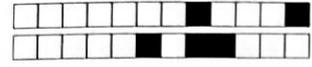


Ch
1
3
5
6

Ch 1, 3, 5, 6



+17/1/24+



GULF UNIVERSITY FOR SCIENCE AND TECHNOLOGY
DEPARTMENT OF MATHEMATICS AND NATURAL SCIENCE

PHYS100: How Things Work

SPRING 2018 TEST 1

Date: March 14, 2018

- Duration : 50 minutes
- Answer any 20 questions
- Open book. The use of electronic calculators are allowed
- Sharing of any information is not allowed
- Questions using the sign ♣ may have zero, one or several correct answers. Other questions have a single correct answer.

T1

Name: ~~XXXXXXXXXX~~ ~~XXXXXXXXXX~~

ID: ~~XXXXXXXXXX~~ Section:

Ch 1 + 3 + 5 + 6



✓ Question 1 What is meant by "uniform circular orbit"?

- A Moving around a circle with constant speed
- B Moving around a circle with constant velocity
- C Moving around an ellipse with changing speed
- D Moving around a circle with changing speed

✓ Question 2 What is the speed of an object whose kinetic energy is 62.5 J if its mass is 5 kg?

- A 10 m/s
- B 5 m/s
- C 50 m/s
- D 2 m/s

$KE = 62.5$
 $m = 5 \text{ kg}$
 $v = ?$
 $v = \sqrt{2KE/m}$
 $= \sqrt{2(62.5)/5}$
 $= 5$

✓ Question 3 An object is traveling at 45 km/h. What is the speed of the object in m/s?

- A 36 m/s
- B 12.5 m/s
- C 25 m/s
- D 45 m/s

$45 \times 1000 / 3600$
 $= 12.5$

✓ Question 4 How long does a machine whose power rating is 500 W take to do 100 J of work?

- A 25 s
- B 0.5 s
- C 500 s
- D 0.2 s

$P = \frac{W}{t}$
 $t = \frac{W}{P} = \frac{100}{500} = 0.2$

✓ Question 5 If no external force is acting on an object, then

- A its mass is equal to zero
- B its speed must be changing
- C its acceleration must be zero
- D its velocity can only be zero

$t = W \times P = 500 \times 100 = 5000$

Question 6 An external force does 45 J of work on an object. How much does the energy of the change?

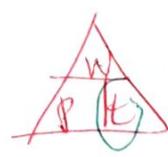
- A It decreases by 45 J
- B it increases by 45 J
- C It changes by 90 J
- D It does not change

$F = 45$

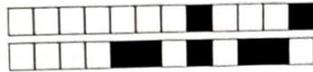
$P = \frac{W}{t}$

✓ Question 7 In Copernicus' theory,

- A Stars move around the earth
- B Stars move in elliptical orbits
- C The earth moves around the sun
- D The sun moves around the earth



② Ti



✓ Question 8 Why did Kepler change the orbits of planets from circles to ellipses?

- A He thought that stars are made of fire
- B He couldn't explain Tycho Brahe's data with circular orbits
- C He thought that the earth was too heavy to move in a circular orbit
- D He did not like circles

✓ Question 9 How far does an object move if it is pushed by a 40 N force so that 100 J of work is done on it? $D = \frac{W}{F} = \frac{100}{40} = 2.5$ $f = 40N$ $w = 100J$ $D = \frac{w}{F} = \frac{100}{40} = 2.5$

- A 5 m
- B 6 m
- C 0.4 m
- D 2.5 m

✓ Question 10 A big ball that is in motion collides with a small ball that is at rest. During the collision $= \frac{100}{40} = 2.5$

- A the bigger ball pushes harder than the smaller ball
- B the smaller ball pushes the bigger one harder
- C both balls push each other equally
- D only the big pushes (the small ball does not push)

$m = \frac{GPE}{gh} = \frac{400}{5 \times 10} = 8$
 $GPE = mgh$

✓ Question 11 What is the mass of an object whose potential energy increases by 400 J if it is raised to a height of 5 m? $m = ?$ $GPE = 400 J$ $h = 5$

- A 8 kg
- B 80 kg
- C 25 kg
- D 4 kg

$S = \frac{D}{t} = \frac{45}{0.5} = 90$

✓ Question 12 An object travels 45 km in 30 minutes. The speed of the object in km/h is $30 \rightarrow 0.5$

- A 45 km/h
- B 120 km/h
- C 90 km/h
- D 30 km/h

$m = \frac{GPE}{gh} = \frac{400}{5 \times 10} = 8$

✓ Question 13 An object initially located at $x_1 = 3$ m is later found at $x_2 = -7$. What is the displacement of the object? $S = ?$ $x_2 - x_1 = (-7) - 3 = -10$

- A -4 m
- B 3 m
- C -7 m
- D -10 m

✓ Question 14 Which of the following statements describes retrograde motion? During retrograde motion

- A the stars appear to be moving backwards
- B the moon appears larger and with reddish color
- C the sun slows down and planets speed up
- D planets appear to be moving backwards

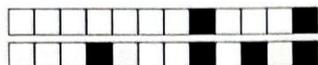
✓ Question 15 The weight of an object whose mass is 50 kg is $w = mg$

- A 600 N
- B 5 N
- C 500 N
- D 50 N

$50 \times 10 = 500$
mass

$50 \times 10 = 500$
 $m \times g = 500$

3
II



+17/4/21+

Question 16 Which of the following is not a correct description of the motion of an object under the influence of an external force?

- A An object whose acceleration is not zero
- B An object whose motion is changing
- C An object whose acceleration is increasing
- D An object whose velocity is constant

Question 17 A ball is thrown up in vacuum (i.e., ignore air). While the ball is rising,

- A both its kinetic and potential energy increase
- B its kinetic energy increases while its potential energy decreases
- C both its kinetic and potential energy decrease
- D its kinetic energy decreases while its potential energy increases

Question 18 Which of the following is not part of Ptolemy's theory?

- A The stars move in circular orbits around the earth
- B The moon moves around the earth
- C The earth moves around the sun
- D The sun moves around the earth

Question 19 What happens to the magnitude of the force of gravity between two objects if the distance between them is halved (i.e., $r \rightarrow r/2$) without their masses changing?

- A It becomes four times bigger
- B It doubles
- C It decreases to a half
- D It decreases four times

$$\frac{1}{2}r \quad 15mm$$
$$\frac{1}{2}r^2$$
$$= \frac{1}{2}\left(\frac{1}{2}\right)^2$$

Question 20 Which of the following statements best describes the acceleration of an object whose motion is changing?

- A Its acceleration is not zero $a \neq 0$
- B Its acceleration is equal to its velocity
- C Its acceleration is not defined
- D Its acceleration is zero

