PHYSICS DEPARTMENT

PHY 1033   Exam 1   September 21, 2006
S. Obukhov

Name (print): _____

On my honor, I have neither given nor received unauthorized aid on this examination.

Signature: _____

YOUR TEST NUMBER IS THE 5-DIGIT NUMBER AT THE TOP OF EACH PAGE.

DIRECTIONS
(1) **Code your test number on your pink answer sheet (use 76–80 for the 5-digit number)**. Code your name on your answer sheet. **Darken circles completely (errors can occur if too light)**. Code your UFID on your answer sheet.
(2) Print your name on this sheet and sign it also.
(3) You may use a calculator and 1 side of handwritten $8\frac{1}{2} \times 11$ formula sheet. No other materials allowed.
(4) Do all scratch work anywhere on this exam that you like. At the end of the test, this exam printout and the formula sheet are to be turned in. No credit will be given without both answer sheet and printout with scratch work most questions demand.
(5) Work the questions in any order. Incorrect answers are not taken into account in any way; you may guess at answers you don't know if you feel that a correct answer is listed. Guessing on all questions will most likely result in failure.
(6) It is not our intention to omit the right answer, but if you believe that none of the answers is correct, please mark the answer closest to your answer.
(7) **Blacken the circle of your intended answer completely, using a number 2 pencil**. Do not make any stray marks or the answer sheet may not read properly.
(8) As an aid to the examiner (and yourself), in case of poorly marked answer sheets, please circle your selected answer on the examination sheet.
(9) **Take g=10 m/s^2 and $c = 3 \times 10^8$ m/s throughout this test.**
(10) Good luck!!!
>>>>>>>>**WHEN YOU FINISH** <<<<<<<<
Hand in the pink answer sheet separately.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
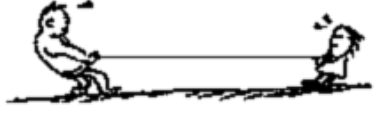
1. Science is a body of knowledge that
    A. is an ongoing activity of humans.
    B. describes order in nature.
    C. condenses knowledge into testable laws.

    (1) A, B, and C   (2) A only   (3) B only   (4) C only   (5) None of these

2. As an object freely falls downward, its
    A. acceleration increases.
    B. velocity increases.

    (1) B   (2) A   (3) both A and B   (4) neither   (5) —

3. If no external forces are acting on a moving object it will

    (1) continue moving at the same velocity.
    (2) move slower and slower until it finally stops.
    (3) continue moving at the same speed.
    (4) —
    (5) —

4. The two measurements necessary for calculating average speed are

    (1) distance and time.
    (2) velocity and time.
    (3) distance and acceleration.
    (4) velocity and distance.
    (5) acceleration and time.

5. If an object moves with constant acceleration, its velocity must

    (1) change by the same amount each second.
    (2) change by varying amounts depending on its speed.
    (3) always decrease.
    (4) be constant also.
    (5) —

6. If a rocket initially at rest accelerates at a rate of 50 m/s for one minute, its speed will be

    (1) 3000 m/s.   (2) 500 m/s.   (3) 50 m/s.   (4) 3600 m/s.   (5) —

7. An apple falls from a tree and hits the ground 5 meters below. It hits the ground with a speed of about

    (1) 10 m/s.   (2) 5 m/s.   (3) 20 m/s.   (4) 15 m/s.   (5) not enough information given to estimate

8. Consider drops of water that leak at a steady rate from a dripping faucet. As the drops fall they

    (1) get farther apart. (2) get closer together. (3) remain at a relatively fixed distance from one another. (4) — (5) —

9. Compared to the mass of a certain object on Earth, the mass of the same object on the moon is

    (1) the same.   (2) one sixth as much.   (3) zero.   (4) six times as much.   (5) —

10. A ride on a roller-coaster car containing 6 passengers takes 3 minutes. Neglecting friction, a similar ride with 12 passengers aboard would take

    (1) 3 minutes.   (2) 1.5 minutes.   (3) 6 minutes.   (4) 18 minutes.   (5) —

11. An object is pulled northward by a force of 10 N and at the same time another force of 15N pulls it southward. The magnitude of the resultant force on the object is

    (1) 5 N.   (2) 150 N.   (3) 0 N.   (4) 25 N.   (5) —

12. An apple at rest weighs 1 N. The net force on the apple when it is in free fall is

   (1) 1 N.   (2) 9.8 N.   (3) 0 N.   (4) 0.1 N.   (5) none of these

13. A skydiver, who weighs 500 N, reaches terminal velocity of 90 km/h. The air resistance on the diver is then

   (1) 500 N.   (2) 410 N.   (3) 250 N.   (4) 90 N.   (5) none of these

14. Arnold Strongman and Suzie Small each pull very hard on opposite
    ends of a massless rope in a tug-of-war. The greater force on the rope
    is exerted by

   (1) both the same, interestingly enough.   (2) Arnold, of course.   (3) Suzie, surprisingly.   (4) —   (5) —

15. A vehicle that weighs 4000 N on the surface of the Earth is travelling in outer space at a speed of 200 m/s. The
    smallest constant force that must be applied to stop it in 20 seconds is

   (1) 4000 N.   (2) 20 N.   (3) 40 N.   (4) more than 4000 N.   (5) 400 N.

16. A car traveling at 100 km/hr strikes an unfortunate bug and splatters it. The force of impact is

   (1) the same for both.   (2) greater on the car.   (3) greater on the bug.   (4) —   (5) —

17. A rifle recoils while firing a bullet. The speed of the rifle's recoil is small because the

   (1) rifle has much more mass than the bullet.
   (2) momentum of the rifle is smaller.
   (3) force against the rifle is smaller than against the bullet.
   (4) momentum is mainly concentrated in the bullet.
   (5) —

18. The conservation of momentum is most closely related to

   (1) Newton's 3rd law.   (2) Newton's 1st law.   (3) Newton's 2nd law.   (4) Newton's 4th law   (5) —

19. A ball is moving at 3 m/s and has a momentum of 48 kg m/s. What is the ball's mass?

   (1) 16 kg   (2) 12 kg   (3) 4 kg   (4) 144 kg   (5) none of these

20. A 5-kg shark swimming at a speed of 1 m/s swallows an absent-minded 1-kg fish swimming toward it at 4 m/s. The speed of the shark after this meal is

(1) 1/6 m/s.　　　　(2) 2/3 m/s.　　　　(3) 1/2 m/s.　　　　(4) 1/5 m/s.　　　　(5) 3/2 m/s.

21. An object lifted 10 meters gains 200 J of potential energy. If the same object is lifted 20 meters, its potential energy gain is

(1) twice as much.　　(2) four times as much.　　(3) the same.　　(4) half as much.　　(5) more than four times as much.

22. When a car is braked to a stop, its kinetic energy is transformed to

(1) heat.　　　(2) stopping energy.　　　(3) potential energy.　　　(4) energy of rest.　　　(5) energy of motion.

23. A machine puts out 100 Watts of power for every 1000 Watts put into it. The efficiency of the machine is

(1) 10%.　　　　(2) 90%.　　　　(3) 50%.　　　　(4) 110%.　　　　(5) none of these

24. A car moving at 50 km/hr skids 20 m with locked brakes. How far will the car skid with locked brakes if it were traveling at 150 km/hr?

(1) 180 m　　　　(2) 90 m　　　　(3) 20 m　　　　(4) 120 m　　　　(5) 60 m

25. An object at rest may also have

(1) potential energy.　　　(2) kinetic energy.　　　(3) velocity.　　　(4) momentum.　　　(5) speed.