



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI-ABUJA**  
**FACULTY OF COMPUTING**  
**DEPARTMENT OF COMPUTER SCIENCE**  
**2025\_2 EXAMINATIONS**

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**COURSE CODE** : CIT 335  
**COURSE TITLE** : Computational Science and Numerical Methods  
**CREDIT UNIT** : 3  
**TIME ALLOWED** : 2½ HOURS  
**INSTRUCTION** : Answer Question 1 and any other Three Questions

- 1a) Write short notes on the following operators used in programming: [4 marks]  
i) DIV ii) MOD
- 1b) Convert the following numbers to floating point representation  
i) 168,500 ii) 0.0378462 iii) - 0.00746 [3 mks]
- 1c) Convert the following binary numbers to base 10 [7 marks]  
i.  $(11001.10)_2$  ii.  $3107_{16}$  [7 marks]
- 1d) Mention any two ways of reducing the number of digits in a numerical value? [2 marks]
- 1e) Round the following numbers to 4 decimals  
i)  $6.322556 = 6.3226$ , ii)  $6.323501 = 6.3235$
- 1f) Using a well-labelled diagram, describe the black box representation of a problem [7 marks]
- 2a) State the formal definition of condition number: [3 marks]
- 2b) Convert the following numbers to base 10: [7 marks]  
i)  $(101.101)_2$  ii)  $(ADE)_{16}$
- 2c) With the aid a well-labeled diagram, state the Mean Value theorem of differential calculus. [5 marks]
- 3a) Write short notes on the following  
i) Complex floating Point number ii) rational arithmetic iii) Euclidean algorithm  
iv) Interval arithmetic [6 marks]
- 3b) Explain the difference between decimal and binary number representations. [4 mks]
- 3c) Convert the following numbers to floating point representation  
i) 168,500 ii) 0.0378462 iii) - 0.00746 [3 mks]
- 3d) Round the following numbers to 4 decimals:  
i) 1.23767 ii)  $0.774539 = 0.7745$ ,

- 4a) Briefly describe the condition number of a function
- 4b) Multiply of floating-point numbers A and B, where  $A = -18.0$  and  $B = 9.5$
- 4c) Convert  $1/3$  to floating point using seven digits of precision and compute the Absolute errors and Relative errors
- 5a) Give a suitable algorithm for the following
- i) floating point multiplication
  - ii) Floating point Division [4 marks]
- 5b. Convert the following Octal numbers  $2671_8$  and  $7777_8$  to a Decimal number.
- 5c) Chop the following numbers to 4 decimals:
- i) 0.774539
  - ii) 6.323001