KATHMANDU UNIVERSITY
End Semester Examination
March/April 2017

Marks Scored:

Level : B.Sc.
Year : I

Course : COMP 116
Semester: II

Exam. Roll No. :

Time : 30 mins.

F.M. : 10

Registration No.:

Date APR 0 9 2017

SECTION "A"
[20 Q. × 0.5 = 10]

Tick [√] the most appropriate answer.

1. How many types of constructor are there in C++??
[ ] 1 [ ] 2 [ ] 3 [ ] 4

2. When is an abstract class useful?
[ ] no classes should be derived from it
[ ] no objects should be instantiated from it
[ ] you want to defer the declaration of the class
[ ] there are multiple paths from one derived class to another

3. Diamond Problem in C++ can be solved using
[ ] Virtual Function [ ] Inheritance
[ ] Virtual Base Class [ ] Polymorphism

4 Derived class is also called _____.
[ ] Parent class [ ] Child class [ ] Base class [ ] Virtual class

5 What is meant by pure virtual function?
[ ] Function which does not have definition of its own
[ ] Function which does have definition of its own
[ ] Function which does not have any return type
[ ] Function which has many arguments.

6 What is meant by Polymorphism?
[ ] class having many forms [ ] class having only single form
[ ] class having two forms [ ] class having no forms at all

7 How many types of inheritance are there in c++?
[ ] 2 [ ] 3 [ ] 4 [ ] 5

8 What should be the name of constructor?
[ ] same as object [ ] same as member
[ ] same as class [ ] same as function

9 What is a function template?
[ ] creating a function without having to specify the exact type.
[ ] creating a function with having a exact type.
[ ] both a & b
[ ] creating a function with no arguments

10. What does the class can hold?
[ ] Another class
[ ] Data
[ ] Function
[ ] Both Data and Function

11. How many specifiers are there in class?
[ ] 1 [ ] 2 [ ] 3 [ ] 4

12. Which operator is used to define the member of a class externally?
[ ] : [ ] :: [ ] # [ ] ;

13. The access specifier if not declared in a program is by default _____
[ ] Public [ ] Protected
[ ] Private [ ] Null

14. Constructors are a special type of member function which are used to:
[ ] Initialize the objects
[ ] Construct the data members
[ ] Validate the data's.
[ ] Declare the arguments.

15. When struct is used instead of the keyword class means, what will happen in the program?
[ ] access is public by default
[ ] access is private by default
[ ] access is protected by default
[ ] none of the mentioned

16. Which of the following operators can't be overloaded?
[ ] :: [ ] + [ ] - [ ] *

17. What is an operator overloading?
[ ] making c++ operator works with objects
[ ] giving new meaning to existing operator
[ ] both first and second
[ ] making new operator

18. Function overloading is also similar to which of the following?
[ ] Operator overloading [ ] Destructor overloading
[ ] Constructor overloading [ ] Function overriding

19. What will happen while using pass by reference?
[ ] The values of those variables are passed to the function so that it can manipulate them
[ ] The location of variable in memory is passed to the function so that it can use the same memory area for its processing
[ ] The function declaration should contain ampersand (& in its type declaration)
[ ] All of the mentioned

20. Which key word is used to check exception in the block of code?
[ ] try [ ] throw
[ ] catch [ ] multiple catch

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F.M .: 40

SECTION "B"

[4 Q. × 6 = 24 marks]

Attempt ANY SIX questions

1. Briefly explain the different types of *class access specifiers.*

2. What is *Inheritance*? Briefly explain its different types.

3. Differentiate between *function overloading* and *template overloading* with suitable examples.

4. Define *Abstract class.* Explain the role of *virtual function* in Object Oriented Programming.

5. Write a Program to compute multiplication of two complex numbers using *operator overloading.*

6. Define *Template*. Explain its importance with suitable examples.

7. Briefly explain the concept of *function overriding* with suitable examples.

SECTION "C"

[2 Q. × 8 = 16 marks]

Attempt ANY TWO questions

8. Define *Constructor* and *Destructor* with suitable examples. Write a Program to calculate the area and circumference of a circle using the concept of *constructor overloading.*

9. Define *Polymorphism*. What are the different *types of polymorphism*? Explain with suitable examples.

10. What is *Object Oriented Programming (OOP)*? Discuss the *features of OOP* with suitable examples. Also differentiate between *Structure Programming approaches* and *Object Oriented Programming approach* with suitable examples.

