جامعة سوهاج
كلية العلوم
حاصلة على شهادة الاعتماد من الهيئة القومية لضمان جودة التعليم والاعتماد منذ 2012/7/12م وعلي شهادة الاعتماد طبقا لمتطلبات المواصفات الدولية
ISO9001:2015/ISO21001:2018

الإمتحان النهائي لمقرر رياضيات عامة 2 – (MATH105)

لطلاب المستوى الاول ساعات معتمدة – برنامج العلوم الفيزيائية

الفصل الدراسي الثاني – للعام الدراسي 2023/2022

تاريخ الإمتحان: 6/ 2023/6 زمن الإمتحان: ساعتان	أستاذ المقرر: د/ الوجيه احمد فرغل
الدرجة الكلية: 40 الصفحات: 2	

أجب عن الأسئلة الأتية:

إختر الإجابة الصحيحة : (بدون استخدام ألة حاسبة) .... (أربعون درجة، النقطة بدرجتين)

1- طول أقصر بعد بين الخطين المستقيمين المتوازيين $3x-4y-2=0,\ \ 8y-6x-9=0$ يساوي

(A) 1.3 (B) 13 (C) 0.5 (D) خلاف ذلك

2- المعادلة المتجانسة $ax^2+2mxy+by^2=0$ تمثل خطين مستقيمين حقيقيين اذ كان:

(A) $m^2=ab$ (B) $m^2>ab$ (C) $m^2<ab$ (D) خلاف ذلك

3-إذا نقلت نقطة الاصل إلى النقطة $(-1,2)$ودارت المحاور بزاوية مقدارها $\frac{\pi}{4}$ فإن الاحداثيات الجديدة للنقطة (1,3) هى:

(A)$\left(\frac{3\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$ (B)$\left(\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$ (C)$\left(\frac{3\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$ (D) خلاف ذلك

4-النقطة التى يجب ان ينقل اليها المحوران كى يحزف الحدان x, y من المعادلة :

$$x^2+4xy+y^2+2x-6y-8=0$$

(A)$\left(\frac{7}{3},-\frac{5}{3}\right)$ (B)$\left(\frac{5}{3},-\frac{7}{3}\right)$ (C)$(7,-5)$ (D) خلاف ذلك

5- ما هي قيمة λ التي تجعل المعادلة الاتية تمثل خطين مستقيمين: $2x^2-xy+\lambda y^2+3x+y+1=0$

(A)6 (B) -6 (C) 3 (D) خلاف ذلك

6- مركز الدائرة $2X^2+2y^2+4x-8y-8=0$ هو

(A)$(1,-2)$ (B) $(1,2)$ (C) $(-1,2)$ (D) خلاف ذلك

7- طول قطر هذه الدائرة $2X^2+2y^2+4x-8y-8=0$ هو:

(A)$2\sqrt{12}$ (B) 3 (C) 6 (D) خلاف ذلك

8- رأس القطع المكافئ $3X^2-6y-12x=0$ هى:

(A)$(2,-2)$ (B) $(6,6)$ (C) $(-2,-2)$ (D) خلاف ذلك

9- بؤرة القطع المكافئ $3X^2-6y-12x=0$ هى:

(A)$\left(2,-\frac{3}{2}\right)$ (B) $\left(2,-\frac{5}{2}\right)$ (C) $\left(\frac{5}{2},2\right)$ (D)خلاف ذلك

10- معادلة الدليل للقطع المكافئ $3X^2-6y-12x=0$ هى:

(A) $y=-\frac{3}{2}$ (B) $x=-\frac{3}{2}$ (C) $y=-\frac{5}{2}$ (D) خلاف ذلك

11- شرط تماس المستقيم $y = \mathrm{mx} + \mathrm{c}$ مع القطع المكافئ $\mathrm{X}^2 = 4ay$ هو:

(A) $c = \frac{a}{m}$ (B) $c = -am^2$ (C) $c = am^2$ (D) خلاف ذلك

12- إذا كان $A = \begin{pmatrix} 2 & 1 & 2 \end{pmatrix}$ و $B = \begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}$ فإن $A \times B = \cdots$ يساوى

(A) 14 (B) $\begin{pmatrix} 10 \\ 2 \\ 2 \end{pmatrix}$ (C) $\begin{pmatrix} 10 & 5 & 10 \\ 4 & 2 & 4 \\ 2 & 1 & 2 \end{pmatrix}$ (D) لا يمكن ضرب المصفوفتين

