

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