**Đáp án Toán A3 ( Mã Math130301) , ngày thi: 5/6/2015**

| Câu | Ý | Nội dung | Điểm |
|---|---|---|---|
| 1 (1d) | | Hình vẽ | 0,5 |
| | | $I=\int_1^2 dx\int_{1/x}^{x} f(x,y)dy$ | 0,5 |
| 2 (1.5d) | | Trong hệ tọa độ Descartes: $J=\int_{-1}^{1} dx\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} dy\int_{\sqrt{x^2+y^2}}^{1+\sqrt{1-x^2-y^2}} f(x,y,z)dz$ . | 0,5 |
| | | Trong hệ tọa độ cầu : $J=\int_0^{2\pi} d\varphi\int_0^{\pi/4} d\theta\int_0^{2\cos\theta} f(\rho\sin\theta\cos\varphi,\rho\sin\theta\sin\varphi,\rho\cos\theta)\rho^2\sin\theta d\rho$ . | 0,5 |
| | | $V_\Omega=\int_0^{2\pi} d\varphi\int_0^{\pi/4}\sin\theta d\theta\int_0^{2\cos\theta}\rho^2 d\rho=\int_0^{2\pi} d\varphi\int_0^{\pi/4} -\frac{8}{3}\cos^3\theta d(\cos\theta)$ <br> $=2\pi\left(-\frac{2}{3}\cos^4\theta\right)\Big\|_0^{\pi/4}=\pi$ | 0,5 |
| 3 (1,5đ) | | $K=\int_{(C)+\overline{BA}}\ldots-\int_{\overline{BA}}\ldots$ | 0,25 |
| | | $\int_{(C)+\overline{BA}}\ldots=\iint_{D:\begin{cases}x^2+y^2\le 1\\ y\ge 0\end{cases}} 1dxdy=S_{(D)}=\frac{\pi}{2}$ | 0,5 |

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| | | $\int\limits_{\overline{BA}} \ldots = \int\limits_{-1}^{1} x.arctgxdx = 2\left(\frac{x^2}{2}arctgx - \frac{x}{2} + \frac{arctgx}{2}\right)\Bigg|_0^1 = \frac{\pi}{2} - 1$<br>$K = \frac{\pi}{2} - \left(\frac{\pi}{2} - 1\right) = 1.$ | **0,5**<br>+<br>**0,25** |
| **4**<br>**(3đ)** | **a(0,5đ)** | $div\left(\vec{F}\right) = y^2 + z^2 + x^2, \quad \overrightarrow{rot}\left(\vec{F}\right) = -2yz\vec{i} - 2xz\vec{j} - 2xy\vec{k}$ | **0,5** |
| | **b**<br>**(1,5đ)** | $W = \iint\limits_{S} xy^2dydz + yz^2dzdx + zx^2dxdy = \iint\limits_{S\cup S_0} \ldots - \iint\limits_{S_0:z=2} \ldots$ | **0,25** |
| | | $\iint\limits_{S\cup S_0} \ldots = -\iiint\limits_{V} (x^2 + y^2 + z^2)dxdydz = -\int\limits_0^{2\pi} d\varphi \int\limits_0^2 dr \int\limits_{r^2/2}^{2} (r^2 + z^2)rdz$<br>$= -2\pi \int\limits_0^2 \left(r^3z + r\frac{z^3}{3}\right)\Bigg|_{r^2/2}^{2} dr = -2\pi \int\limits_0^2 \left(r^3(2 - \frac{r^2}{2}) + r(\frac{2^3}{3} - \frac{r^6}{24})\right)dr = -\frac{40}{3}\pi$ | **0,75** |
| | | $\iint\limits_{S_0:z=2} \ldots = \iint\limits_{S_0:z=2} zx^2dxdy = -\iint\limits_{Dxy:x^2+y^2\le 4} 2x^2dxdy = -\int\limits_0^{2\pi} \cos^2\varphi \int\limits_0^2 2r^3dr = -8\pi$<br>$W = -\frac{40\pi}{3} + 8\pi = -\frac{16\pi}{3}$ | **0,5** |
| | **c**<br>**(1đ)** | Diện tích phần mặt paraboloit là<br>$DT = \iint\limits_{S} dS = \iint\limits_{D:x^2+y^2\le 4} \sqrt{1 + x^2 + y^2}dxdy$ | **0,5** |
| | | DT $= \int\limits_0^{2\pi} d\varphi \int\limits_0^2 \sqrt{1 + r^2}\ .rdr = \frac{2\pi}{3}\left(5^{3/2} - 1\right)$ | **0,5** |

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| **5** **(3đ)** | **a** **(1đ)** | Với $P'_y = Q'_x = e^x \cos y + 6xy^2 \Rightarrow$ PTVP toàn phần<br>Tìm hàm u(x,y) thỏa $\begin{cases} u'_x = P \\ u'_y = Q \end{cases}$ | **0,5** |
| | | $\Rightarrow u(x,y) = e^x \sin y + x^2 y^3 - x + 2y$<br>Vậy NTQ: $e^x \sin y + x^2 y^3 - x + 2y = C$ | **0,5** |
| | **b** **1,5đ** | PTĐT: $k^2 + k + 1 = 0 \Rightarrow k = \dfrac{-1 \pm \sqrt{3}i}{2} \Rightarrow NTQ$ của PT thuần nhất là<br>$Y = e^{-x/2}(C_1 \cos\dfrac{\sqrt{3}}{2}x + C_2 \sin\dfrac{\sqrt{3}}{2}x)$ | **0,5** |
| | | Nghiệm riêng 1 có dạng $y_{r1} = Ae^x \Rightarrow$ Kết quả $y_{r1} = \dfrac{1}{3}e^x$ | **0,5** |
| | | Nghiệm riêng 2 có dạng $y_{r2} = B\cos x + C\sin x \Rightarrow$ Kết quả<br>$y_{r2} = -2\cos x + \sin x$ | **0,5** |
| | | NTQ của phương trình là :<br>$y = e^{-x/2}(C_1 \cos\dfrac{\sqrt{3}}{2}x + C_2 \sin\dfrac{\sqrt{3}}{2}x) + \dfrac{1}{3}e^x - 2\cos x + \sin x$ | **0,5** |