



اجب عن الاسئلة التاليه :

س ١- اوجد شدة المجال وداله الجهد لقشره كرويہ منتظمه الكثافه السطحيه ρ ونصف قطره a عند نقطه p علي محور وتبعد x عن مركزها

س ٢- اذكر مع البرهان نظريه التباعد لجاوس و حقق نظريه جرين في المستوي للمعادله $\oint (xy + y^2) dx + x^2 dy$ حيث c منحنى مقلق في المنطقه المحدده بواسطه $y = x, y = x^2$

س ٣ - ١ - اوجد التباعد في الاحداثيات المنحنيه المتعامده - باستخدام الاحداثيات المنحنيه اثبت ان $\nabla^2(r)^{-1} = 0$

ب - اثبت ان نظام الاحداثيات الاسطوانيه نظام متعامد ثم عبر عن السرعه والعجله لجسيم في الاحداثيات القطبيه الكرويہ

س ٤ - اوجد شدة المجال لمخروط ناقص نصفي قطر قاعدتيه r_1, r_2 وزاويه راسه 2α وذلك عند النقطه التي تمثل راس المخروط وذلك في الحالات التاليه ان يكون المخروط الناقص اجوف او مصمت مركزه

مع اطيب التمانى بالنجاح

تملفات مزيا

المادة: ميكانيكا كلاسيكية	جامعة كفر الشيخ
الفرقة: الثانية	كلية العلوم
الزمن: ساعتين	قسم الرياضيات
التاريخ: ٢٠١٧-١٢-٢٨	الامتحان النهائي



Answer the following questions

Q(1) (a) Obtain the components of the vector having magnitude and direction

$$(12.0 \text{ m}, 120^\circ)$$

(b) Find a unit vector perpendicular to the plane of

$$\vec{a} = 2\hat{i} - 6\hat{j} - 3\hat{k} \text{ and } \vec{b} = 3\hat{i} - 2\hat{j} - \hat{k}$$

Q(2) (a) A particle is moving in a straight line with constant acceleration 4 m/s^2 .

The particle passes through a point O with speed 13 m/s travelling towards a point A where $OA = 20 \text{ m}$. Find (i) The time and velocities of the particle when it paths through A. (ii) The values of t when the particle returns to O

(b) An electron moving along the x-axis has a position given by $x = 16t e^{-t} \text{ m}$, where t is in seconds. How far is the electron from the origin when it momentarily stops.

Q(4) A Small object thrown with a speed v_0 at an angle $\alpha = \cos^{-1}(1/2)$

from the positive direction of x axis. If the acceleration components are

$$\ddot{x} = 2\dot{x}, \ddot{y} = 2\dot{y}. \text{ Find the Cartesian equation of the path.}$$

(b) A small object is thrown with a speed v_0 at an angle α from the

Positive direction of x axis. (i) Find the maximum height, the flight time, the range and the Cartesian equation of the path.

Q(4) (a) A ball is thrown with a speed 80 m/s at an angle 30° to the

horizontal. The launch point is 100 m above the impact plane. Find the maximum height, the flight time and the range

(b) Prove that the relative velocity of two objects having masses m_1 and m_2 before

The collisions equals to the negative of the relative velocity of the two objects after the collision.

Kafrelsheikh University
Faculty of Science
Mathematics Department
Final Exam of First Term
2017-2018



Level : 2nd year Physics
Date : 15 \ 1 \ 2018
Time Allowed : 2H
Total Marks :100 (70 Written, 10 Oral, 20 Exercises)
Exam in one Page

Answer the following questions

Question1

(15 Marks)

Make use the following data, to obtain $f'(1.6)$

x	0	1	3	4
f(x)	-1	0	8	15

Question2

(25 Marks)

1) Prove that

(15 Marks)

$$1) \nabla^n f_{p+n} = \delta^n f_{p+\frac{n}{2}} \quad 2) \nabla = 1 - (1 + \Delta)^{-1}$$

2) Find the solution of the following by using Gauss-Seidel method (n=2) :-

(10 Marks)

$$\begin{aligned} -2x_2 + 3x_3 &= -1 \\ x_1 - x_2 &= 3 \\ x_1 + 2x_2 - 2x_3 &= 3 \end{aligned} \quad x^{(0)} \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

Question3

(30 Marks)

1- Solve the following problem by using third order Range - Kutta method :-

(10 Marks)

$$y' = y - x, \quad y(0) = 1, \quad h = 0.5, \quad \text{in } [0, 1]$$

2- Compute the following

(10 Marks)

$$\int_0^1 \ln(1 + x^2) dx, \quad n = 5$$

3- solve the following by Newton - Raphson's method (n=2) :-

(10 Marks)

$$x^3 - 1 = 0, \quad x_0 = 1$$

And find the error.

With Best Wishes Dr. Amin Elfeky