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**FINAL YEAR B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2005**

Part III—Group II—Physics

Paper VI—COMPUTER SCIENCE

Time : Three Hours

Maximum : 50 Marks

**Section A**

*Answer any two questions.  
Each question carries 6 marks.*

1. Explain the algorithm and write a BASIC program to find the positive root of the equation  $x^2 - 16 = 0$  by bisection method.
2. In a C program, what is a "function" ? State the advantages of the use of function. Show that passing arguments to a function does not alter the variables in main.
3. Explain different types of errors that may occur in an experiment. Explain and find the relation between Standard error in a single observation and Standard error in the mean.
4. Explain, with examples, the linear least square fit method of fitting a curve on a set of data.

[2 × 6 = 12 marks]

**Section B**

*Answer any four questions.  
Each question carries 3 marks.*

5. Write an algorithm to study growth of current in an RL circuit using Euler's method.
6. Distinguish between Machine, Assembly and High level languages.
7. Explain the FOR-TO-NEXT statements. Summarize the rules that apply to a nested FOR-TO-NEXT loops.
8. Explain the term flowchart. Describe the various conventional shapes used in a flowchart.
9. Describe while and do-while statement in C. How do they differ ?
10. What is a structure in C ? How does it differ from an array ?

(4 × 3 = 12 marks)

**Section C**

*Answer any seven questions.  
Each question carries 2 marks.*

11. What is meant by compiler and interpreter ?
12. Write a short note on software and hardware.
13. Describe the histogram of a set of  $n$  measurement.
14. What is the function of GOSUB statement in BASIC language ?

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15. What is generative graphics ?
16. What is an operator ? Describe different types of operators in C.
17. What is the purpose of getchar function ?
18. What is the function of if-else statement in C ?
19. How does an array differ from that of an ordinary variable ?
20. What are library functions ? Give examples used in BASIC.
21. Explain the shell sort technique.

(7 × 2 = 14 marks)

### Section D

*Answer any four questions.  
Each question carries 3 marks.*

22. Square roots of 9 and 10 are given in the table. Calculate square root of 9.4, using linear interpolation :

X : 9     10

Y : 3    3.1623

23. Obtain linear regression equation by linear least square fit for the following set of data :

x : 2    3    5    8    10

y : 8    11    17    26    32

24. Solve the equations  $10x_1 - x_2 + 2x_3 = 4$ ,  $x_1 + 10x_2 - x_3 = 3$  and  $2x_1 + 3x_2 + 20x_3 = 7$  using Gauss elimination method.
25. Find a real root of the equation  $x^3 - 2x - 5 = 0$  using bisection method ; error must be less than 0.01.
26. Write a BASIC program to find all 3 digit prime numbers. Store the result in an array.
27. Write a C program to find the sum of sine series  $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$
28. Draw the flowchart and write a C program to find the total area of 12 spheres of different radii. Use function for calculation and also store volume of each sphere in an array.

(4 × 3 = 12 marks)