Final Exam
PHY101

Name: ..... Student ID: .....

Instructions:
Record your answers to the Part A (multiple-choice questions) on your separate answer sheet, by coloring the circle corresponding your answer using the provided pencil. For parts B and C all answers should be written in pen. You may use scrap paper (blank paper provided) to work out the answers to the questions, but be sure to record all your answers on the answer sheet

Part A (24 marks)

Choose the correct answer : (*0.75 point for each question* ***)***

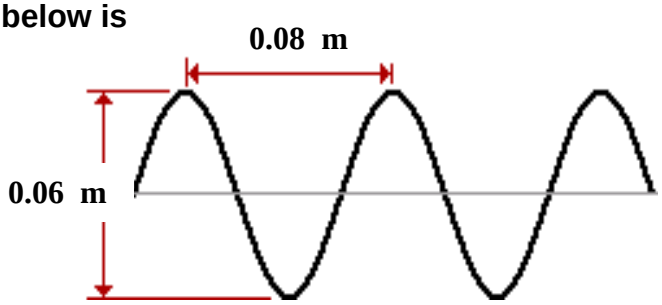
1. A spring while compressed has :
(a) Gravitation Potential Energy.
(b) Elastic Potential Energy.
(c) Heat Energy.
(d) Kinetic Energy.

2. **Friction is always :**
(a) opposite to the motion of a body
(b) in the same direction
(c) Does not affect the motion
(d) non of the answers are correct

3- Convert 14 ˚C to K
(a) 287 K
(b) 187 K
(c) 58 K
(d) 100 K

4-The amplitude (A) of the wave in the diagram below is

a. 0.07 m.
b. 0.04 m.
c. 0.03 m.
d. 0.05 m.



5- 5 Pascal is equal to
(a) 5 N
(b) 5 $N \setminus s^2$
(c) 5 $N \setminus m^2$
(d) 5 dyne

6- In the International system of units (SI), the standard unit for heat is the :

(a) Inch. (b) Kg

(c) ˚C (d) joul.

7- The interference of two waves with same frequencies (f) and same phases ∅ produces :

(a) destructive interference. (b) beat.

(b) Doppler's Effect. (d) constructive interference.

8- When the particles of a medium are vibrating perpendicular to the direction of the wave motion, the wave is :

(c) a sound wave. (b) a standing wave.

(d) a longitudinal wave. (d) a transverse wave.

9- Which is more viscous :

(e) milk. (b) water.

(f) oil. (d) honey.

10- In standing waves at the point of node, the amplitude (A) of wave is:

(g) small. (b) large.

(h) very large. (d) zero.

11- What is the frequency (f) of a wave that has a speed(v) of 0.4 m/sec and wavelength (λ) of 0.020 m ?

(a) 10 hertz. (b) 20 hertz

(c) 0.008 hertz. (d) 0.5 hertz.

12- If two systems are in thermal equilibrium, the two systems are at the same :

(i) temperature. (b) volume.

(c) pressure. (d) height.

13- If you push a wall, the amount of work you do is:

(a) doubles. (b) 1000 N

(c) 36 kg (d) zero.

14- A Mercury drop has a spherical shape because of :

(a) gravitation. (b) surface tension.

(c) Archimedes' principle. (d) Pascal's principle.

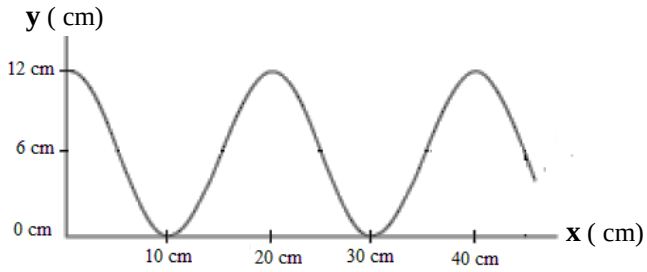
15- A human ear can hear sounds that are:

(a) above the audible range. (b) below the audible range .

(c) in the audible range. (d) none of above.

16- Determine the wavelength (λ) of the wave shown below.

(a) 30 cm.
(b) 40 m.
(c) 20 cm.
(d) 10 m.



17- The hydraulic lift (press) is an application of:

(a) Archimedes' principle.
(b) Bernoulli's principle.
(c) Torricelli's law.
(d) Pascal's principle.

18- Decibel (dB) is a unit of:

(a) mass.
(b) sound intensity level.
(c) energy.
(d) force.

