بسم الله الرحمن الرحيم

The University of Jordan
Faculty of Science
Department of Physics
Dr. Hanan Sa'adeh

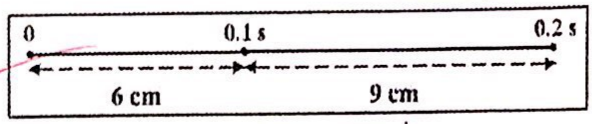
6/13

Practical Physics-1 (0302111)
2nd Semester 2013/2014
Quiz #3
45 minutes

Name (in Arabic):-------[redacted]-- No.: ----[redacted]---- Section: ---6-----

*** Rotational Motion**

Q1- The ticker tape shown was obtained for an experiment using a turntable of radius $R = 10$ cm and a hanging mass $m_h = 100$ g. The time interval between two successive points is 0.1s, and the acceleration due to gravity is 980 cm/s^2.



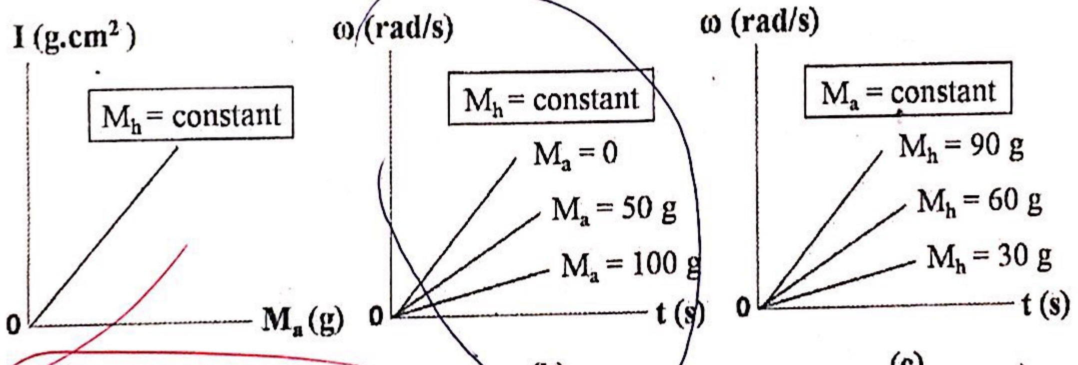
a- The angular acceleration = ___30___ *rad/s^2*.

$30 \rightarrow \alpha = \frac{d\omega}{dt}$ $\omega = \frac{V}{r} = 3$

b- The moment of inertia of the turntable = ___15.27___ *g.cm^2*.

$I = \sqrt{\frac{m g}{\alpha} R^2}$ 30 $V = \frac{9-6}{0.2-0.1}$

Q2- All of the following graphs describe the experiment of rotational motion properly except one:
(M_h: Hanging mass, M_a: Mass added to the turntable, I: Moment of inertia of the turntable)



(a) (b) (c)

Q3- Justify your answer to Q2 above and correct the wrong graph.

Mh is not Constant
and the Smaller
the Wheight the Slope will ~~Decrease~~ Decrease

*** Simple Pendulum**

Q4- A pendulum has a length of 3m and executes 20 complete oscillations in 70 s. The acceleration due to gravity at the location of the pendulum is:

~~(a) 980 cm/s^2~~ (b) 940 cm/s^2 (c) 10 m/s^2 (d) 9.67 m/s^2

Q5- In Q4 above, if the mass of the pendulum bob is doubled, the period will:

(a) increase. (b) decrease. (c) remain the same.

Q6- If we plot **Log L versus Log T** (L is the length of the string and T is the period) to obtain a straight line, the **slope** will be:

(a) $\frac{1}{2}$ (b) 2 (c) -2 (d) -1

Q7- In order to increase the accuracy of the measurement in this experiment,

(a) increase the length of the pendulum.
(b) decrease the mass of pendulum bob.
(c) increase the number of oscillations for which the time is measured.
(d) decrease the number of oscillations for which the time is measured.

* **Ballistic Pendulum**

Q8- A 0.05 kg bullet with velocity 150 m/s is shot into a 3 kg ballistic pendulum of 1 m length. When the bullet hits the pendulum it swings up from the equilibrium position and reaches an angle φ at its maximum. Find how high the pendulum rises after the bullet gets stuck inside ($g = 9.8\ m/s^2$).

(a) 0.31 cm (b) 0.31 m (c) 0.31 mm (d) 310 cm

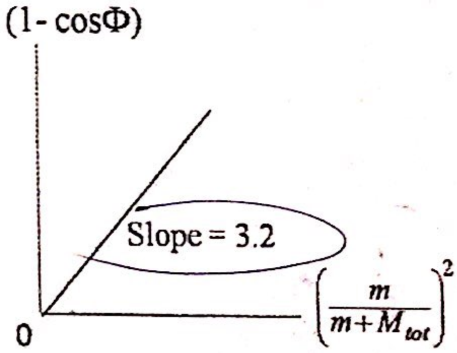
Q9- Determine the angle φ in Q8 above.

(a) 46° (b) 40° (c) 30° (d) 90°

Q10- The collision between the bullet and the pendulum in Q8 above is:

(a) inelastic. (b) perfectly elastic. (c) perfectly inelastic.

Q11- A plot of $(1-\cos\Phi)$ versus $\left(\frac{m}{m+M_{tot}}\right)^2$ is shown, where m is the mass of a steel ball projected horizontally into the ballistic pendulum, M_{tot} is the total mass of the pendulum (mass of the pendulum + added mass), and Φ is the maximum deflection of the pendulum. The pendulum has a length of 25 cm. If the speed of the ball before collision is 4 m/s, the acceleration due to gravity at the location of the pendulum is:



(a) $10\ m/s^2$ (b) $9.4\ m/s^2$ (c) $9.6\ m/s^2$

Q12- In Q11 above, if instead we plot $(\cos\Phi)$ versus $\left(\frac{m}{m+M_{tot}}\right)^2$, the relationship will be:

(a) nonlinear and direct. (b) nonlinear and inverse.
(c) linear and direct. (d) linear and inverse.

ALL THE BEST