PHYSICS DEPARTMENT

PHY 1033 Exam 1 February 2, 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. As an object freely falls downward, its

   (1) velocity increases. (2) acceleration increases. (3) both of these. (4) none of these. (5) —

2. A sheet of paper can be withdrawn from under a container of milk without toppling it if the paper is jerked quickly. This best demonstrates that

   (1) the milk carton has inertia.
   (2) the milk carton has no acceleration.
   (3) there is an action-reaction pair of forces.
   (4) gravity tends to hold the milk carton secure.
   (5) none of these

3. The gain in speed each second for a freely-falling object is about

   (1) 10 m/s. (2) 0. (3) 5 m/s. (4) 20 m/s. (5) depends on the initial speed

4. A truck is moving at constant velocity. Inside the storage compartment, a rock is dropped from the midpoint of the ceiling and strikes the floor below. The rock hits the floor

   (1) exactly below the midpoint of the ceiling.
   (2) behind the midpoint of the ceiling.
   (3) ahead of the midpoint of the ceiling.
   (4) More information is needed to solve this problem.
   (5) none of these

5. The two single measurements necessary for calculating average speed are

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

6. A car maintains a constant velocity of 100 km/hr for 10 seconds. During this interval its acceleration is

   (1) zero. (2) 10 km/hr. (3) 1000 km/hr. (4) 110 km/hr. (5) —

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

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

8. Disregarding air resistance, objects fall with constant

   (1) acceleration. (2) velocity. (3) speed. (4) distances each successive second. (5) —

9. Disregarding air drag, how fast must you toss a ball straight up in order for it to take 2 seconds to return to the level from which you tossed it?

   (1) 10 m/s (2) 20 m/s (3) 7.5 m/s (4) 5 m/s (5) 15 m/s

10. Compared to a 1-kg block of solid iron, a 2-kg block of solid iron has twice as much

    A. volume **B.** inertia **C.** mass

    (1) all of these (2) A (3) B (4) C (5) none of these

11. A force is a vector quantity because it has both

    (1) magnitude and direction. (2) action and reaction counterparts. (3) mass and acceleration. (4) — (5) —

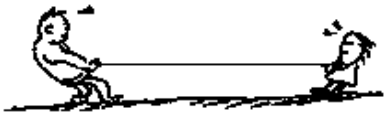
12. An object is pulled northward by a force of 10 N and at the same time another force of 15N pulls it southward. The magnitude of the resultant force on the object is

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

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) 90 N. (3) 250 N. (4) 410 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) Suzie, surprisingly. (2) Arnold, of course. (3) both the same, interestingly enough. (4) — (5) —

15. A Mack truck and a Volkswagen traveling at the same speed have a head-on collision. The vehicle that undergoes the greatest change in velocity will be the

(1) Volkswagen. (2) Mack truck. (3) same for both. (4) — (5) —

16. Which of the following has the largest momentum relative to the Earth?

(1) a pickup truck speeding along a highway
(2) a Mack truck parked in a parking lot
(3) a tightrope walker crossing Niagara Falls
(4) a dog running down the street
(5) the Science building on campus

17. The difference between impulse and impact force involves the

(1) time the force acts.
(2) mass and its effect on resisting a change in momentum.
(3) difference between acceleration and velocity.
(4) distance the force acts.
(5) —

18. 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 is mainly concentrated in the bullet.
(3) force against the rifle is smaller than against the bullet.
(4) momentum of the rifle is smaller.
(5) —

19. If you push for a half hour or a whole hour against a stationary wall,

(1) no work is done in either case.
(2) half as much work is done during the half hour.
(3) twice as much work is done during the half hour.
(4) it is impossible to determine how much work is done.
(5) —

20. Do 100 J of work in 50 s and your power output is

(1) 2 W (2) 1/2 W. (3) 5,000 W. (4) 50 W. (5) 4 W.

21. An object may have potential energy because of its

(1) location. (2) momentum. (3) speed. (4) acceleration. (5) none of these

22. When a rifle is fired it recoils as the bullet is set in motion. The rifle and bullet ideally acquire equal
A amounts of kinetic energy.
B but opposite amounts of momentum.

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

23. If the speed of a moving object doubles, which of the following also doubles?

(1) kinetic energy (2) acceleration (3) momentum (4) all of the above (5) —

24. In science, a theory is

(1) a synthesis of a large body of well tested knowledge. (2) unchangeable. (3) an educated guess. (4) less than a fact. (5) —

25. Early Greeks knew (to a fair approximation)
A the size of the moon.
B the Earth-moon distance.
C the size of the Earth.

(1) all of these. (2) none of these. (3) A (4) B (5) C