Physics past papers (رَوح)

Done by:

1-which of the following radiation has positive energy

a)-alfa rays
b)-beta rays
c)-gama rays
d)-x_rays
e)- none of these
particle المفروض الجواب يكون اخر خيار بس كان الفا بس هاذ خطأ لانه الفا

Answer: A

2-a cube has a side of 4cm . it has mass of 256 gram. What is the density in SI unit

a-)5*10-3 kg/m3
b-)3*103 kg/m3
c-)5*102 kg/m3
d-)2*103 kg/m3
e-)4*103 kg/m3

Mass = 0.256 kg
$x = 4 \times 10^{-2}$

$\rho = \frac{m}{V} = \frac{0.256}{(4\times10^{-2})^3}$

$= 4000 \ kg/m^3$
$= 4 \times 10^3$

Answer:E

3- What is the hight to which water rise in a narrow tube of radius 0.4 mm, if the coefficient of the surface tension for water is 7.2 *10-2 N/m and the contact angel is zero degree

a-)3.6 cm
b-)0.72 cm
c-)1.8 cm
d-)0.96 cm
e-)4.5 cm

$h = \frac{2\gamma\cos\theta}{\rho g r}$

$= \frac{2 \times 7.2\times10^{-2} \times \cos(0)}{(1000)(9.8)(4\times10^{-3})}$ $= 0.036$

$= 3.6$ cm

Answer: A

4-A convex tens has focal length 20 cm , calculate at what distance from the lens should the object be placed so that it from an image at 30 cm on the other side from lens

a) (-40) cm
b) 60 cm
c) 40 cm
d-)(-60) cm
e-)(-20) cm

$\frac{1}{f} = \frac{1}{s} + \frac{1}{s'}$

$\frac{1}{0.2} = \frac{1}{s} + \frac{1}{0.3}$

$\frac{1}{0.2} - \frac{1}{0.3} = \frac{1}{s}$

$s = 0.6$ m
$= 60$ cm

Answer: B

5- A wire of nichrome has a radius of 1 mm and length 2 m , the resistivity of nichrome is 1.08*10-6 ome.m , find the current if the potential difference is 10 V

a) 21 A
b) 14.5 A
c)12.5 A
d) 18 A
e) 6.8 A

Answer: B

$I = \frac{V}{R}$

$R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2}$

$= \frac{1.08\times10^{-6} \times 2}{\pi (0.001)^2} \approx 0.6878$

$I = \frac{V}{R} = \frac{10}{0.6878}$

$= 14.53$ A

6- calculate the volume of the displaced water to keep a person of a weight 700 N in a swimming pool

a)0.08 m3
b)0.04 m3
c)0.07m3
d)0.05 m3
e)0.02m3

$F_B = F_g$

$\rho V g = 700$

$V = \frac{700}{(1000)(9.8)}$

$V = 6.07$

Answer: c

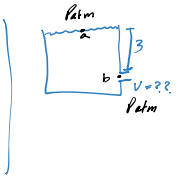
7- A large storage tank open at the top and filled with water,if there is a small hole in its side at a point 3 cm bellow the water level determine the speed at which the water leaves the hole , consider the speed of water at the top is zero $v_0 = 0$

a)1.5 m/s
b)5.5
c)2.5
d)7.7
e)2.2

$V = \sqrt{2gh}$

$V = \sqrt{(2)(9.8)(0.03)}$

$= 0.768$



$P_a = P_B$ = atmospheric pressure

$P_A + \rho y_a g + \frac{1}{2}\rho v_0^2 = P_B + \rho y_b g + \frac{1}{2}\rho V^2$

$\rho y_a g - \rho y_b g = \frac{1}{2}\rho V^2$

$g(y_a - y_b) = \frac{1}{2}V^2$

$2gh = V^2$

$V = \sqrt{2gh}$ $= \sqrt{(2)(9.8)(0.03)}$ $= 0.7668$

$\sqrt{(2)(9.8)(3)} = 7.68$

Answer: D

8- water flows through a cylindrical pipe of varying cross-section, the velocity is 4 m/s at a point where the pipe dimeter is 1 cm, at a point where the pipe dimeter is 3 cm the velocity is

a)1.5 m/s
b)2
c)0.33
d)0.44
e)1

$V_1 A_1 = V_2 A_2$

$V_1 = 4\ m/s$ $V_2 = ??$

$r_1 = 0.5 \times 10^{-2}$ $r_2 = 1.5 \times 10^{-2}$

$(4)(\pi)(0.5\times10^{-2})^2 = V_2 (1.5\times10^{-2})^2 \pi$

$V_2 = 0.44$

Answer: D

9- A cube of aluminum has a cubical hole through its center, if the cube is heated from 40 F to 130 F , what is the fractional increase of the volume of the hole if the coefficient of the linear expansion for aluminum is 2.4*10-5 K(-1)

