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Question Paper Code : X11204

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

First Semester

Civil Engineering

GE 8151 – PROBLEM SOLVING AND PYTHON PROGRAMMING

(Common to Aeronautical Engineering/ Aerospace Engineering/Agriculture Engineering/
Automobile Engineering/Biomedical Engineering/Computer Science and Engineering/
Computer and Communication Engineering/Electrical and Electronics Engineering/
Electronics and Communication Engineering/Electronics and Instrumentation
Engineering/Electronics and Telecommunication Engineering/ Environmental
Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering
and Management/Instrumentation and Control Engineering/Manufacturing
Engineering/Marine Engineering/Material Science and Engineering/Mechanical
Engineering/Mechanical Engineering (Sand witch) Mechanical and Automation
Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/
Production Engineering/Robotics and Automation/Safety and Fire Engineering/
Biotechnology/ Chemical Engineering/Chemical and Electrochemical Engineering/
Fashion Technology/Food Technology/Handloom and Textile Technology/Information
Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical
Technology/Plastic Technology/Polymer Technology/Textile Chemistry/Textile
Technology)
(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What are the factors used to judge the quality of the algorithms ?
2. What is control flow ? List and define the ways of execution of control.
3. Define expression.
4. Python Program to Exchange the Values of Two Numbers without using a temporary variable.
5. Define string slice. Give example.
6. Given an array of n elements, write a function to search a given element x in the array.
7. What is cloning list ? Give example.



8. What is difference between list and tuple in python ?
9. What are packages ? How to import modules from a package ?
10. How will you update the contents of one file to another file in python ?

PART – B

(5×16=80 Marks)

11. a) i) Explain the strategies for developing algorithms with example. **(10)**
ii) Write algorithm for towers of Hanoi problem. **(6)**

(OR)

- b) Explain the process of algorithm design and analysis. **(8+8)**
12. a) i) How does the order of evaluation of operations happen when an expression contains more than one operator ? Explain. **(8)**
ii) Differentiate parameter and argument. Explain the method to pass arguments in a function with suitable example. **(4+4)**

(OR)

- b) Define various methods and functions in Python. Differentiate them with example. **(8+8)**
13. a) i) Brief fruitful function and void functions with example. **(4+4)**
ii) There are two sorted arrays A and B of size n each. Write an algorithm to find the median of the array obtained after merging the above two arrays (i.e. array of length 2n). **(8)**

(OR)

- b) i) Write recursive implementation of binary search. **(8)**
ii) What are immutable strings ? For the given sentence sort words of sentence in ascending order : Chennai Anna University. **(8)**
14. a) i) Write functions called nested_sum that takes a list of integers and adds up the elements from all of the nested lists and cumsum that takes a list of numbers and returns the cumulative sum; that is, a new list where the i^{th} element is the sum of the first $i + 1$ elements from the original list. **(5+5)**



- ii) Take dictionaries d1 and d2 and returns a new dictionary that contains all the keys from d1 that are not in d2. (6)

(OR)

- b) i) Write functions called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise and has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list. (8)
- ii) Write a function that takes a histogram and returns a list of word-frequency tuples and print the ten most common words. (8)

15. a) i) Write a program that reads a file and builds a histogram of the words in the file. (8)
- ii) Print all numbers present in the text file and also print the number of blank spaces in that file. (8)

(OR)

- b) i) Write a function called sed that takes as arguments a pattern string, a replacement string, and two filenames; it should read the first file and write the contents into the second file (creating it if necessary). If the pattern string appears anywhere in the file, it should be replaced with the replacement string. If an error occurs while opening, reading, writing or closing files, your program should catch the exception, print an error message, and exit. (8)
 - ii) How to read or process command line arguments in python ? Explain with example. (8)
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