Resolución Examen Ingreso 1-2018 2da opción UMSS-FCYT

ARITMÉTICA-ÁLGEBRA

A1. $4x^2+(-2m-5)x+(m-1)=0$ y $\frac{x_2+x_1}{x_1x_2}=\frac{3}{5}$ (1)

$\Rightarrow a=4;\ b=-2m-5;\ c=m-1$ y $x_1+x_2=-\frac{b}{a}=\frac{2m+5}{4}$ (2)

Reemplazando (2) en (1) tenemos: $x_1x_2=\frac{c}{a}=\frac{m-1}{4}$

$$\frac{2m+5}{m-1}=\frac{3}{5} \Rightarrow 10m+25=3m-3$$
$$7m=-28$$
$$\boxed{m=-4}$$

A2. a, b, c en P. G. $\Rightarrow b=ax$ y $c=ax^2$ con $a>0$ y $x>0$

$\Rightarrow \log a, \log b, \log c$ satisfacen: $\log a, \log(ax), \log(ax^2)$

$\Rightarrow \underbrace{\log a}_{u}, \underbrace{\log a+\log x}_{u+d}, \underbrace{\log a+2\log x}_{u+2d}$ están en P. A y $\boxed{d=\log x}$

A3. $\sqrt[n]{\frac{20^n\cdot 20}{4^n\cdot 4^2+4^{(n+1)}}}=\sqrt[n]{\frac{4^n\cdot 5^n\cdot 20}{4^n\cdot 16+4^n\cdot 4}}=\sqrt[n]{\frac{\cancel{4^n}\cdot 5^n\cdot \cancel{20}}{\cancel{4^n}\cdot(\cancel{20})}}=\sqrt[n]{5^n}=\boxed{5}$

A4. $\begin{cases} \frac{(x+y)}{2}-\frac{xy}{2(x-y)}=\frac{(2+x)}{2}-\frac{(y^2-x)}{2(x-y)} \\ yx+x-1=(y+2)(x-1) \end{cases}$

$\Rightarrow \cancel{x^2}-\cancel{y^2}-\cancel{xy}=2x-2y+\cancel{x^2}-\cancel{xy}-\cancel{y^2}+x$

$2y=3x \Rightarrow y=\frac{3x}{2}$ (1)

$\cancel{xy}+x-1=\cancel{xy}-y+2x-2$

$\Rightarrow y=x-1$ (2)

(2) en (1): $2(x-1)=3x$

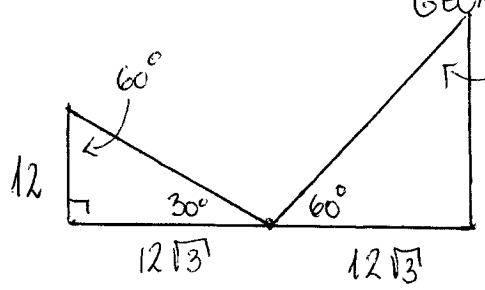
$2x-2=3x \Rightarrow -2=x \Rightarrow$ En (1): $y=-3$

$\Rightarrow x+y=-2-3=\boxed{-5}$

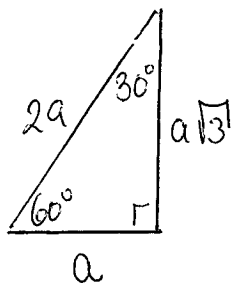
· Resolución Examen Ingreso 1-2018 2da opción UMSS-FCyT Fila 1

GEOMETRÍA TRIGONOMETRÍA

G.5



$x = (12\sqrt{3})\sqrt{3} = 12 \cdot 3 = \boxed{36}$



G.6 $\cos 4x + \cos 2x = \cos x$

$2\cos\left(\frac{4x+2x}{2}\right)\cos\left(\frac{4x-2x}{2}\right) = \cos x$

$2\cos 3x \cos x - \cos x = 0$

$\cos x(2\cos 3x - 1) = 0$

$\cos x = 0$

$x = 90° \pm k360$

$x = 270° \pm k360$

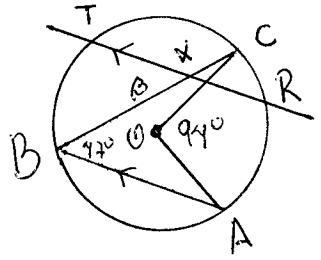
$\cos 3x = \frac{1}{2}$

$3x = 60° \pm k360° \Rightarrow x = 20° \pm k120°$

$3x = 300° \pm k360° \Rightarrow x = 100° \pm k120°$

$\Rightarrow \boxed{x = 20°}$

G.7



$\measuredangle AOC = 94°$ ($\measuredangle$ central)

