Fortran to find the real as well as complex roots of a quadratic equation.
4. Write down a program in C/Fortran to add two matrices.

**Module II**

**Answer any one question from the following. Each question carries 25 marks.**

1. i) Write the working formula of an inverting amplifier 3  
ii) Draw the circuit diagram of an inverting amplifier using  $R_1=1K\Omega$ ,  $R_2=6.8K\Omega$  and OPAMP (IC-741) 3  
iii) The input voltages ( $v_i$ ) of an inverting amplifier is given below.

Serial No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Input Voltage ( $v_i$ ) in Volt	-3.5	-3.0	-2.5	-2.0	-1.5	-1	-0.5	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5

- a) Calculate the output voltage ( $v_o$ ) of the given data table using formula. 5
- b) Plot the input ( $v_i$ ) vs Output ( $v_o$ ) voltage on a graph paper. 5
- c) Calculate the voltage gain from the graph. 3
- d) Compare the theoretical voltage gain ( $A_v$ ) and voltage gain obtained from the graph. 3

- e) Discuss the nature of the curves obtained in context of different voltage gain and the input voltage. 3

**Or**

2. i) Write the working formula of a non-inverting amplifier 3  
 ii) Draw the circuit diagram of a non-inverting amplifier using  $R_1=1K\Omega$ ,  $R_2=8.2K\Omega$  and OPAMP (IC-741) 3  
 iii) The input voltage ( $v_i$ ) of a non-inverting amplifier is given below.

Serial No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Input Voltage ( $v_i$ ) in Volt	-3.5	-3.0	-2.5	-2.0	-1.5	-1	-0.5	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5

- a) Calculate the output voltage ( $v_o$ ) of the given data table using formula. 5  
 b) Plot the input ( $v_i$ ) vs Output ( $v_o$ ) voltage on a graph paper. 5  
 c) Calculate the voltage gain from the graph. 3  
 d) Compare the theoretical voltage gain ( $A_v$ ) and voltage gain obtained from the graph. 3  
 e) Discuss the nature of the curves obtained in context of different voltage gain and the input voltage. 3

**Or**

3. i) Write the working formula of a differential amplifier 3  
 ii) Draw the circuit diagram of differential amplifier using  $R_1=1K\Omega$ ,  $R_2=10K\Omega$  and OPAMP (IC-741) 3  
 iii) The input voltage ( $v_i$ ) of a differential amplifier is given below.

Serial No		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Input Voltage ( $v_i$ ) in Volt	$V_1$	1.5	2	1	1	1	.5	.3	0	0.5	-5	-5	-5	-5	-1	-1.5
	$V_2$	-2	-1	-1.5	-1	-5	-5	-2	0	1	0.5	1	1.5	2	2	2

- a) Calculate the output voltage ( $v_o$ ) of the given data table using formula. 5  
 b) Plot the input ( $v_i$ ) vs Output ( $v_o$ ) voltage on a graph paper. 5  
 c) Calculate the voltage gain from the graph. 3  
 d) Compare the theoretical voltage gain ( $A_v$ ) and voltage gain obtained from the graph. 3  
 e) Discuss the nature of the curves obtained in context of different voltage gain and the input voltage. 3

**Or**

4. i) Write the working formula of an three input adder 3  
ii) Draw the circuit diagram of an three input adder using  $R_1=1K\Omega$ ,  $R_2=10K\Omega$  and OPAMP (IC-741) 3  
iii) The input voltage ( $v_i$ ) of an three input adder given below.

Serial No		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Input Voltage ( $v_i$ ) in Volt	$V_1$	-1.5	-1.5	-1	-1	-.5	0	-.2	0	.2	1.5	1.5	1.5	1.5	1.5	1.5
	$V_2$	-1.5	-1	-1	-.5	-.5	-.5	-.1	0	0	-.5	.5	.5	.5	0	1.5
	$V_3$	-1	-.5	-.5	-.5	-.5	-.5	0	0	.3	0	-.5	0	.5	1.5	.5

- a) Calculate the output voltage ( $v_o$ ) of the given data table using formula. 5  
b) Plot the input ( $v_i$ ) vs Output ( $v_o$ ) voltage on a graph paper. 5  
c) Calculate the voltage gain from the graph. 3  
d) Compare the theoretical voltage gain ( $A_v$ ) and voltage gain obtained from the graph. 3  
e) Discuss the nature of the curves obtained in context of different voltage gain and the input voltage. 3