13- القيم المميزة للمصفوفة $A = \begin{pmatrix} 3 & 2 \\ 2 & 3 \end{pmatrix}$ هي

(A) 5, 1 (B) -5, 1 (C) 5, -1 (D) خلاف ذلك

14- معكوس هذه المصفوفة $\begin{pmatrix} 1 & -2 & 1 \\ 3 & 0 & 2 \\ 2 & 1 & 3 \end{pmatrix}$ يساوى

$(\boldsymbol{A})\begin{pmatrix} -2 & 7 & -4 \\ -5 & 1 & 1 \\ 3 & -5 & 6 \end{pmatrix}$ $(\boldsymbol{B})\frac{1}{11}\begin{pmatrix} 2 & 7 & 4 \\ 5 & 1 & 1 \\ 3 & -5 & 6 \end{pmatrix}$ $(\boldsymbol{C})\frac{1}{11}\begin{pmatrix} -2 & 7 & -4 \\ -5 & 1 & 1 \\ 3 & -5 & 6 \end{pmatrix}$ $(\boldsymbol{D})$ خلاف ذلك

15- اذا كانت المجموعه A={a,b,c,d,e} ، فان رتبة قوة المجموعة Aتساوى

(A) 32 (B)25 (C)5 (D) خلاف ذلك

16- مجموع هذه المتسلسلة $\sum_{n=0}^{\infty}\left(\frac{3}{2}\right)^n = 1 + \left(\frac{3}{2}\right) + \left(\frac{3}{2}\right)^2 + \cdots$ يساوي

(A) $\frac{2}{3}$ (B) ∞ (C) 0 (D) خلاف ذلك

17- الكسور الجزئية للكسر $\frac{x^4}{x^3-x^2+x-1}$ هى :

(A) $\frac{1}{2(x-1)} + \frac{x+1}{2(x^2+1)}$ (B) $x - 1 + \frac{1}{2(x-1)} + \frac{x+1}{2(x^2+1)}$ (C) $x + 1 + \frac{1}{2(x-1)} - \frac{x+1}{2(x^2+1)}$ (D) خلاف ذلك

18- قيمة ال x التى تجعل المتسلسلة $\sum_{n=0}^{\infty}\left(\frac{x}{3}\right)^n$ تباعدية هى :

(A)$x \leq 3$ (B) $x > 3$ (C) $x < 3$ (D) خلاف ذلك

19- المتسلسلة التالية $\frac{3n^2+5}{5n^3+2n-7}$ تكون:

(A) تقاربية (B) متذبذبة (C) تباعدية (D) خلاف ذلك

20- مجموع المتسلسلة التالية $\frac{1}{2\times3\times4} + \frac{1}{3\times4\times5} + \cdots + \frac{1}{(n+1)(n+2)(n+3)}$ يساوى

$(\boldsymbol{A})S_n = \frac{n(n+5)}{(n+2)(n+3)}$ $(\boldsymbol{B})S_n = \frac{(n+5)}{(n+2)(n+3)}$ $(\boldsymbol{C})S_n = \frac{n(n+5)}{12(n+2)(n+3)}$ $(\boldsymbol{D})$ خلاف ذلك

....

انتهت الأسئلة مع أطيب الأمنيات بالتوفيق والنجاح،،،،،،،،،**د/ الوجيه أحمد فرغل**

Sohag University
Section: 4th Math
(Differential Geometry)

Second Semester Exam 2023
Time: 3 hours
Date: 18-6-2023

Faculty of Science
Math Department
Code: 404 M

Choose the correct answer (4 Marks for each point)

1- If a surface is plane, then

(a) $H \neq 0,\ K = 0$ (b) $K \neq 0, H \neq 0$ (c) $H = 0, K \neq 0$ (d) $H = 0, K = 0$

2- Afar from the origin point, the points that lie on the surface $z = x^2 + y^2$ are

(a) Plannar (b) parabolic (c) Hyperbolic (d) Elliptic

3- At any point on an asymptotic line, the relation between the torsion and the Gaussian curvature is

(a) $\tau^2 = \pm K$ (b) $\tau^2 = K$ (c) $\tau^2 = -K$ (d) $\tau^2 = \pm\sqrt{K}$

4- The torsion value of the curve $\underline{r}(t) = (t, \frac{1+t}{t}, \frac{1-t^2}{t})$ at all points is

