

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁
1. $9.8 \text{ m}/(\text{second})^2$ is equal to: (A) $9.8 \text{ km}/(\text{hour})^2$ (B) $35 \text{ km}/(\text{hour})^2$ (C) $1.3 \times 10^5 \text{ km}/(\text{hour})^2$ (D) $1.3 \times 10^8 \text{ km}/(\text{hour})^2$ (E) none of these 2. If a jogger can maintain a speed of $10 \text{ km}/\text{hour}$, this is equivalent to: (A) 2.8 m/s (B) 36 m/s (C) 170 m/s (D) $3.6 \times 10^7 \text{ m/s}$ (E) none of these 3. A rectangular block has a width of $10.00 \text{ cm} \pm 0.4\%$ and a length of $20.00 \text{ cm} \pm 0.5\%$. The area of a clock face with these dimensions will have a % uncertainty of about: (A) 0.02% (B) 0.1% (C) 0.9% (D) 2% (E) none of these 4. If the distance traveled in a time interval is zero: (A) there can be no motion (B) there can be no change in position (C) there may be motion, but at the end of the time interval the object is back at its original position (D) both (A) and (B) are correct. (E) none of these is correct. 5. Which is not a vector quantity? (A) speed (B) velocity (C) acceleration (D) displacement (E) change in position 6. Vector X and Y are perpendicular to each other. What is the magnitude of the component of A in the direction of vector Y ? (A) zero (B) $0.707X$ (C) $1.414X$ (D) X, the magnitude of this vector (E) none of these are correct 7. Can two non-zero vectors of unequal magnitudes ever add up to zero? (A) no, never (B) yes, always (C) yes, this may be possible depending upon the directions of the vectors (D) both (A) and (B) (E) none of these are correct 8. Can three non-zero vectors of unequal magnitudes ever add up to zero? (A) no, never (B) yes, always (C) yes, this may be possible depending upon the vectors (D) both (A) and (B) (E) none of these are correct					

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁
9. If the mass decreases, the same net force will produce an acceleration with a magnitude that is: (A) larger (B) smaller (C) the same (D) cannot be determine (E) none of these 10. The direction of the acceleration of an object shall be in the direction: (A) of the net force upon it (B) perpendicular to the net force upon it (C) of the largest of the individual forces acting upon it (D) determined by its velocity since acceleration is rate of change of velocity (E) none of these 11. If an object is in EQUILIBRIUM (A) no forces can act upon it (B) no NET force can act upon it (C) it cannot have a non-zero velocity (D) both (A) and (C) (E) all of these are true 12. STATIC equilibrium corresponds to a situation where an object's (A) velocity is zero (B) acceleration is zero (C) net force acting upon it is zero (D) all of these are true (E) none of these are true 13. The molecule carbon monoxide can be represented as two point masses, representing the atoms, separated by a fixed distance. If C has a mass of 12 units and O has a mass of 16, the center of mass of a CO molecule will be located between the atoms: (A) no, it will be beyond the O atom (B) 12/28 of their separation away from the C (C) 16/28 of their separation away from the C (D) 12/16 of their separation away from the C (E) none of these 14. Consider a 20Kg child who exerts a force of 10 N during a play. How much work is done as the child exerts this force while pushing straight ahead a toy car that moves forward a distance of 0.80m? (A) 0 (B) 2.0 Nm/s (C) 8.0 Nm (D) 780 Nm (E) none of these 15. An object can have a negative value for gravitational potential energy (PE). (A) No (B) only if its mass could be negative (C) if it is at the level where PE is defined as zero (D) if it is below the level where PE is defined as zero (E) if it is above the level where PE is defined as zero					

