



Unity Academy Secondary School - Keranyo Branch
Physics Review questions for Grade 12

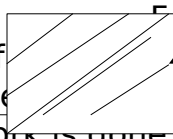
I. Choose the best answer on the following questions

1. A ball is kicked from the ground with a velocity V at an angle of 37° above the horizontal, What fraction of its total energy is Kinetic energy when it reaches its maximum, Neglect air resistance (Sine $37^\circ=0.6$, $\cos 37^\circ=0.8$)
 A. 0.6 B. 0.36 C. 0.8 D. 0.64
2. A block has a speed of 3m/s at the bottom of an inclined plane that makes 37° with the horizontal. Assuming the coefficient of Kinetic Friction between the inclined plane and the block to be 0.1 find the distance the block moves up the inclined plane before it stops?

A. 0.66m B. 0.33m C. 0.45m D. 0.55m

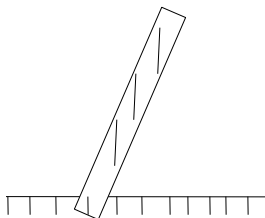
3. What work is done by a force $F = (2j - j)$ and a displacement $s = (3j + 2j)m$?

A. 3J B. 2.5J C. 5J D. 4J

4.  A block that weights 10N is pulled at an angle of θ the horizontal with a constant force of 10N. The block moves with a constant speed through 2M, what work is done against friction?

A. 8J B. 16J C. 20J D. 12J

5.



A uniform pole that weights 800N and length 6M makes an angle of 30° with the horizontal what is its potential energy relative to the ground

A. 2400J B. 3600J C. 4800J D. 1200J

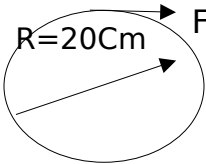
6. How much electrical energy is used by an electric stove of 2KW when is used for

90 Minutes?

A. 10.8MJ B. 12.7MJ C. 3.6MJ D. 5.4MJ

7. An elevator of mass 1200Kg and carries a maximum load of 700kg. A constant frictional force of 2500N retards its motion when it moves upward. What is the minimum power delivered when the elevator moves at 6m/s (use $g=10m/s^2$)

A. 12.1KW B. 26.4KW C. 129KW D. 13.2KWH

8. A pendulum 1M long is displaced 53° above its equilibrium position and released. How fast is it moving as it passes the lowest point.
- a. $\sqrt{8}\text{m/s}$ B. 2m/s C. $\sqrt{10}\text{m/s}$ D. $\sqrt{6}\text{m/s}$
9. A fly wheel of gasoline engine is require to give up 300J of kinetic energy while its angular velocity decreased from 6000rpm to 540rpm. What moment of inertia is required?
- A. 0.4Kgm^2 B. 0.8kgm^2 C. 0.6kgm^2 D. 0.2kgm^2
10. What is the radius of gyration of an object of mass 8kg if the moment of inertia of the body is 12kgm
- A. 1.23m B. 1.11m C. 0.55m D. 0.615m
11. A motor starts from rest runs at 80rad/s supplies a torque of 60Nm when it accelerates at a rate 3rad/s^2 what is the angular momentum of a point on the motor
- A. $3200\text{kgm}^2/\text{s}$ B. $800\text{kgm}^2/\text{s}$ C. $1600\text{kgm}^2/\text{s}$ D. $2400\text{kgm}^2/\text{s}$
12. An engine developed a power 600W in a period of 8 seconds what torque is developed by the engine?
- A. 564Nm B. 900Nm C. 600NM D. 764.3Nm
13. The angular speed of a fly wheel increase from 20rad/s to 40rad/s and a work of 80J is done in this time. What is the moment of inertia of the wheel?
- A. 0.28Kgm^2 B. 0.14Kgm^2 C. 0.42Kgm^2 D. 0.21Kgm^2
14. The moment of inertia of a hallow sphere is $\frac{2}{3}MR^2$. What is its moment of inertia about an axis through it surface?
- A. $\frac{1}{5}MR^2$ B. $\frac{5}{3}MR^2$ C. $\frac{2}{5}MR^2$ D. $\frac{1}{3}MR^2$
15. A 500g uniform sphere of radius 7cm spins at 30 rev/s on an axis through its center. What is its angular momentum?
- A. $0.18\text{Kgm}^2/\text{s}$ B. $17.3\text{Kgm}^2/\text{s}$ D. $1.84\text{Kgm}^2/\text{s}$ D. $1.73\text{Kgm}^2/\text{s}$
16.  A constant force of 40N is applied tangentially to the rim of a wheel of radius 20Cm. The moment of inertias of the wheel is 30Kgm^2 what is its angular acceleration?
- A. 8rad/s^2 B. 2.67Rad/s^2 C. 0.8Rad/s^2 D. 0.267rad/s^2

