

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Attempt ALL questions.

Very short question:

4×2=8

1. Define data abstraction and data encapsulation.
2. What is namespace? Write syntax for declaring namespace. 1+1
3. What do you mean by exceptions and exceptional handling?
4. What do you mean by reference variable? Write the syntax to define reference variable. 1+1

Group B

Short question (Attempt any SEVEN):

5. Differentiate between OOP and POP. b x 3
6. Write a program to find the volume of cube, sphere and cylinder using function overloading. 7 × 4 = 28
7. What do you mean by this pointer? Write a program to illustrate the use of 'this' pointer. 1+3
8. What is friend? Write advantages and disadvantages of friend function. 1+3
9. Write a program to illustrate Copy Constructor.
10. Define pure virtual function and abstract class. Write the syntax for pure virtual function and virtual function. 2+2
11. Write a program to input numbers and print the largest number using function template.
12. Write a program to illustrate static data member and static member function.

113
52
3/1/23

(2)

Group C

Long question (Attempt any THREE):

3×8=24

13. ✓ Write a program to overload the binary '+' operator to add two complex numbers without using friend function. (2+6)

14. ✓ Differentiate between overriding and overloading function. Write a program to illustrate hierarchical inheritance.

15. ✗ Explain different file pointers used in file handling. Write a program to open the file in write mode to write the name, roll and marks obtained in OOP of 'n' number of students.

16. ✓ Discuss steps to create a header file with an example. Write a program to convert basic type to class type. (5+5)

2014

PURBANCHAL UNIVERSITY
2023

B. E. Computer/Electrical/Second Semester/Final
Time: 03:00 hrs.

Full Marks: 60 /Pass Marks: 24

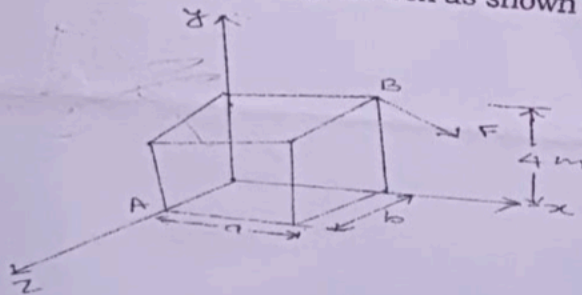
BCI2003: Applied Mechanics (New Course)

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The figures in the margin indicate full marks.

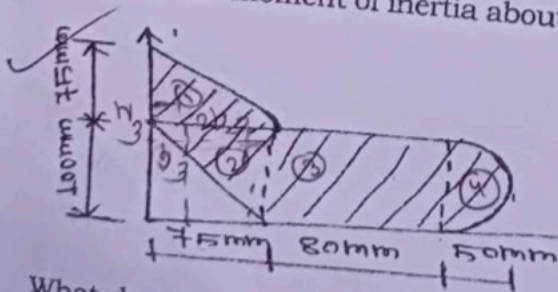
Attempt ALL questions.

1. Mention the fundamental concepts and principle of mechanics? 4
- 2(a) Describe Lami's theorem? List out the different types of forces? 3+1
- (b) The moment of the force $\vec{F} = (2i - 3j + 4k)$ acting at B about point A is given by $\vec{M} = (-3i + 7j - 12k)$. Determine the dimension 'a' and 'b' of the rectangular box as shown in figure below. 10



$I_{zz} = 3xx + 3yy$

- 3(a) State and prove perpendicular axis theorem? 2
- (b) Compute the moment of inertia about centroidal X and Y axis. 6



4. What do you mean by friction & state the Law of friction. Mention the condition of sliding? 1+3+2

Contd. ...

(2)

5(a) Derive the expression for equation of motion for a particle moving along a rectilinear path when the acceleration is given function of velocity. 4

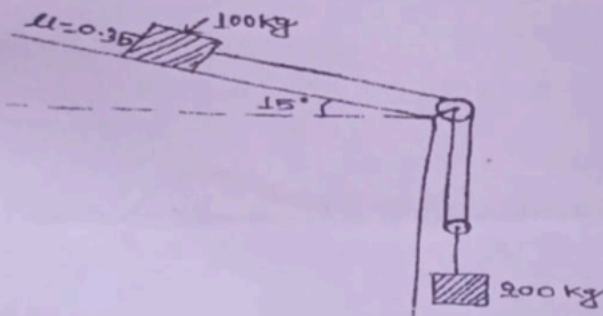
(b) The acceleration of the particle is defined by the relation $a=21-12x^2$, where a is expressed in m/sec^2 and x is in meter, the particle starts no initial velocity at the Position $x=0$. Determine: 6

- (i) The velocity when $x=1.5m$.
- (ii) The position where velocity is again zero.
- (iii) The position where velocity is maximum.

$$v = \frac{dx}{dt}$$

6(a) Describe the angular momentum in brief? 2

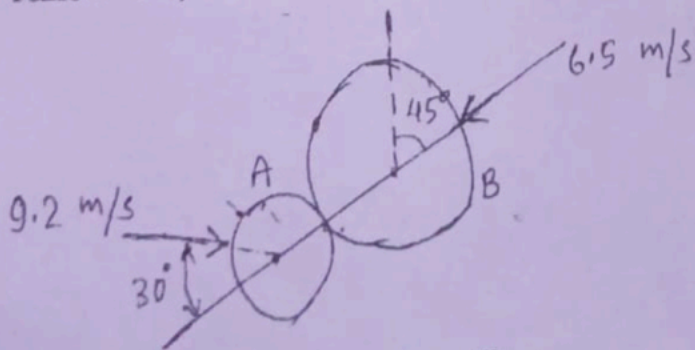
(b) Two blocks as shown in fig. Starts from rest. The pulleys are friction less having zero mass. The kinetic coefficient of friction is 0.35, determine the acceleration of each blocks & tension in the cord. 6



$$d\theta = v \cdot dt$$
$$v = \frac{d\theta}{dt}$$
$$d^2\theta = v \cdot dt$$

7(a) Illustrate the potential and kinetic energy of a particle? 4

(b) The initial velocities and their directions of the balls are as shown in figure. Determine the final velocities and the direction after impact. Take $e=0.8$, mass of ball A=450g, mass of ball B=890g. 6



$$F = ma = m \cdot \frac{dv}{dt}$$

$$\frac{dx}{dt} = v$$