$\measuredangle CBA = \frac{94°}{2} = 47°$ ($\measuredangle$ Inscrito)

$\hat{\beta} = 47°$ (alternos Internos)

$\alpha + \beta = 180°$ (Suplem.)

$\alpha = 180° - 47°$

$\boxed{\alpha = 133°}$

G.8 $\operatorname{Sen}\theta = \frac{4}{5}$ y $\theta \in$ II C $\Rightarrow y = 4, r = 5$; $x^2 + y^2 = r^2 \Rightarrow x = \pm 3 = -3$

Luego: $Z = \dfrac{\tan\left(\frac{6\pi}{2} - \theta\right) + \operatorname{Sen}\theta}{\cos\left(\frac{3\pi}{2} - \theta\right) \cdot \tan(\theta)} = \dfrac{(-\tan\theta) + \operatorname{Sen}\theta}{(-\operatorname{Sen}\theta) \cdot \tan\theta} = \dfrac{-\left(-\frac{4}{3}\right) + \frac{4}{5}}{-\left(\frac{4}{5}\right) \cdot \left(-\frac{4}{3}\right)}$

$$Z = \frac{\frac{4}{3} + \frac{4}{5}}{+\frac{4}{5} \cdot \frac{4}{3}} = \frac{\frac{32}{15}}{\frac{16}{15}} = \boxed{2}$$

Fila 1

P9 1er tramo

$$a = \frac{\Delta v}{\Delta t} = \frac{8}{4} = 2\left[\frac{m}{s^2}\right] \rightarrow x_1 = \frac{1}{2}(2)(4)^2 = 16[m]$$

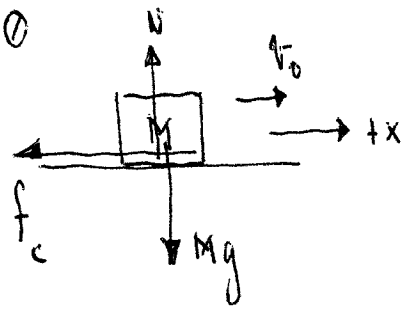
2do tramo

$$v = 8\left[\frac{m}{s}\right] \rightarrow x_2 = 8(10-4) = 48[m]$$

$$\Rightarrow D = 16 + 48 = \underline{64[m]}$$

(a)

P10



$$\hat{y}: N - Mg = 0 \rightarrow N = Mg$$

$$\hat{x}: -\mu_c N = Ma$$

$$\hookrightarrow a = -\mu_c g$$

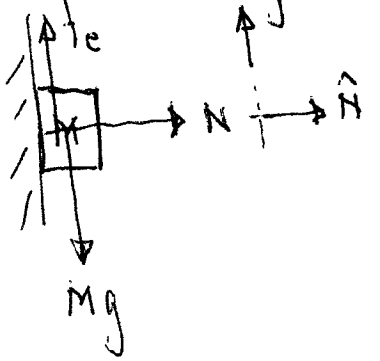
$$v^2 = v_0^2 + 2a\Delta x$$

$$0 = 5^2 + 2(-\mu_c g)\Delta x$$

$$\hookrightarrow \Delta x = \frac{25}{2(0,1)(10)} = \underline{12,5[m]}$$

(d)

P11



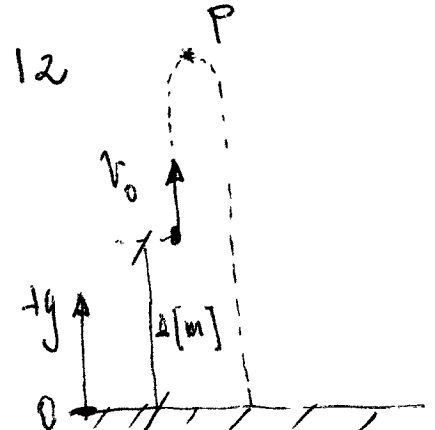
$$\hat{y}: \mu_e N - Mg = 0 \Rightarrow \mu_e \frac{Mv^2}{r} = Mg$$

$$\hat{N}: N = M\frac{v^2}{r}$$

$$v = \sqrt{\frac{rg}{\mu_e}} = \sqrt{\frac{20(10)}{\frac{1}{2}}} = \underline{20\left[\frac{m}{s}\right]}$$