(a) 0 (b) $2\sqrt{2}$ (c) $\frac{\sqrt{2}}{3}$ (d) -3

5- The relation between the principal curvatures on a surface which has an umbilical point is

(a) $k_1 = -k_2$ (b) $k_1 \neq k_2$ (c) $k_1 = k_2$ (d) $k_1 = \pm k_2$

6- The surface that given by the parametric representation $\underline{r}(u,v) = (\cosh u \cos v, \cosh u \sin v, u)$ is

(a) Developable (b) Minimal (c) Sphere (d) Plane

7- The curve $\underline{r} = \underline{r}(t)$ is a plane curve if the following condition is satisfied

(a) $\tau = 0, \kappa = 0$ (b) $r' \wedge r'' \neq 0$ (c) $[r', r'', r'''] = 0$ (d) $r' \wedge r'' = 0$

8 - The osculating plane of the curve $\underline{r}(t) = (t, 1-t, t+t^2)$ at the point $(1,0,2)$ is parallel to

(a) oz axis (b) oy axis (c) ox axis (d) $ox \cup oy$

9- The curvature lines on a surface are the parametric lines if

(a) $g \neq 0, L = 0$ (b) $g_{12} = 0,\ L_{12} \neq 0$ (c) $g = 0, L \neq 0$ (d) $g_{12} = 0 = L_{12}$

10- The indicatory for a given cylinder on the plane curve $y = f(x)$ is

(a) *Positive* (b) *Zero* (c) *Negative* (d) *Not defined*

11- The Gaussian curvature of the surface $\underline{r}(u,v) = (u+v, u-v, uv)$ at the point $(1,1)$ is equal to

(a) $1/16$ (b) $1/16\sqrt{2}$ (c) $3/8\sqrt{2}$ (d) $3/8$

12- The umbilical points which lie on the surface are the points at which

(a) $H = 0$ (b) $K = const.$ (c) $K_n = const.$ (d) $L_{\alpha\beta} = 0$

13- The orthogonal section of a surface is a curve which has

(a) $\tau = 0,\ \kappa = const.$ (b) $\tau = const.,\ \kappa = const.$ (c) $\tau = 0,\ \kappa = 0$ (d) $\tau = const.,\ \kappa = 0$

14- The direction on a surface is called asymptotic line, if the following condition is satisfied

(a) $II = const. \neq 0$ (b) $K = const. \neq 0$ (c) $H = 0$ (d) $II = 0$

15- If the Frenet formulas had put in a matrix form, then this matrix is

(a) orthogonal (b) diagonal (c) symmetric (d) hermit

16- The curve tangent $\underline{r}(t)=(\mu t, \lambda t^2, t^3),\ 2\lambda^2=3\mu$ make a constant angle with the constant direction

(a) $\underline{A}=(1,0,1)$ (b) $\underline{A}=(-1,1,0)$ (c) $\underline{A}=(0,-1,-1)$ (d) $\underline{A}=(0,1,1)$

17- For any space curve $\underline{r}=\underline{r}(s)$, $\dfrac{d\underline{r}}{ds}\cdot\dfrac{d^4\underline{r}}{ds^4}$ is equal to

(a) $-\kappa^2$ (b) $\kappa\kappa'$ (c) $-\kappa^3+\kappa''-\kappa\tau^2$ (d) $-3\kappa\kappa'$

18 – The involute of a helix is

(a) *a circle* **(b)** *a circular helix* **(c)** *a plane curve* **(d)** *a space curve*

19 - If there is a one-to one correspondence between the points of two space curves and the bi-normals of these curves are congruent at the corresponding points, then the two curves are

(a) Circular helices (b) Evolute curves (c) Bertrand curves (d) Plane curves

20- For given two Bertrand curves $\underline{r}_1(u),\ \underline{r}_2(u)$ and τ_1, τ_2 are their torsions, then we have

(a) $\tau_1=f(u)\,\tau_2$ (b) $\tau_1=\dfrac{m}{\tau_2},\ m=const.$ (c) $\tau_1=\pm\sqrt{\tau_2}$ (d) $\tau_1\tau_2=f(u)$

21- The normal vector for the spherical image of the tangent of the curve $\underline{r}=\underline{r}(s)$ is given by

