

KATHMANDU UNIVERSITY  
End Semester Examination  
March/ April, 2017

Marks Scored:

Level : B.E./B.Sc./B. Pharm./B. Tech.  
Year : I

Course : PHYS 101  
Semester : I

Exam Roll No. : \_\_\_\_\_ Time: 30 mins.

F. M. : 15

Registration No.: \_\_\_\_\_

Date : MAR 26 2017

SECTION "A"  
[15Q × 1 = 15 marks]

*Choose and tick the most appropriate answer. The symbols, unless mentioned otherwise, have their usual meanings.*

1. Which one of the following statements is correct?  
[a] Non-conservative force is the negative gradient of potential energy.  
[b] Work done by a conservative force is independent of path followed.  
[c] Work done by a non-conservative force is independent of the path followed.  
[d] Work done by a non-conservative force is equal to the change in potential energy.
  
2. When a massive body moving with velocity  $u$  elastically collides with a light body at rest, and the collision is head-on type, then after collision the light body moves approximately with the velocity  
[a]  $u$  along the initial direction of massive body.  
[b]  $2u$  along the initial direction of massive body.  
[c]  $u$  opposite to the initial direction of massive body.  
[d]  $2u$  opposite to the initial direction of massive body.
  
3. Two particles are moving along same direction with accelerations  $a_1$  and  $a_2$  under the application of equal forces  $F$  and  $F$  respectively. The center of mass of the system is moving with the acceleration  
[a]  $\frac{2a_1a_2}{a_1 + a_2}$       [b]  $\frac{a_1 + a_2}{2}$       [c]  $\frac{a_1a_2}{a_1 + a_2}$       [d]  $\sqrt{a_1a_2}$
  
4. The radius of gyration of a circular disc of radius  $R$  about its diameter is  
[a]  $\frac{R}{\sqrt{2}}$       [b]  $R$       [c]  $\frac{R}{2}$       [d]  $\frac{R}{4}$
  
5. A solid sphere of mass  $M$  and radius  $R$  is used as a compound pendulum in which the axis of oscillation is a horizontal tangent to it. The time period of the oscillation is  
[a]  $2\pi\sqrt{\frac{2R}{5g}}$       [b]  $2\pi\sqrt{\frac{7R}{5g}}$       [c]  $2\pi\sqrt{\frac{2R}{g}}$       [d]  $2\pi\sqrt{\frac{5R}{7g}}$
  
6. Under the central force field,  
[a] linear momentum of a moving particle is always zero.  
[b] angular momentum of a moving particle is always zero.  
[c] linear momentum of a moving particle is non-zero constant.  
[d] angular momentum of a moving particle is non-zero constant.

7. Two identical wires  $A$  and  $B$  of different materials are stretched to the lengths  $L_A$  and  $L_B$  by applying a stretching forces  $F_A$  and  $F_B$  respectively. Which one of the following conditions confirms that  $A$  is more elastic than  $B$ ?
- [a]  $L_A < L_B$  for  $F_A < F_B$                       [b]  $L_A > L_B$  for  $F_A > F_B$   
 [c]  $L_A > L_B$  for  $F_A < F_B$                       [d]  $L_A < L_B$  for  $F_A > F_B$
8. According to Poiseuille's law, the volume flow rate of a viscous fluid across a horizontal tube is
- [a] inversely proportional to pressure difference across the tube.  
 [b] directly proportional to length and fourth power of radius of the tube.  
 [c] independent of length and radius of the tube, depends only on the nature of the fluid.  
 [d] inversely proportional to length and directly proportional to fourth power of radius of the tube.
9. If 25:4 be the ratio of maximum and minimum intensities when two waves were superposed, then the ratio of intensities of superposing waves is
- [a] 7:3                      [b] 5:2                      [c] 49:9                      [d] 29:21
10. Optical activity is the process of
- [a] producing polarized light by passing unpolarized light through a medium.  
 [b] rotating the plane of vibration by passing polarized light through a medium.  
 [c] converting plane polarized light to unpolarized light by passing through a medium.  
 [d] calculating the intensity ratio of polarized and unpolarized lights by passing through the medium.
11. A thermodynamical process starts from  $A$  and ends at  $C$  following the path  $ABC$  as shown in figure. The work done by the system during the process is
- [a]  $(P_1 - P_2)(V_3 - V_1)$   
 [b]  $\frac{1}{2}(P_1 + P_2)(V_2 - V_1) + P_2(V_3 - V_2)$   
 [c]  $\frac{1}{2}(P_1 - P_2)(V_2 - V_1) + P_2(V_3 - V_2)$   
 [d]  $(P_1 - P_2)(V_2 - V_1) + P_2(V_3 - V_1)$

