جامـــعة فـــلســطين

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رقم الطالب:......................................		اسـم الـمساق: رياضيات 2
اسم الطالب:......................................		تاريخ الامتحان: 22/ 05 /2018
الكليـــــة: كليـــة تكنولوجيا المعلومات	الامتحان النهائي	عدد الأسئلــة:(4) أســئلة
القسم / التخصص...........................	الفصل الدراسي الثاني	زمن الامـتحان: ســاعــتان
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	Q1	Q2	Q3	Q4	Q5 لغير المكتمل
Mark					

ملاحظة هامة: السؤال الخامسفقط لغير المكتمل نصفي ثاني المقبولة أعذارهم:

Question 1: **(10 marks)**

I) Choose the corrects

1. If A is an mxn matrix, the solution space of the homogeneous system of equation $Ax = 0$, which is a subspace of R^n is called the
   a. Column space of A
   b. Row space of A
   c. Null space of A

2. If V is any vector space and $S = \{v_1, v_2, \dots v_n\}$ is a set of vectors in V, then S is called a **basis** for V if the following two conditions hold:
   a. S spans V and S is linearly dependent.
   b. S is linearly independent and S is not spans V.
   c. None of the above.

3. The (nullity) number of parameters in the general solution of $Ax = 0$ if A is a 6×8matrix of rank2.
   a. Nullity(A) = n- rank(A) = 6-2=4
   b. Nullity(A) = n- rank(A) = 8-2=6
   c. Nullity(A) = n+ rank(A) = 6+2=8

4. Assume u=$(\boldsymbol{u_1}, \boldsymbol{u_2}, \boldsymbol{u_3})$, then$\boldsymbol{u} \times \boldsymbol{u} =$
   a. 0.
   b. **0**.
   c. None of the above.

5. Let$S = \{v_1, v_2, \dots v_r\}$be a set of vectors in R^n, then S is linearly dependent if
   a. r>n.
   b. r<n.
   c. r=n.

II) True or False:

1- If$P_1 = (x_1, y_1, z_1)$ and $P_2 = (x_2, y_2, z_2)$ are two points in 3-space, then the distance d between them is the norm of the vector$\boldsymbol{P_1P_2}$ ()
2- All bases for a finite-dimensional vector space have not the same number of vectors ()
3- Every set called a vector space is a subspace of itself. ()
4-We use the wronskian to determine whether the functions are linearly dependent. ()
5- dim($\boldsymbol{P_n}$) = n. ()

Question 2: **(18 marks)**

I) **Show that** $\begin{bmatrix} 20 \\ 4 \end{bmatrix}$ **belongs to span of** $v_1 = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$ and $v_2 = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$. **(6 marks)**

II) **Are** $v_1 = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$ and $v_2 = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$ **linearly independent?** **(6 marks)**

III) Let the linear equations system **(6 marks)**

$$-x_1 + 3x_2 + 2x_3 = 1$$
$$x_1 + 2x_2 - 3x_3 = -9$$
$$2x_1 + x_2 - 2x_3 = -3$$

from the form $Ax = b$. Show that b is in the column space of A and then express b as a linear combination of the column vectors of A?

Question 3: (17 marks)

I) **Consider the vectors** $u = (1, 2, -1)$ and $v(6, 4, 2)$ in R^3**. Show that** $w = (4, -1, 8)$ **is not a linear combination of** u and v**.(5 marks)**

II) **let** $\mathrm{V} = \{(\mathrm{x}, \mathrm{y}),\ \mathrm{x}, \mathrm{y} \in \mathrm{R}\}$. **define addition and multiplaction on V by**

$$(x_1,\ x_2) + (y_1,\ y_2) = ((x_1 + y_1),\ (x_2 - y_2))$$

$$and\ a(x_1, x_2) = (ax_1, ax_2)$$

Is V a vector space? If not, why?(5 marks)

III) Find the basis for the nullspace of A. (7 marks)

$$A = \begin{bmatrix} 1 & -1 & 3 \\ 5 & -4 & -4 \\ 7 & -6 & 2 \end{bmatrix}$$

Question 4: **(5 marks)**

I) **Let** $A = \begin{bmatrix} 1 & -1 & 3 \\ 5 & -4 & -4 \\ 7 & -6 & 2 \\ 1 & -1 & 3 \\ 5 & -4 & -4 \end{bmatrix}$ **and** $B = \begin{bmatrix} 0 & -1 & 3 \\ 0 & 0 & -4 \\ 0 & 0 & 2 \\ 0 & 0 & 0 \end{bmatrix}$. **Find AxB.(2 marks)**

II) **Assume** $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & 3 \end{bmatrix}$. **Find A^{-1}.(3 marks)**

السؤال الخامس فقط لغير المكتمل نصفي ثاني المقبولة أعذارهم:

Question 5:

Assume the following system

$$2x_1 - 1x_2 + 3x_3 = 3$$
$$6x_1 + 3x_2 + x_3 = 2$$
$$2x_3 = -1$$

to find:

I) **Minors of coefficient matrix A.**

II) **Adjoint of A.**

III) **Using row reduction, find |A|.**

IV) **Using Cramer rule, solve the system.**

مع تمنياتنا لكم بالتوفيق والنجاح