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Exam. Roll No. : Time: 30 mins. F.M. : 20

Registration No.: Date : APR 0 7 2017

SECTION "A"
[20 Q × 1=20 marks]

Choose the most appropriate answer and **mark [X]**.

1. Forces are called concurrent when lines of action meet in
   [ ] lines of action meet at one point [ ] lines of action lie in one point
   [ ] lines of action are parallel [ ] lines of action are perpendicular

2. If a number of forces act simultaneously on a particle, it is possible
   [ ] to replace them by a single force
   [ ] to replace them by a single force acting through CG
   [ ] to replace them by a couple
   [ ] to replace them by a couple and a force

3. If two equal forces of magnitude P act at an angle 9^0, their resultant will be
   [ ] P/ 2Cos(9/2) [ ] P Sin(9/2) [ ] P Cos(9/2) [ ] 2P Tan(9/2)

4. The centre of gravity of a quarter lies at a distance of _____from its base measured along the vertical radius.
   [ ] $2R/3\pi$ [ ] $4R/3\pi$ [ ] $8R/3\pi$ [ ] $R/3\pi$

5. Where are pile foundations used
   [ ] larger surface area for foundation [ ] for deeper stability
   [ ] low soil bearing capacity [ ] b & c

6. Bricks are soaked in water before use at least for
   [ ] 12 hrs [ ] 18 hrs [ ] 2 days [ ] 24 hrs

7. How many members does a vertical member does Queen Post Truss has
   [ ] 2 [ ] 4 [ ] 6 [ ] 5

8. The rock having tendency to split in a definite direction is called
   [ ] stratified [ ] un-stratified [ ] foliated [ ] all of the above

9. Zenithal angle means:
   [ ] angle between zenithal line and horizontal surface.
   [ ] clockwise angle made by survey line with zenithal line in vertical plane.
   [ ] angle between any two survey lines in vertical plane.
   [ ] angle between any two survey lines in horizontal plane.

10. The error which occurs while conducting the survey from whole to part and part to whole is:
    [ ] same
    [ ] in whole to part, it is localized and in part to whole it is expanded.
    [ ] in whole to part, it is expanded and in part to whole it is localized.
    [ ] in both the methods, it is localized

11. GPS requires use of
[ ] three satellites for an earth surface fix.
[ ] four satellites for a 3D fix.
[ ] both 'a' and 'b'.
[ ] larger number of satellites as possible.

12. Which one of the following scale is the smallest one?
[ ] 1 cm = 10 m [ ] 1:5000 [ ] 1:10000 [ ] 1 cm = 10 km

13. A closed system is one in which
[ ] mass does not cross boundaries, though energy may do so
[ ] mass crosses the boundary but not the energy
[ ] neither mass nor energy crosses the boundary of the system
[ ] both energy and mass cross the boundaries of the system

14. Intensive property of a system is one whose value
[ ] depends on the mass of the system, like volume
[ ] does not depend on the mass of the system, like temperature, pressure
[ ] is not dependent on the path followed but on the state
[ ] is dependent on the path followed and not on the state

15. Heat and work are
[ ] point functions [ ] system properties
[ ] path functions [ ] intensive properties

16. The basis for measuring thermodynamics property of temperature is given by
[ ] zeroth law of thermodynamics [ ] first law of thermodynamics
[ ] second law of thermodynamics [ ] third law of thermodynamics

17. If 850 kg liquid occupies volume of one cubic meter, then 0.85 represents its
[ ] specific weight [ ] specific mass
[ ] specific gravity [ ] specific density

18. During the opening of a valve in pipe line, the flow is
[ ] steady [ ] unsteady [ ] uniform [ ] laminar

19. The flow in which the particles of a fluid attain such velocities that vary from point to point in magnitude and direction as well as from instant to instant, is known as
[ ] uniform [ ] steady [ ] turbulent [ ] streamline

20. For small discharge at high pressure,_____pump is preferred
[ ] centrifugal [ ] axial flow [ ] mixed flow [ ] reciprocating

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SECTION "B"
[3Q × 11 = 33 marks]

Use **appropriate answer book** for different sections. Answer *ALL* questions.

