شاملة للمنهج

Ministry of Higher Education
& Scientific Research
Al-Muthanna University
College of Science
Departement of mathmatics and
computer applications

Subject: Operations research
Stage: Fourth stage
Date: / /2018
Time : 3 hours

28 05 2018

((Assessment of the final exam for the second semester))

45

Academic year 2017 -2018

ملاحظة :- لكل سؤال 12 درجة

السؤال الأول:- معمل يقوم بإنتاج 3 نوع من المنتجات A,B,C حيث كان سعر بيع المنتج A =150دينار للوحدة الواحدة وسعر بيع B =200 دينار للوحدة الواحدة وسعر بيع C=250 دينار للوحدة الواحدة وكانت كلف انتاج الوحدة الواحدة لهذه الأنواع هي A=20 وB=40 وC=60 دينار والجدول التالي يوضح كمية المواد الاولية التي تحتاجها المنتجات

المنتجات ← المواد الاولية ↓	A	B	C	الطاقة الاستيعابية
I	2	3	10	40
II	4	8	12	80
III	6	10	14	100
الوقت	1.5	1	3	16

المطلوب وصف هذه المشكلة بأنموذج برمجة خطية؟

الأسئلة تغطي فقرات كثيرة

السؤال الثاني :- إذا كان لدينا مسألة البرمجة الخطية الآتية :-

$$MaxZ = 50X_1 + 40X_2$$
$$S.to$$
$$6X_1 + 3X_2 \le 54$$
$$4X_1 + 5X_2 \le 60$$
$$X_1, X_2 \ge 0$$

وأن المصفوفة تحت الاحادية هي $\begin{bmatrix} 5/18 & -1/6 \\ -2/9 & 1/3 \end{bmatrix}$

أكتب جدول الحل الامثل ؟

السؤال الثالث:- لمسألة البرمجة الخطية حدد الحالة الخاصة إن وجدت باستعمال واحدة فقط من الطرائق الآتية

1-طريقة M

2-طريقة المرحلتين

$$MaxZ = 3X_1 + 2X_2$$
$$S.to$$
$$2X_1 + X_2 \le 2$$
$$2X_1 + 4X_2 \ge 12$$
$$X_1, X_2 \ge 0$$

جامعة المثنى
كلية العلوم
اللجنة الامتحانية المركزية

يتبع

السؤال الرابع :- أوجد الحل الأمثل للمسألة الآتية

Dest.→ Sources↓	1	2	3	Supply
1	0.7	0.9	0.8	3
2	0.3	0.4	0.6	5
Demand	5	2	1	

السؤال الخامس :- للمشروع التالي تم تقدير ثلاثة أوقات لكل نشاط أوجد المسار الحرج ووقت الانجاز

Act. And Expected times	A=2,5,8	B=6,9,12	C=5,14,17	D=5,8,11	E=3,6,9	F=3,12,21	G=1,4,7
Pre.Act.	-	A	A	B	C,D	-	E,F

جامعة المثنى
كلية العلوم
اللجنة الامتحانية المركزية

Best of luck

Lecturer
ALAA H. SABRI

28.05.2018

Head of Departmen
MUSA M. KRAIDI

Ministry of Higher Education
& Scientific Research
Al Muthanna University
College of Science
Department of Mathematics
and Computer Applications

Subject: Complex analysis II
Stage: 4th stage
Date: / / 2018
Time : 3 hours

03. 06. 2018

45

((Assessment of the final exam for the second semester))
Academic year 2017 -2018

Q1// A// Define the following terms :
arc , simple arc , simple closed curve , simple connected domain , positively oriented , differentiable arc .

B// Evaluate the integrals $\int_C \frac{e^{-z}dz}{z-\frac{\pi i}{2}}$, $\int_C \frac{\cosh z}{z^4}dz$; *where c is the square* $x = \pm 2$, $y = \pm 2$

** *(12 marks)*

Q2// Use residues to evaluate the definite integral $\int_{-\pi}^{\pi} \frac{d\theta}{1+\sin^2\theta}$

** *(6 marks)*

Q3// Prove that by using contour integral $\int_0^\infty \frac{\cos(ax)-\cos(bx)}{x^2}dx = \frac{\pi}{2}(b-a)$; $a \ge 0, b \ge 0$,

Then with $1-\cos(2x) = 2\sin^2 x$ *show that* $\int_0^\infty \frac{\sin^2 x}{x^2}dx = \frac{\pi}{2}$.

** *(6 marks)*

Q4// State and prove Cauchy- Coursat theorem, and give an example.

** *(6 marks)*

Q5// Determine the image of the first quadrant of z plane mapped by the transformation $w = z^2$.

** *(6 marks)*

Q6// Show that by using contour integral $\int_0^\infty \frac{x^{p-1}}{1+x}dx = \frac{\pi}{\sin(p\pi)}$; $0 < p < 1$

** *(6 marks)*

Q7// Compute $\oint_C \frac{e^z dz}{(z-1)(z+3)^2}$; *where C is given by* a) $|z| = 2$, b) $|z| = 5$

** *(6 marks)*

Q8//A// Expand $f(z) = \frac{z}{(z+1)(z-2)}$ *in Laurent series valid for* $0 < |z-2| < 3$

B// Write the principal part of the function at its isolated singular point and determine whether that point is a pole, a removable singular point, or an essential singular point:

$f(z) = \frac{1}{(2-z)^3}$, $f(z) = \frac{\cos z}{z}$

** *(12 marks)*

Good Luck

جامعة المثنى
كلية العلوم
اللجنة الامتحانية المركزية

Lecturer
Dr. Yaseen Merzah

2018.6.13

M.M. KRADY
Head of Department
Asst. Prof. Mousa M. Krady

Ministry of Higher Education
& Scientific Researcher
AL-Muthanna University
College of Science
Department of mathematic
And
Computer applications

Subject :Function Analysis II
Stage : 4^{th}
Date: / / 2018
Time : 3 hour

11 06. 2018

((Assessment of the final exam for the second semester))

Academic year 2017-2018

45

note:

Remark\ Twelve marks for every equations توضيح

خطأ املائي

Q1\ Prove or disprove the following statements:

(1) If x and y two vectors in pre Hilpert space X, then $\|x+y\|^2 = \|x\|^2 + 2\operatorname{Re}\langle x, y\rangle + \|y\|^2$.