17. A fly wheel has a moment of inertia of 3.8 Kg.M^2 , what constant unbalanced torque is required to decrease its speed from 5 rev/s to 2 rev/s in 6 revolutions?
- A. -10.5 N.M B. 41.8 NM C. -41.8 NM D. 10.5 N.M
18. A disk of moment of inertia 0.25 Kg.m^2 is rotating freely with an angular speed of 4 rad/s . When a second non rotating disk of moment of inertias 0.15 kg.m^2 is dropped on it, the two rotate as a unit - what is the final angular velocity of the system?
- A. 2.5 rad/s B. 0.5 rad/s C. 1 rad/s D. 0.45 rad/s
19. A 20 kg solid disk ($I = \frac{1}{2}MR^2$) rolls on a horizontal surface at the rate of 4 m/s . What is its total Kinetic Energy?
- A. 160 J B. 120 J C. 240 J D. 80 J
20. An electron is released in a region where there is an electric field of 6000 V/m , What time does it take to attain a velocity of $4.8 \times 10^7 \text{ m/s}$? (Mass of electron = $9.1 \times 10^{-31} \text{ kg}$)
- A. 2.7 s B. 0.46 s C. 0.455 s D. 3.2 ns
21. A proton is shot from a positive plate to a negative plate that has a separation of 15 cm with a speed of $2 \times 10^5 \text{ m/s}$ in an electric field of 3000 N/C , what will be its speed just before hitting the negative plate?
- A. $3.55 \times 10^5 \text{ m/s}$ C. $2.9 \times 10^{11} \text{ m/s}$
 B. $7.5 \times 10^4 \text{ m/s}$ D. $6.02 \times 10^4 \text{ m/s}$
22. Three point charges are placed on the X-axis $= 2 \mu\text{C}$ at $x=0$, $+4 \mu\text{C}$ at $X=20 \text{ cm}$, and $+= \mu\text{C}$ at $X=80 \text{ cm}$, the force in the $2 \mu\text{C}$ charge is?
- A. 1.8 N B. 2.025 N C. 225 N D. 2.25 N
23. One of the following is different from the others
- A. F/M B. C/Vm C. C^2/NM^2 D. C^2/NM
24. Two identical metal sphere carry charges of $9 \mu\text{C}$ and -15 MC are separated by a distance of 2 cm . The balls are touched to each other and then separated by a distance of 2 cm Which of the following is true about the situation?
- A. They attract each other with a force of 2.02 N
 B. They repel each other with a force of 2.02 N
 C. They attract each other with a force of 3037.5 N
 D. They repel each other with a force of 3037.5 N

25. A charge of $4\mu\text{C}$ is placed on the X-Axis at $x=0$ how much work is done in carrying a charge of 0.02MC from $X=100\text{cm}$ to $X=20\text{Cm}$?
- A. $3.6\mu\text{J}$ B. $0.9\mu\text{J}$ C. $2.88\mu\text{J}$ D. $5.6\mu\text{J}$
26. Four point charges each $+1\mu\text{C}$ are placed at the corners of a square of side 30cm . What is the electric potential at the center of the square?
- A. $30\sqrt{2}\text{KV}$ B. $120\sqrt{2}\text{KV}$ C. $60\sqrt{2}\text{KV}$ D. $15\sqrt{2}\text{KV}$
27. By what factor will the I energy stored in a capacitor change when the potential difference is doubled?
- A. 2 B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. 4
28. How large a resistor must be placed In series with a 0.8MF capacitor if the time constant is to be 2S ?
- A. $4\mu\Omega$ B. $1.6\mu\Omega$ C. $2.5\mu\Omega$ D. $0.4\mu\Omega$
29. Four capacitors each 2MC are connected in series what is the total capacitance of the system?
- A. $8\mu\text{F}$ B. $0.5\mu\text{F}$ C. $2\mu\text{F}$ D. $0.25\mu\text{F}$
30. The potential difference between two large parallel metal plates is 120V . The plate separation is 3cm . The electric field intensity between the plates is?
- A. 800V B. 400V C. 40KV D. 4KW
31. An ammeter Is connected in series with unknown resistor, and a voltmeter is connected across the terminator of the resister. If the ammeter reach 1.2A and the voltmeter reads 18V what is the value of the resistance?
- A. 21.6Ω B. 1.5Ω C. 2.16Ω D. 15Ω
32. An electric generator has an emf of 120Y and a terminal voltage of 110v . what is its eternal resistance?
- A. 2Ω B. 0.5Ω C. 1.09Ω D. 0.91Ω
33. What is the resistance of a wire made of silver 180m long and 0.3mm^2 cross section (resistivity of silver= $1.6 \times 10^{-8}\Omega\text{m}$)
- A. 9.6Ω B. 2.4Ω C. 7.2Ω D. 4.8Ω
34. An electric motor take 15A at 110V . That is the cost of operating the motor for 8h at the rate of birr $0.5/\text{Kwh}$
- A. Birr 0.66 B. Birr 3.3 C. birr 6.6 D. birr 0.33

35. An electric Crane uses 8A at 150V to raise a load of 4500N at a rate of 7m/min

determine the efficiency of the system.

