Zagazig University- Banha Branch Faculty of Engineering- Shoubra

Math. and Phy. Eng. Department

1st Year: Elec. Engineering

Mathematics A

(تخلفات)

Date: 27/12/2003

0الامتحان مكون من (5) أسئلة مكتوبة في صفحة واحدة و المطلوب الإجابة على كل الأسئلة

Time: 3 Hours

(1)(a)Test the series: (i)
$$\sum_{n=1}^{\infty} \frac{2^n}{2n+1}$$
 (ii) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4+1}$

(ii)
$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4 + 1}$$

- (b) Find the interval of convergence of the series: $\sum_{n=1}^{\infty} \frac{(x-2)^n}{\sqrt{n+2}}$
- (c) Find the envelope of the curves: $(y+\alpha)^2 + (x-\alpha)^2 = 2$
- (2)(a) Find the extrema of the function: $f(x,y) = x^2 + y^3 4xy + 4y$ (b) Solve the differential equation: $y'' + y = \tan x$
- (3) Solve the differential equations:

$$(a)(x^3 + \cos y)dy + (x + 3y_x^2)dx = 0$$

(b)
$$y'' + y = e^{2x} + \cos x$$

$$(c)_{x}^{2}y^{-3}xy-5y=_{x}^{2}$$

(4)(a)Solve the system of equations: (D+1)y - z = x,

$$-2Dy + (D+1)z = e^{2x}$$

(b)If
$$\overline{U} = (2xy)i + (xyz^2)j - (xzy^2)k$$
. Find $\nabla \cdot \overline{U}$ and $\nabla x \overline{U}$

(5)(a)Show that the function $u(x,y) = y + e^{2x} \cos 2y$ is harmonic and find its conjugate v(x,y) such that the function w = u + iv is analytic

(b)Evaluate the integrals: (i) $\int_{C} \frac{z \cos 3z}{z^2 + 36} dz$ (ii) $\int_{C} \frac{\sin 2z}{z^3} dz$

$$(ii) \int_{C} \frac{\sin 2z}{z^3} dz$$

where C (in the two integrals) is the ellipse |z-4| + |z+4| = 10Good Luck Dr. Mohamed H. Eid