(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS

2019/2020 ACADEMIC YEAR

SPECIAL /SUPPLEMENTARY EXAMINATIONS

YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE IN COMPUTER SCIENCE

COURSE CODE: CSC 410

COURSE TITLE : DISTRIBUTED SYSTEMS

DATE: 10/02/2021 TIME: 11.00 A.M – 01.00 P.M

INSRUCTIONS TO CANDIDATE

ANSWER **QUESTION ONE** AND **ANY OTHER TWO**

QUESTION ONE [COMPULSORY] [30MARKS]

a) Define the term transparency in distributed system **[2 marks]**

b) With the help of a diagram, discuss distributed system as a middleware **[5 marks]**

c) Briefly describe any two goals of distributed systems **[4marks]**

d) What is an architectural style? **[2 marks]**

e) Describe any two architectural style used id distributed systems **[4 marks]**

f) Scalability of a system can be measured along three different dimensions, Discuss. **[3 marks]**

g) What is the difference between a process and a thread? **[2marks]**

h) The formal model of distributed message passing has two timing models. Discuss **[4marks]**

i) What are election algorithm? **[2 marks]**

j) State any two reasons for using message passing interface. **[2 marks]**

QUESTION TWO [20MARKS]

a) (i) Define what is a bully algorithm **[2 marks]**

(ii) Describe the algorithm of bully algorithm **[5 marks]**

b) Describe using an example the general MPI program structure **[4 marks]**

c) What is a Parallel Virtual Machine? **[2 marks]**

d) Outline any four advantages of using remote procedure call **[4 marks]**

e) Channel directed from processor $\mathbf{P_i}$ to processor $\mathbf{P_j}$ is modeled in two pieces. Discuss **[3 marks]**

QUESTION THREE [20MARKS]

a) Explain any two differences between MPI and PVM **[4 marks]**

b) (i) What is Remote Method Invocation? **[2 marks]**

(ii) Briefly explain the three layers of Remote Method Invocation **[3 marks]**

c) What is the difference between a thread and a process? **[4 marks]**

d) Define what is meant by multithread client **[2 marks]**

e) Discuss using a diagram the multithreaded server organized as dispatcher-worker model **[5 marks]**

QUESTION FOUR [20MARKS]

a) Explain two reasons for code migration **[2 marks]**

b) What is the difference between Weak and strong migration model? **[4 marks]**

c) Explain any three features of software agents? **[3 marks]**

d) Define what is meant by CORBA? **[2 marks]**

e) Explain any four services provided by CORBA **[4 marks]**

f) State any three advantages of using CORBA **[3 marks]**

g) Explain any two difference between RMI and CORBA **[2 marks]**

QUESTION FIVE [20MARKS]

a) Define the following terms

(i) synchronization **[2 marks]**

(ii) Physical clock **[2 marks]**

(iii) Clock drift **[1 mark]**

(iv) Skew **[1 mark]**

b) Briefly explain any two methods used to attempt synchronization of physical clocks in distributed systems. **[6 marks]**

c) What is mutual exclusion? **[2 marks]**

d) Briefly explain any three requirements of mutual exclusion algorithms **[3 marks]**

e) Explain any three security threats in distributed system **[3 marks]**