a)3.6 *10-3
b)2.8*10-3
c)1.5*10-4
d)4.5*10-3
e)1.9*10-3

$\Delta V = 3\gamma V_0 \Delta T$

$\frac{\Delta V}{V_0} = ??$

$\frac{\Delta V}{V_0} = (3)(2.4\times10^{-5})(50)$

$= 3.6 \times 10^{-3}$

$T_F = 130\ F$

$T_c = \frac{5}{9}(F - 32)$

$T_{cF} = 54.44\ c^\circ$

$T_i = 40\ F$

$T_c = \frac{5}{9}(F - 32)$

$= 4.44\ c^\circ$

$\Delta T = 50$

Answer: A

10- A small artery has a length of 1.3*10-3 and a radius of 2*10-5 m, if the pressure drop across the artery is 1.5 Kpa, what is the flow rate through the artery (/ blood = 2.084*10-3 pa.s)

a)5*10-11 m2/s
b)6*10-11
c)9*10-11
d)3.5*10-11
e)2*10-11

$Q = \frac{\pi \Delta P R^4}{8 \eta \ell}$

$= \frac{(\pi)(1500)(2\times10^{-5})^4}{(8)(2.084\times10^{-3})(1.3\times10^{-3})}$

$= 3.478 \times 10^{-11}$

Answer: D

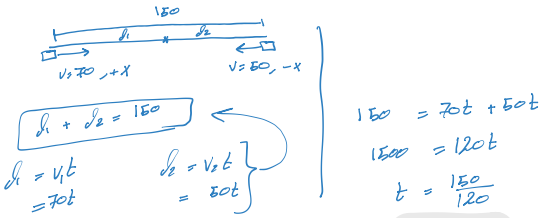
11- two cars are initially 150 km apart and traveling toward each other, one car is moving at 70 km/h and others is moving at 50 km/h, in how many hours will they meet

a)2.5 h
b)1.25
c)2.25
d)3.5
e)3

$V = \frac{d}{t}$

$d = vt$

$d = |\Delta x|$



$150 = 70t + 50t$

$15000 = 120t$

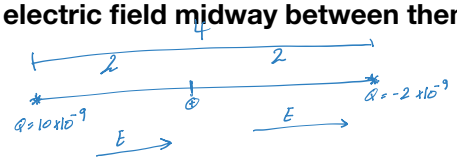
$t = \frac{150}{120}$

$t = 1.25$

Answer: B

12- two point particles, one with charge 10n C and the other with -2nC , are separated by 4m, the magnitude of electric field midway between them is

a)18 N/C
b)10
c)15
d)27
e)12



$E = \frac{k Q}{r^2}$

$\frac{9\times10^9 \times 10\times10^{-9}}{4}$

$E = \frac{k Q}{r^2}$

$E = \frac{9\times10^9 \times 2\times10^{-9}}{4}$

$\Sigma E = 27$

Answer: D

13- the velocity of a particle moving along x-axis is given by (v(t)= 4+15t-3t2) m/s, what is the acceleration of the particle at t=1 s

a)9 m/s2
b)15
c) 6
d) 3
e) 12

$a|_{t=1}$

$\frac{dv}{dt}\Big|_{t=1} = 15 - 6t$

$15 - 6 = 9\ m/s^2$

Answer:A

14- a ray of light travels through air(n=1) and approaching the boundary with water (n=1.33) , the angel of incidence is 55 degree, determine the angel of refraction

a) 32
b) 20
c) 38
d) 18
e) 10

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$(1)\ \sin(55) = 1.33 \sin\theta_2$

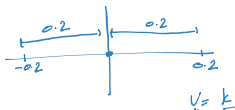
$\sin^{-1}\left(\frac{0.819}{1.33}\right)$

$\theta_2 = 38$

Answer: C

15- A particle of q1= 7 nc is located on the x-axis at the point x1= 0.2m , a second particle of charge q2= -3nc is placed on the x- axis at x2= -0.2 m, what is the total electric potential at the origin x= 0

a) 180 V
b) 900 V
c) (-900) V
d) 220
e) (-180)



$V = \frac{kQ}{r}$

$= \frac{9\times10^9 \times 3\times10^{-9}}{0.2}$

$V_{(-)} = 135$

$V = \frac{kQ}{r}$

$V = \frac{9\times10^9 \times 7\times10^{-9}}{0.2}$

$V_{(+)} = 315$

$V_{tot} = 315 - 135$

$= 180$

Answer: A

16- the speed of light in an unknown medium is measured to be 2*108 m/s , what the index of refraction of the medium

a) 1.2
b) 1.6
c) 1.5
d) 1.4
e) 1.8

$C = nV$

$3\times10^8 = 2\times10^8 n$

$n = 1.5$

Answer : C

17- if a acceleration is ,V is velocity , X is position and t is the time ,then which equation is not dimensionally correct

a) t=av
b) x=vt
c) a=v2/x
d) v=at
e) t2=2x/a

a) $t = aV$

$t = \frac{V \cdot V}{t}$

$t = \frac{\frac{x}{t} \cdot \frac{x}{t}}{t}$

$t = \frac{x^2}{t^3}$

$[T] = \frac{[L]^2}{[T]^3}$ ✗

$X = Vt$

$x = \frac{x}{t} \cdot t$

$x = x$

$[L] = [L]$ ✓

Answer: A