1. (a) Identify the centroid of the given shape (Figure 1). [4]

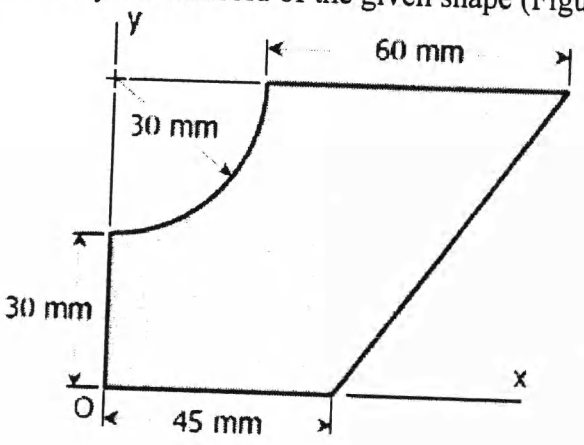

Figure 1

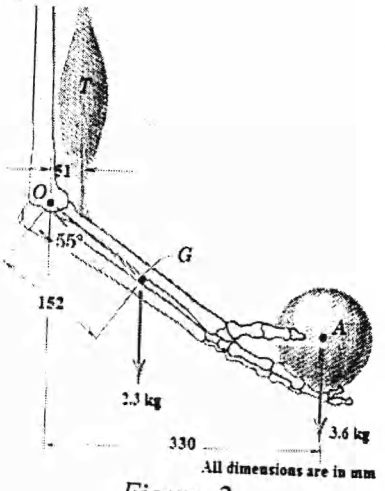

Figure 2

(b) Elements of the lower arm are shown in the Figure 2. The weight of the forearm is 2.3 kg with mass center at G. Determine the combined moment about the elbow pivot O of the weights of the forearm and the sphere. What must be the biceps tension force be so that the overall moment about O is zero? [2+2]

(c) The 7000 N force is applied to the 100 kg block as shown in Figure 3, which is stationary before the force is applied. Determine the magnitude and direction of the friction force F exerted by the horizontal surface on the block. [1.5+1.5]

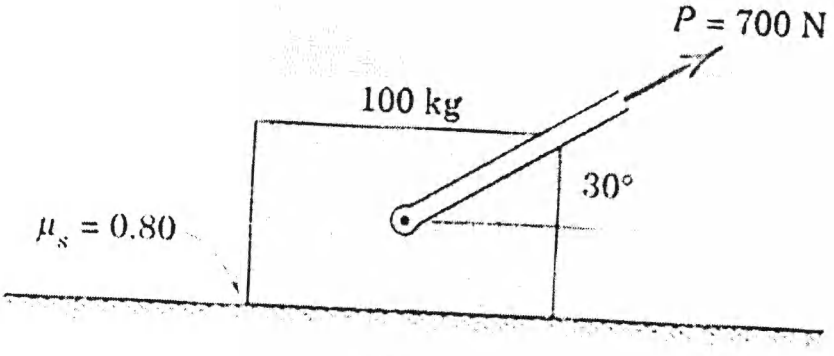

Figure 3

2. (a) If a system is well insulated, can the system be considered as an adiabatic system or isothermal system? Support your answer with proper reason. Also tabulate the difference between adiabatic and isothermal system? [2+2]

(b) Explain the working of simple vapor compression refrigeration system. [4]

(c) Write short notes on the following including examples: [1.5+1.5]

i. Thermal reservoirs ii. Heat engine

3. (a) List the differences between impulse turbine and reaction turbine. [3]

(b) A 40 cm diameter pipe, conveying water, branches into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3 m/s. Find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 30cm diameter pipe is 2 m/s. [2+2]

(c) Define the following: [4]

i. Unsteady flow ii. Uniform flow iii. Turbulent flow iv. Streaklines

SECTION "C"

[1Q × 11 =11 marks]

4. (a) Write down two different types of footings for low depth foundations with neat sketches and examples. What are the different loads acting on the foundation? What are the two different types of piles and describe their working method through sketches? [2+1+1]

(b) What is lintel? What are the different materials used for lintels and write the maximum spanning length of some of them? Write down the difference between load bearing and framed structures. [1+2+1]

(c) What are cantilever bridges? Show the working of Tie Arch Bridge with simple sketches. [1+2]

SECTION "D"

[1Q ×11 = 11 marks]

5. (a) Explain different types of survey stations and survey lines used in chain surveying with diagram. [2+1]

(b) Briefly explain the process of remote sensing with appropriate diagram. [2+1]

(c) The angles at the stations of a closed traverse ABCDEFA were observed as given below in the table. Adjust the angular error in the observations, if any, and calculate the bearings of the traverse lines in the **Reduced bearing systems** if whole circle bearing of the line AB is 42 ^{0}. [5]

Traverse Station	Included angle
A	120°35′40″
B	89°24′20″
C	131°01′40″
D	128°03′00″
E	94°55′20″
F	156°00′00″