UPES
End Semester Examination, December 2023

Course: GPU Programming   Semester: VII
Program: B.Tech CSE GG   Time: 03 hrs.
Course Code: CSGG4009   Max. Marks: 100

Instructions: Please follow the guidelines written in the cover page of your answer-sheet.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Write scenarios where __device__ must be used before the function signature.	4	CO4
Q 2	Explain the term "Querying Device Properties" with example CUDA code.	4	CO2
Q 3	Define the relationship between warps, blocks and SMs.	4	CO2
Q 4	Describe why it is generally not a good idea to put _syncthreads inside a loop.	4	CO2
Q 5	Explain the term Computational intensity operations and its relevance in GPU programming.	4	CO1

SECTION B
(4Qx10M= 40 Marks)

Q 6	Write down the OpenCL code to check whether an array of numbers are even or odd parallelly. The result should be returned in a vector of 1 and 0 where 1 represents odd and 0 represent even. **OR** Given two Array A and B of size N, write a CUDA GPU program to populate the Array C of size N such that: $C[i] = max(A[i], B[N-i-1])$ Where N is an even number	10	CO3

Q 7	Describe the functionality of cudaMalloc, cudaFree and cudaMemcopy with an example.	10	CO2
Q 8	Differentiate between Task Parallelism vs Data Parallelism.	10	CO1
Q 9	Create a table to show the mapping of terminologies between CUDA and OpenCL Programming.	10	CO1
SECTION-C **(2Qx20M=40 Marks)**			
Q 10	Elaborate the data parallelism concepts in OpenCL & OpenACC and compare OpenACC & CUDA **OR** Explore the contents of Data parallel Execution Model and CUDA Memories	20	CO3
Q 11	Write a CUDA based program to add two integer Matrices.	20	CO4