(a)

P12



$$y = 1 + 10t - \frac{g}{2}t^2$$

$$v = 10 - gt$$

En P $v = 0$

$$0 = 10 - gt_p \rightarrow t_p = 1[s]$$

$$y_p = 1 + 10(1) - \frac{10}{2}(1)^2 = 6[m]$$

$$\Rightarrow D = 5 + 6 = \underline{11[m]}$$

(d)

Resolución N° 1

Q 13 d Cuantos gramos de metano (CH_4) contendran $12,0444 * 10^{23}$ moléculas de CH_4 (masa molar = 16 g/mol)

Datos

$m_{CH_4} = ?$

$$12,0444 * 10^{23}\ \text{moleculas}\ CH_4 * \frac{1\ \text{mol de}\ CH_4}{6.022 * 10^{23}\ \text{moleculas}\ CH_4} * \frac{16\ \text{g de}\ CH_4}{1\ \text{mol}\ CH_4}$$

$$= 32\ \text{g de}\ CH_4$$

Respuesta A) 32 //

Q.14 Considere la siguiente reacción:

$$\overset{+1\ +7\ -2}{K}\overset{}{Mn}\overset{}{O_4} + \overset{+1\ -2}{H_2}\overset{}{S} + \overset{+1\ -1}{H}\overset{}{Cl} \longrightarrow \overset{+1\ -1}{K}\overset{}{Cl} + \overset{+2\ -1}{Mn}\overset{}{Cl_2} + \overset{+1\ -2}{H_2}\overset{}{O} + \overset{0}{S}$$

Una vez igualada la ecuación, el coeficiente que acompaña al HCl es?

Semiecuaciones:

Igualar atomicamente y electricamente

$$8H^+ + MnO_4^{-1} + 5e^- \longrightarrow Mn^{+2} + 4H_2O \quad *2$$

$$S^{-2} - 2e^- \longrightarrow S^0 \quad *5$$

$$16H^+ + 2MnO_4^{-1} + 2S^{-2} \longrightarrow 2Mn^{+2} + 8H_2O + 5S$$

$$2KMnO_4 + 5H_2S + 6HCl \longrightarrow 2KCl + 2MnCl_2 + 8H_2O + 5S$$

	R	P
K:	2	2 ✓
Mn:	2	2 ✓
Cl:	6	6 ✓
S:	5	5 ✓
H:	16	16 ✓
O:	8	8 ✓

Rpta: 6

B) 6 //

Q 15. 64 g de un gas ocupan 200L a -73°C y 124,8 torr ¿Cuál es la masa molecular del gas? (R = 62,4 torrL/molK)

Datos: $m = 64\,g$

$V = 200L$

$T = -73 + 273$

$P = 124,8$ torr

$PV = nRT$

$n = \dfrac{124,8\ torr * 200L}{62,4\ \frac{torrL}{molK} * 200K}$

$n = 2$ moles de gas como $n = \dfrac{m}{M}$

despejamos $M = ?$ $\quad M = \dfrac{64}{2} = 32$ Rpta C) 32

Q.16 ¿Que molaridad tiene una solución al 8,0% de NaOH? La densidad de la solución es de 1,028 g/mL

Datos:

Solución al 8,0% NaOH

$\rho = 1.028\ g/mL$

100g de solución = 8,0g de NaOH

$1,028\ \frac{g\ de\ solucion}{mL\ de\ solucion} * \frac{8,0\ g\ de\ NaOH}{100\ g\ de\ disolu} * \frac{1\ mol\ de\ NaOH}{40\ g\ de\ NaOH} * \frac{1000\ mL\ de\ solu}{1\ L\ de\ solucion}$

$1,028 * 2 = 2,056$

$M = 2,056$

Rpta: D) 2,056

N°