- A. 43.75% B. 25.4% C. 50.8% D. 34.1%

36. What resistance must be placed in parallel with 20Ω to make the combined resistance is 15Ω ?

- A. 5Ω B. 30Ω C. 15Ω D. 60Ω

37. A proton enters magnetic field of the flux density 1.5Wb/M^2 with a velocity of $2 \times 10^7 \text{m/s}$ at an angle of 30° with the field, the force on the proton is

- A. $2.4 \times 10^{-12} \text{N}$ B. $1.2 \times 10^{-12} \text{N}$ C. 240nN D. 1200nN

38. A charge particle enters a crossed electric field $E=80\text{KV}$ and magnetic field $B=0.4\text{T}$, what must be the velocity of the particle so that it moves straight (undetected) in the two fields?

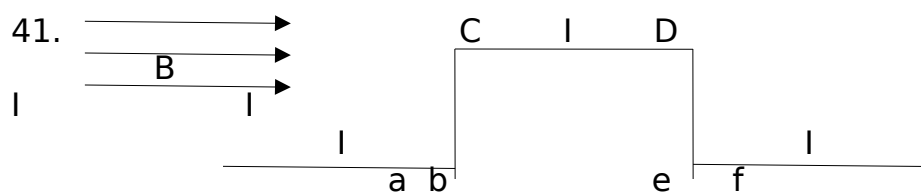
- A. $4 \times 10^5 \text{m/s}$ B. $2 \times 10^4 \text{m/s}$ C. $4 \times 10^4 \text{m/s}$ D. $2 \times 10^5 \text{m/s}$

39. A rectangular current loop has 40 turns and sides of 10cm and 12cm. It carries current of 2A in a magnetic field of 0.25T. The torques on the current loop is?

- A. 0.24NM B. 0.06NM C. 2.4NM D. 0.6Nm

40. An electron is accelerated from rest through a p.d of 3.75KV. It enters a region where $B=4 \times 10^{-3} \text{T}$ perpendicular to the velocity, The radius of the path of the electron is

- A. 26Cm B. 5.2Cm C. 2.6Cm D. 52Cm



A wire carrying current I is in a magnetic field B as shown. On which segment of the wire is the force Zero?

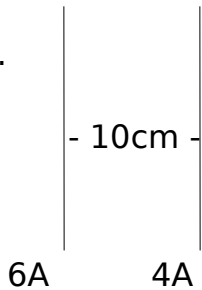
- A. Cb and De B, cb and Cd C. ab and de D. CD and ef

42. What is the value of the magnetic field at a distance of 5cm from a straight long

wire that has a current of 15A?

- A. $3 \times 10^{-5} \text{T}$ B. $0.3 \times 10^{-6} \text{T}$ C. $6 \times 10^{-5} \text{T}$ D. $0.6 \times 10^{-6} \text{T}$

43.



Two long straight parallel wires have currents of 6A and 4A in the same direction. The distance between the wires is 10cm. What is the force between the two wires per meter?

- A. $4.8 \mu\text{N}$ attraction C. $4.8 \mu\text{N}$ Repulsion
B. $48 \mu\text{N}$ attraction D. $48 \mu\text{N}$ repulsion

44. What shunt resistance should be connected in parallel with an ammeter having

a resistance of 0.05Ω so that 40% of the total current will pass through the ammeter?

- A. $75 \text{m}\Omega$ B. $33 \text{m}\Omega$ C. $20 \text{m}\Omega$ D. $67 \text{m}\Omega$

45. A magnetic flux in a circular loop of 200 turns and radius 10cm varies uniformly from 0.3T to 0.5T in a time of 1ms. The induced emf in the coil is

- A. 4KV B. 40Kv C. 2Kv D. 20Kv

46. Which of the following does not affect magnetic flux?

- A. Change in magnetic field C. Change in area
B. Orientation (direction) D. Nature of surface area

47. A coil that has 200 turns and area of 8cm^2 carries a current of 2A, what is its magnetic dipole moment?

A. 0.32Am^2

B. 3.2Am^2

C. 1.6Am^2

D. 0.16Am^2

48. One of the following is not true?

A. A moving charge creates a magnetic field

B. A charge entering a magnetic field experience force

C. A moving charge in a magnetic field experience maximum force when its velocity is parallel to the field

D. A proton and an electron entering a magnetic field experience a force of the same magnitude but opposite direction

49. What is the magnetic field inside a conductor of radius 15mm at a distance of 10mm from the center of the conductor?

A. $1.77 \times 10^{-6}\text{T}$

B. 8.54×10^{-7}

C. $17.7 \times 10^{-6}\text{T}$

D. $8.54 \times 10^{-6}\text{T}$

50. A crane that has a power of $5 \times 10^5 \text{ W}$ is used for 5 minutes. How much energy is

used by the crane?

A. 150 MJ

B. 3MJ

C. 300 MJ

D. 1.5 MJ