19- The period (T) of a pendulum depends on:

(a) the pendulum's mass
(b) the pendulum's length
(c) the pendulum's arc size.
(d) the pendulum's weight

20- Based on Bernoulli's equation, as the speed (v) of a moving fluid increases, the pressure (p) in the fluid:

(a) decreases.
(b) increases.
(c) may increase or decrease.
(d) remains constant.

21- Find the density (ρ) of a substance whose mass is 25 Kg and it's volume is 5 m^3 .

(a) 5 Kg\m3
(b) 0.2 Kg.m2
(c) 30 m3 \ Kg
(d) 15 Kg .m3

22- A man with a height of 1.8 m is standing in front of a flat mirror, what is the height of his image?

(a) 100 m
(b) 0.5 m
(c) 2.8 m
(d) 1.8 m

23- Mass and weight are:

(b) both measuring the same thing.
(b) two different quantities.
(c) exactly equal.
(d) both measured in kilograms.

24- The amount of heat needed to change the state of matter from solid to liquid without a change in temperature is called:

(a) Latent Heat of Vaporization.
(b) Latent Heat of Fusion.
(c) specific Heat.
(d) Heat capacity.

25-The dimensional formula of velocity (v) is

(a) LT^{-1} (b) LT^{2}

(c) LT (d) LT^{-2}

26- ' For every action, there is an equal and opposite reaction' , that is :

(a) Newton's 1st law (b) Newton's 2nd law

(c) Newton's 3rd law (d) Newton's gravitational law

27- The buoyant force acting on an object is equal to:

(a) the weight of the object. (b) the weight of the fluid.

(c) the weight of the replaced fluid (d) the volume of the object.

28-Which of the following IS NOT a vector quantity?

(a) Displacement. (b) Velocity.

(c) Acceleration (d) Mass.

29- The potential energy of a body at certain height is 400J. The kinetic energy of this body when it is just touches the ground is

(a) 400J (b) 200J

(c) Zero J (d) 800 J

30- Momentum is equal to :

(a) mass times weight. (b) mass times velocity.

(c) velocity times distance. (d) time times work.

31- A device for measuring the atmospheric pressure is called the

(a) Manometer. (b) Barometer.

(c) thermometer. (d) hydraulic press

32- If the distance (r) between two bodies increases then the attraction force (F_g) between them will:

(a) Increases (b) Decreases

(c) Not affected (d) Become zero.

Part B (10 Marks)

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1. Fill in the Blanks from the words given below: (0.5 mark each)

- - decreases - - - thermal conduction - - - velocity - -

a. Elastic modulus (e.g Young modulus) is calculated by the ratio stress / strain

b. ……real image…….. is formed when light rays pass through and diverge from the image point.

c. thermal convection is the transfer of heat by the movement of molecules.

d. heat capacity is the energy required to raise the temperature of a substance by 1K.

e. Newton's second law states that the force is proportional to acceleration.

f. According to Doppler effect , if two objects move toward each other , the frequency of the sound waves will ……increases……

g. The law of reflection states that the angle of incidence equals the angle of ……reflection……

2. Using the sketch below:

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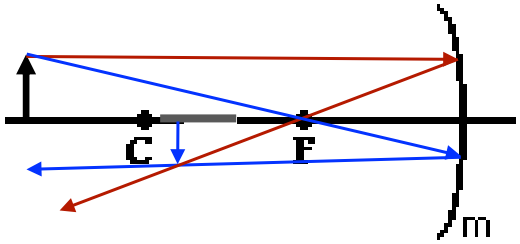

a. Draw the image of the object (↑) formed by a concave mirror.

b. Is the image virtual or real.

…….

c. Is the image up right or inverted.

…….

d. Is the image smaller or larger or the same size of the object.

…….

e. If the object is 12 cm from mirror and the mirror focal length f = 5cm, find the image distance (q) from mirror. (don't forget the unit)

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Part C (6 Marks) **Solve THREE of the following Problems (2mark each):**

1. What quantity of heat (ΔQ) is required to raise the temperature of 450 g of water from 15 ˚C to 85 ˚C ? (the specific heat of water is 4.18 cal \ g.˚C **)**

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2. A car travels 30 km in 0.75 hour on a straight highway, what is its average velocity ?

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3. A bicycle is moving with a velocity of 19 m/s. If its weight is 100 N, find the kinetic energy K.E.

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4. A steel railroad track has a length of 25 m. What is <u>the change in its length</u> when it experiences a temperature change of 40 K. (The coefficient of linear expansion of steel is $12 \times 10^{-6}\ K^{-1}$)

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5 - A woman with a mass of 50 kg climbs a set of stairs that are 3 m high. How much <u>gravitational potential energy</u> does she gain?

Best Wishes