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Question Paper Code : 40669

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

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 (Sandwich)/ Mechanical and Automation Engineering/Mechatronics Engineering/ Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation/Safety and Fire Engineering/Artificial Intelligence and Data Science/Bio Technology/Biotechnology and Biochemical Engineering/ Chemical Engineering/Chemical and Electrochemical Engineering/Computer Science and Business System/Fashion Technology/Food Technology/Handloom and 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.   List out two differences between an algorithm and peseudo code.

2.   What is a recursive algorithm?

3.   Differentiate Compiler and Interpreter.

4.   Write a python script to calculate the average of three numbers.

5. Write a python script to accept two integer numbers from the user and print product of two numbers. If product is greater than 100 then also print the sum of those two integer numbers.

6. What is the purpose of break and continue statements in python?

7. What is the output of the following python script?

A = [10, 20, 30, 40, 50]

for i in range (len(A))"

print (A[i], end ' ')

8. Define dictionary in python with a suitable example.

9. Define a file and give the basic file operations in proper order to be performed on a file in python language.

10. Give differences between packages and modules in python.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Write a recursive algorithm to find the factorial of a given number.
(5)

(ii) Write a short note on building blocks of an algorithm. (8)

Or

(b) (i) Write an algorithm to check whether a given number is palindrome or not. (5)

(ii) Differentiate iterative and recursion strategies for developing algorithm. (8)

12. (a) (i) Write a python script to find the roots of a quadratic equation. (5)

(ii) Explain about various datatypes used in Python with example. (8)

Or

(b) (i) Write a python script to swap the values of two variables without using an intermediate variable. (5)

(ii) Write a python code to find factorial of a number using function. (8)

13. (a) Differentiate between linear search and binary search procedures and write a python script to search for a number in a given list of numbers using binary search.   (13)

Or

(b) Write a short note on operations which are performed on strings in python and write a python script that allows the user to type in phrase and then outputs the acronym for that phrase.

Note : An acronym is a word formed by taking the first letters of the words in a phrase and making a word from them. For example, RAM is an acronym for random access memory. The acroym should be all uppercase, even if the words in the phrase are not capitalized.   (13)

14. (a) Write a python script to find the product of two given matrices.   (13)

Or

(b) Write a python script to sort N numbers using insertion sort.   (13)

15. (a) Write a python script that calculates the average word length in a single paragraph stored in a text file by the user and stores total number of words in the paragraph and average word length of the paragraph in another text file.   (13)

Or

(b) Write a python script to toggle the case of the text in an input text file and save the output in an output text file.   (13)

Note : the toggle of text "Hello World!" is "hELLO wORLD!".

PART C — (1 × 15 = 15 marks)

16. (a) Format conversion is an important requirement in many software applications. Hence develop an algorithm to perform the following date format conversion :

Input date format : 07/21/1983

Output date format : July 21, 1983

Finally write a python script to implement the above algorithm.   (15)

Or

(b) The sieve of Eratosthenes is an elegant algorithm for finding all of the prime numbers upto some limit N. The basic idea is to first create a list of numbers from 2 to N. The first number is removed from the list, and announced as a prime number, and all multiplies of this number upto N are removed from the list. This process continues until the list is empty.

Write a python script that prompts a user for N and then uses the sieve algorithm to find all the primes less than or equal to N.   (15)

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