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁
16. Momentum is: (A) directly proportional to mass (B) directly proportional to velocity (C) inversely proportional to velocity (D) both (A) and (B) (E) both (A) and (C) 17. What is the direction of the momentum of a car traveling at the highway speed? (A) straight down (B) in the direction of the car's motion (C) perpendicular to the velocity of the car (D) direction has no meaning as far as momentum is concerned (E) none of these 18. What is another way of defining FORCE? (A) it is impulse (B) it is change in momentum (C) it is the rate of change of momentum (D) it is the change in momentum times the time interval (E) it is the time interval divided by the change in momentum 19. It is often said that "momentum is conserved". However, most moving things that we watch eventually slow down and stop. This can be explained by the NET FORCE on most objects: (A) being zero (B) not being zero (C) being constant (D) not being constant (E) being unrelated to momentum which is a mass and velocity product 20. A small mass and a large mass each have the same kinetic energy. Which mass will have the largest momentum? (A) the small one (B) the large one (C) they will be the same (D) any of these, depending upon the relative sizes of the masses (E) none of these 21. A large torque ($\tau = \mathbf{r} \times \mathbf{F}$): (A) requires a large force (B) requires a large lever arm (C) produces a large change in angular momentum (D) produces a large rate of change in angular momentum (E) all of these 22. If the net torque upon an object is zero: (A) its angular momentum is zero (B) its angular momentum is constant (C) its angular momentum is constant and equal to zero (D) its angular momentum cannot be constant but may zero (E) none of these					

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁
23. At the same depth, the pressure in salt water will be: (A) less than at the same depth in fresh water (B) more than at the same depth in fresh water (C) the same as at the same depth in fresh water (D) all of these (E) none of these 24. There are many units for pressure. Which are not pressure units? (A) bar and millbar (B) torr (C) mm of mercury per square centimeter (D) Newton per square meter and pounds per square inch (E) all of these are pressure units 25. When a hot object and a cold object are placed in thermal contact, they will come to equilibrium at a temperature: (A) midway between their initial temperatures (B) someplace between their initial temperatures (C) closer to the higher of the two initial temperatures (D) equal to one-half of the sum of their initial temperatures (E) either higher than the hot one or colder than the low temperature 26. Heat transfer within a typhoon is primarily by: (A) radiation (B) convection (C) conduction (D) all of these in almost equal amounts (E) none of these 27. The internal energy ($\Delta U = Q - W$, where U, Q and W denote the internal energy, net heat transfer into the system, and work done by the system respectively) of a system can increase if: (A) heat is added to a system exceeds the work done by the system (B) heat leaving a system is less than the work done by the system (C) heat leaving a system is less than the work done on the system (D) both (A) and (B) (E) both (A) and (C) 28. 100 J of heat leave a system while the system does 60 J of work, The change in internal energy for this system is: (A) an increase in 40 J (B) a decrease of 40 J (C) an increase of 160 J (D) a decrease of 160 J (E) none of these					

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁

29. Electrical charge interaction can be summarized by:
 (A) – charge repels other – charge (B) + charge repels other + charge
 (C) – charge and + charge attract each other (D) all of these (E) none of these

30. Consider two point charges that are separated by a distance, $2r$. If this distance between them is increased to $5r$, the force between the charges is:
 (A) $1/25$ as great as it had been (B) $4/25$ as great as it had been (C) $1/9$ as great as it had been
 (D) 25 times as great as it had been (E) none of these

31. A charge $+2q$ is at a distance R from a charge $+4q$. Where would be a point between these two charges where the net force upon another charge would be zero?
 (A) this is not possible (B) at $0.33R$ from the $+2q$ charge (C) at $0.41R$ from the $+2q$ charge
 (D) at $0.50R$ from the $+2q$ charge (E) none of these

32. An electric field:
 (A) surrounds a charge (B) exist in a region where a net force will act upon a stationary charge
 (C) (A) but not (B) (D) both (A) and (B) (E) none of these

33. The electric field is zero:
 (A) inside any conductor (B) inside an conductor with a static charge
 (C) inside any material, conductor or insulator, with a static charge (D) never (E) none of these

34. if a charge of 3.0 coulombs is transferred through an electrical potential difference of 6.0 volts, the amount of work done is : (A) 0 (B) 0.50 J (C) 2.0 J (D) 18 J (E) none of these

35. On an electric equi-potential surface:
 (A) V is 0 (B) V is constant, but need not be zero
 (C) the electric field intensity is equal to the potential (D) both (B) and (C) (E) none of these

