PHYSICS DEPARTMENT

PHY 1033   Exam #2   October 19, 2004
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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. According to Newton's Law of Gravitation, doubling the distance between two interacting objects

   (1) divides by 4 the gravitational force between them.
   (2) multiplies by 2 the gravitational force between them.
   (3) divides by 2 the gravitational force between them.
   (4) multiplies by 4 the gravitational force between them.
   (5) none of these.

2. A 100-Watt lamp glows brighter than a 25-Watt lamp when both are connected to a 120-v household receptacle. The electrical resistance of the 100-Watt lamp must be

   (1) less.   (2) greater.   (3) the same.   (4) polarized   (5) none of these.

3. Stretch a copper wire so that it is thinner and the resistance between its ends

   (1) increases.   (2) decreases.   (3) remains unchanged.   (4) disappears.   (5) none of these.

4. When a 10-V battery is connected to a resistor, the current in the resistor is 2 A. What is the resistor's value?

   (1) 5 ohms   (2) 2 ohms   (3) 10 ohms   (4) 20 ohms   (5) more than 20 ohms

5. Connect a pair of lamps in series and you draw current from the connected battery. Connect the same lamps in parallel and you draw

   (1) more current.   (2) less current.   (3) the same current.   (4) ...sometimes more, sometimes less.   (5) no current.

6. Suppose the circumference of a bicycle wheel is 2 meters. If it rotates at 1 revolution per second when you are riding the bicycle, then your speed will be

   (1) 2 m/s   (2) 1 m/s   (3) 3 m/s   (4) 3.14 m/s   (5) 6.28 m/s

7. An industrial flywheel has a greater rotational inertia when most of its mass is

   (1) nearest the rim.   (2) nearest the axis.   (3) uniformly spread out as in a disk.   (4) —   (5) —

8. The long heavy tail of a spider monkey enables the monkey to easily vary its

   (1) center of gravity.   (2) weight.   (3) momentum.   (4) inertia.   (5) none of these.

9. A phonograph record player has constant rotational speed. The speed of the record relative to the pickup needle is greatest

   (1) at the beginning of the record.
   (2) at the end of the record.
   (3) everywhere because it has the same speed anywhere on the record.
   (4) —
   (5) —

10. For a system in mechanical equilibrium, the net force on the system

    (1) and the net torque on the system are zero.
    (2) is zero.
    (3) may be any amount as long as the net torque is zero.
    (4) —
    (5) —

11. A huge rotating cloud of particles in space gravitate together to form an increasingly dense ball. As it shrinks in size, the cloud

    (1) rotates faster.   (2) rotates slower.   (3) rotates at the same speed.   (4) —   (5) —

12. According to Kepler's laws, the paths of planets about the sun are

    (1) ellipses.   (2) parabolas.   (3) circles.   (4) straight lines.   (5) none of these.

13. The reason the moon does not crash into the Earth is that the

    (1) moon has a sufficient tangential speed.
    (2) Earth's gravitational field is weak at the moon.
    (3) gravitational pull of other planets keeps the moon up.
    (4) moon has less mass than the Earth.
    (5) none of these.

14. Suppose the moon had twice the diameter but the same mass and same orbital distance from Earth. In that case, the high tides on Earth would be

(1) practically the same.   (2) higher.   (3) lower.   (4) unequal in size.   (5) none of these.

15. An object is dropped and freely falls to the ground with an acceleration of 1 g. If it is thrown upward at an angle instead, its acceleration will be

(1) 1 g downward.   (2) 1 g upward.   (3) 0 g   (4) larger than 1 g.   (5) none of these.

16. The circular orbit of a satellite orbiting the Earth is characterized by a constant

(1) all of these.   (2) speed.   (3) acceleration.   (4) radial distance.   (5) none of these.

17. A positive ion has more

(1) protons than electrons.
(2) electrons than neutrons.
(3) electrons than protons.
(4) protons than neutrons.
(5) neutrons than protons.

18. Two protons attract each other gravitationally and repel each other electrically. By far the greater is

(1) the electrical repulsion.   (2) the gravitational attraction.   (3) neither – they are the same.   (4) —   (5) —

19. When a single charge q is placed at one corner of a square, the electric field at the center of the square is F/q. If two other equal charges are placed at the adjacent corners of the square, the electric field at the center of the square due to these three equal charges is

(1) F/q (2) $3F/q$ (3) $F/(2q)$ (4) $F/(3q)$ (5) none of these.

20. If you use 10 J of work to push a coulomb of charge into an electric field, its voltage with respect to its starting position is

(1) 10 V.   (2) less than 10 V.   (3) more than 10 V.   (4) —   (5) —