Review for Final—Steve Liebling
PHY 3

MULTIPLE CHOICE

In the following multiple choice questions, **circle** the answer (either (a), (b), (c), or (d)) that *best* answers the question. There is no partial credit for these. Each is also worth the same amount, 1 point.

1. If the Earth ballooned to three times its current radius but kept its current mass, then, in terms of the acceleration constant g, what would the new acceleration due to gravity be at the surface of our enlarged planet?

    (a) $a = 9g$

    (b) $a = 3g$

    (c) $a = g/3$

    (d) $a = g/9$

2. A scuba diver with an attached safety line descends at $3.0 ft/s$. The line is released from a spinning spool of fixed radius $0.50 ft$. If the line is always taught, how fast is the spool turning?

    (a) $0.5 rad/s$

    (b) $3.0 rad/s$

    (c) $6.0 rad/s$

    (d) $12.0 rad/s$

3. Convert $33.0 rev/min$ into standard units

    (a) $0.550 rads/s$

    (b) $3.46 rads/s$

    (c) $18.8 rads/s$

    (d) $303 rads/s$

4. A $14.0 kg$ mass is separated from a $24 kg$ mass by a distance of $156 m$. Where is the center of mass of this pair?

    (a) $98 m$ from the $14.0 kg$ mass

    (b) $108 m$ from the $14.0 kg$ mass

    (c) $30 m$ from the $24.0 kg$ mass

    (d) $54 m$ from the $24.0 kg$ mass

    (e) $78 m$ from the $24.0 kg$ mass

5. A flywheel has a moment of inertia of $25.0 kg \cdot m^2$ about its axis around which it spins at $1.20 revs/s$. What is the rotational kinetic energy of the flywheel?

    (a) $711 J$

    (b) $94.2 J$

    (c) $18.0 J$

    (d) $15.5 J$

6. A spinning skater with moment of inertia about her central axis $13.1 kg \cdot m^2$ rotates at $\omega = 0.50 rads/s$. She then pulls her arms into her body and thus decreases her moment of inertia to $8.34 kg \cdot m^2$. Assuming ideal conditions, what's her new angular speed?

(a) $0.318 rad/s$

(b) $0.393 rad/s$

(c) $0.785 rad/s$

(d) $1.27 rad/s$

7. Two hoops, A and B are are free to rotate about their centers and are connected by a massless belt. The belt is moving at a speed of $15m/s$. The larger hoop has three times the radius of the first and nine times the mass.

   (a) What's the ratio of the angular speed of hoop B to that of A?

   (b) What's the ratio of the kinetic energy of hoop B to that of A?

   (c) What's the ratio of the angular momentum of hoop B to that of A?