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁

36. The relationship between equi-potential surfaces and electric field lines is:
 (A) there is none (B) they are perpendicular
 (C) the electric field lines are directed along the surface in the direction of the potential
 (D) it depends on the sign of the charge (E) none of these

37. In the expression for a parallel plate capacitor, $C = (k\epsilon_0 A)/d$, the value of $k\epsilon_0$:
 (A) increases as d becomes smaller (B) is a constant and cannot be changed
 (C) is equal to one for a vacuum, using SI units
 (D) is determined by the material placed between the plates (E) none of these

38. how much charge is transferred by a constant, direct current of 3.00 Amperes in 4.0 minutes?
 (A) less than 1 C (B) 12.0 C (C) 80.0 C (D) 720 C (E) none of these

39. With a 15 Ampere current, how many electrons pass through a plane perpendicular the current flow each second? Assuming the magnitude of the charge of an electron is 1.6×10^{-19} C.
 (A) less than one (B) 15 (C) 9.4×10^{19} (D) 3.4×10^{23} (E) none of these

40. A positive charge moving horizontally to the right enters a region where there is a magnetic field directed vertically upward. The force acting upon this charge due to its interaction with this field will be directed:
 (A) to the right (B) toward you (C) away from you (D) vertically upward
 (E) there will be no force in this situation

41. What is the source of magnetic fields?
 (A) electric dipoles (B) electric charges (C) electric currents (D) all of these
 (E) none of these

42. A magnet was broken in half. If the two broken ends are brought toward each other, these ends will:
 (A) repel each other (B) attract each other (C) not interaction (D) either (A) or (B) is possible
 (E) none of these

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

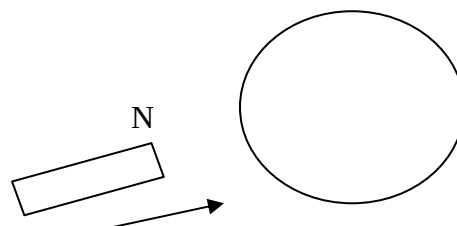
專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁

43. If currents flow in two parallel, straight wires that are near each other, the resulting force between these currents' interaction is:

- (A) 0
- (B) an attraction if the currents flow in the same direction
- (C) an attraction if the currents flow in the opposite direction
- (D) an attraction no matter the directions of the currents flow
- (E) none of these

44. Consider the North pole of a magnet being inserted into a loop of wire as show in the figure. As the magnet is pushed toward the loop, there will be an induced current in the loop that is directed:

- (A) clockwise
- (B) counter clockwise
- (C) away from the magnet
- (D) there is no current
- (E) none of these,



45. An electromagnetic wave is traveling east with its electric field oscillating in a horizontal plane. The magnetic field for this wave oscillates in a plane that is:

- (A) vertical
- (B) horizontal
- (C) east-west
- (D) continually changing
- (E) none of these

46. Gamma rays are electromagnetic radiation:

- (A) no, they are energy
- (B) with very high frequencies
- (C) with very short wavelength
- (D) both (B) and (C)
- (E) none of these

47. What is the refractive index of a vacuum?

- (A) 0
- (B) 1
- (C) 3.00×10^8
- (D) this will be undefined
- (E) none of these

亞洲大學

96 年產業研發碩士專班秋季班招生考試試題紙

專班別	組別	考試科目	考試日期	時 間	備註
半導體工程產業研發 碩士專班	無	普通物理	96.06.23	08:20-10:00	共 8 頁
48. Light exhibits wave properties most clearly when it: (A) is in a vacuum (B) propagates along straight line paths (C) interacts with large objects whose dimensions are several times its wavelength (D) interacts with small objects whose dimensions are comparable to its wavelength (E) none of these 49. Diffraction effects are amore commonly experienced in everyday life for sound waves than for light because: (A) light usually travels in rays (B) light has greater wave speed (C) light has shorter wavelength (D) light waves are less common than sound waves (E) none of these 50. when a coherent light is incident along a path perpendicular to a narrow double slit, at the center of the resulting interference pattern there will be: (A) a minimum (B) a maximum (C) either a minimum or maximum depending upon wavelength (D) either a minimum or maximum depending on the ratio: wavelength/(slit separation) (E) none of these					