(a) $N_1=\dfrac{\kappa T-\tau B}{\sqrt{\kappa^2+\tau^2}}$ (b) $N_1=\dfrac{\tau T-\kappa B}{\sqrt{\kappa^2+\tau^2}}$ (c) $N_1=\dfrac{\tau B-\kappa T}{\sqrt{\kappa^2+\tau^2}}$ (d) $N_1=\dfrac{\tau T+\kappa B}{\sqrt{\kappa^2+\tau^2}}$

22- The curvature of any plane curve parameterized by arc length s is

(a) $\kappa=\kappa(s)$ **(b)** $\kappa=\kappa(s)=const\neq 0$ **(c)** *Not exist* **(d)** *Equals zero*

23- The curvature of the spherical image of the bi-normal vector for the curve $\underline{r}=\underline{r}(s)$ is given from

(a) $\kappa_1=\tau\sqrt{\kappa^2+\tau^2}$ (b) $\kappa_1\kappa=\sqrt{\kappa^2+\tau^2}$ (c) $\kappa_1\tau=\sqrt{\kappa^2+\tau^2}$ (d) $\kappa_1\kappa^2=\sqrt{\kappa^2+\tau^2}$

24- The angle between two space curves is the angle between

(a) Their curvatures (b) Their binormals (c) Their normals (d) Their tangents

25- For a given curve $\underline{r}(s)$, which lies on a sphere of radius λ and $\underline{r}_\circ$ is the position vector of its center. If the curvature and torsion of $\underline{r}(s)$ are respectively, $\kappa=1/\rho$, $\tau=1/\sigma$, then $(\underline{r}(s)-\underline{r}_\circ).\underline{B}$ is equal

(a) $-\frac{\rho^{\bullet}}{\sigma}$ (b) $\rho\underline{N}$ (c) $\rho\underline{B}$ (d) $-\rho^{\bullet}\sigma$

26 - The curve $\underline{r}(u)=(a\cos u,\ a\sin u, bu),\ \ a>0,\ b\neq 0$ lies on

(a) Plane (b) Sphere (c) Circular Clynder (d) Clynder

27- On the surface that given with the parametric representation $x^3=(x^1)^2+(x^2)^2$, one of the following points is an umbilical point (a) $(2,1)$ (b) $(2,0)$ (c) $(-1,2)$ (d) $(0,0)$

28 – In terms of the arc length of the curve given by the parametric form $\underline{r}(t)=(2e^t\cos t,\ 2e^t\sin t,\ e^t)$, the curvature value is equal (a) $\dfrac{2\sqrt{3}}{s}$ (b) $\dfrac{2\sqrt{2}}{3s}$ (c) $\dfrac{1}{3s}$ (d) $\dfrac{3\sqrt{2}}{2s}$

<u>Put true or false in the following sentences</u>

1- The osculating plane of a space curve is one of the tangent planes to the curve.

2- The indicatory of each of the first and second fundamental form for a surface is always positive.

3- On a sphere of radius $\sqrt{2}$, we have $\frac{L_{11}}{g_{11}} = \frac{L_{22}}{g_{22}} = \frac{1}{\sqrt{2}}$.

4- For a circular helix, $\tau = \tau(s)$, $\kappa = \kappa(s)$, $\frac{\kappa}{\tau} = c$.

5- If $\underline{r}(t) = (\frac{t}{2}, \frac{1}{2t}, \frac{1}{\sqrt{2}} lin\ t)$, is the parametric representation for a space curve $\underline{r} = \underline{r}(t)$

where $t = s + \sqrt{s^2+1}$, then $ds = |\underline{r}'(t)|$

6- The normal on the osculating plane for a helix is always constant.

7- the surface $x^3 = (x^1)^2 - (x^2)^2$ consists of parabolic points.

8 - If $\underline{r} = \underline{r}(s)$ is a plane curve, then its evolute is a helix.

9- The curves whose constant curvatures classified as Evolute curves.

10- The normal curvature at a point on a surface is the smallest curvature comparing with the other curvatures.

11- The mean curvature on a surface is negative when it has orthogonal asymptotic lines.

12 - The normal of the curve $\underline{r}(t) = (3t - t^3, 3t^2, 3t + t^3)$ is $\underline{N} = \frac{1}{(1+t^2)}(-2t, 1-t^2, 1)$

My best wishes with success

Prof. Dr. Hossam Seif Abdel-Aziz

انتهت الأسئلة مع أطيب تمنياتنا لكم بالتوفيق ******************************* ا.د / حسام سيف