BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF ENGINEERING AND PHYSICS

PROGRAMME: BACHELOR OF SCIENCE HONOURS DEGREE IN ELECTRONIC ENGINEERING

EEE1204 (1): COMPUTER ENGINEERING AND PROGRAMMING

DURATION: 3 HOURS TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES NOV 2024

1. Answer any FOUR questions only.
2. Each question carries equal marks.
3. Show all your steps clearly in any calculations.
4. Start each new question on a fresh page.

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1. a) Write a C/C++ program to calculate the sum of the following series [9]

$$1+\frac{2}{2!}+\frac{3}{3!}+\frac{4}{4!}+\ldots\ldots\ldots+\frac{n}{n!}$$

b) Using a flowchart show the booting process of an 80286 computer running MSDOS as its Operating System. [8]

c) Write a C/C++ program which can find the lowest common multiple (LCM) and highest common factor (HCF) of at least two numbers. [8]

2. a) Draw the internal structure of a microprocessor and explain the functions of CPU as well as for each structure. Briefly explain the importance of a **control bus** in a microcomputer system. [13]

b) With the aid of a diagram explain the "Waterfall Model" approach to developing software projects. Describe what activities must be undertaken in each of the eight stages. [12]

3. a) Explain why a computer's configuration is called BIOS or CMOS setup when it is known that, BIOS refers to ROM and CMOS refers to RAM. Also give their relationship. [12]

b) i. Design a memory bank using 512Kbits x 2 memory ICs to give a memory bank of16 bit data. [6]

ii. Give total capacity of one chip. [3]

iii. Give total capacity of the memory bank. [4]

4 a) Explain the following terms as used in microcomputer system: [8]

i. Real and protected mode
ii. Transient and Utility programs

b) The Pythagoras' theorem is given by the formula $r^2 = x^2 + y^2$, **where r = hypotenuse, x and y are adjacent sides to the right-angle.** Write a C/C++ program which prompts on screen for the values of x and y. The calculates the value of r and display it. [9]

b) Using appropriate examples to illustrate, what do you understand by the following terms as used in C++?

i. Pointer and Pointer dereferencing [2]
ii. Inheritance. [2]
iii. Encapsulation [2]
iv. Polymorphism [2]

5 a) Explain how the presence of CACHE memory improves the speed of a computer system. State and explain the caching schemes. [8]

b) Write a C/C++ program to find whether a given number is a prime number or not. [9]

c) Write a C/C++ program which can multiply three by three matrices. [8]

END OF PAPER