(2) If $\{x_n\}$ is sequence in normed space X and for all $x \in X$ s.t $x_n \to x$, then $x_n \xrightarrow{w} x$.

(3) If X is Hilpert space over field F and $T, S \in B(X)$, then $(S \circ T)^* = T^* \circ S^*$.

(4) If $f : X \to Y$ is an one to one linear transformation then $\ker(f) = \{0\}$. ?

Q2\ A\ If $f : X \to Y$ is a linear transformation then f is bounded iff f is continuous.

B\ If x and y two vectors in pre Hilpert space X, then $\langle x, y\rangle = \frac{1}{4}\left[\|x+y\|^2 - \|x-y\|^2 + i\|x+iy\|^2 - i\|x-iy\|^2\right]$.

Q3\ State and prove Cauchy –Schwarz inequality.

Q4\ A\ Let X be Hilpert space and let $\psi : X \to X^*$ be defined by $\psi(y) = f_y$ s.t $f_y(x) = \langle x, y\rangle$ for all $x \in X$. Does ψ bijective ,associative, and linear transformation.

B\ If $f : X \to F$ is an nonzero linear functional over normed space X then f is continuous iff $\ker(f)$ is closed set .

Q5\ A\ Let X be a vector space over field F and let $P : X \to X$ be a linear transformation then P be a projection over X iff $1-P$ is projection over X .

B\ Give an example with it is solution for normed space and the same time be pre-Hilbert space .

Best Luck

Lecturer
Zainab Hayder

2018.6.13

M.M.KRADA
Head of Department
Asst.Prof.Mousa Makey

Ministry of Higher Education
& Scientific Research
Al-Muthanna University
College of Science
Department of Mathematics and
Computer Applications

22. 05. 2018

Subject: Topology
Stage: Fourth

Date: / /2018
Time: 3 hr

22. 05. 2018

45

((Assessment of The Final Exam for The Second Semester))
Academic year 2017-2018

Note: For each question 12 marks

Q1: Give example for the following:

1- Separable is not second space. 2- Set is not compact. 3- T_1-space is not T_2-space.
4- First is not second space.

Q2: In usual topological space (R, T_u), answer the following:

1- Is $[0,1]$ is compact set in R? Why?
2- Is $[0,1]$ is connected set in R? Why?
3- Is $[0,1]$ is path in R? Why?
4- Is $[0,1]$ is arcwise in R? Why?

Q3: Let X be a topological space. Then prove the following are equivalent:

i- X is normal space.

ii- If H is an open and F is closed such that $F \subseteq H$ then there exist open set G such that $F \subseteq G \subseteq \overline{G} \subseteq H$.

Q4: In (R, T_u), (Q, T_Q) is relative topology then

1- What the difference between the sets $Q \cap [\sqrt{-2}, \sqrt{2}]$ and $Q \cap (\sqrt{-2}, \sqrt{2})$.

2- Use this difference to show the relative topology (Q, T_Q) is not connected.

Q5: Consider the following subsets of real plane R^2

$$A = \{(x, y) : 0 \le x \le 1, y = x\}$$

$$B = \{(x, 0) : \frac{1}{4} \le x \le 1\}$$

Determine with graph:

1- Arcwise connected 2- Separated 3- Connected

M-M-KRADY
Head of Department
Asst. Prof. Mousa Makey Krady

جامعة المثنى
كلية العلوم
اللجنة الامتحانية المركزية

Good Luck

Lecture
Dr. Amer Himza Almyaly

2018- 6 - 13

Ministry of Higher Education
& Scientific Research
AlMuthanna University
College of Science
Department of mathematics
&computer applications

Subject: Applied mathema
Stage: 4th

Date: / /2018
Time : 3 h

07. 06. 2018

45

((Assessment of the final exam for the second semester))
Academic year 2017 -2018

ركز على البرهان

Note // 6 Marks For Every Equation

1) By using polar coordinates , show that $B(m,n)=\dfrac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$ where $m,n>0$?

2)Solve by using Frobenius method the following D.E. $xy''-y'-xy=0$?

3) Defined Bessel equation of order v ? and find solution of Bessel equation of the first kind of order v ? ??

4) Find the $\dfrac{d}{dx}\left(x^{-n}J_n(x)\right)$? And find $\int x^3 J_3(x)dx$?

5) Defined Euler D.E. ? And solve the following D.E. $x^2y''-xy'+y=0$? السؤال غير واضح

6) What is Legendre equation ? and the general formula for Legendre function? find $P_3(x)$?

7) For each Fixed $n=0,1,2,...$, the Bessel functions $J_n(\lambda_{1n}x), J_n(\lambda_{2n}x),...$. form an orthogonal set on the interval $0\le x\le R$ with respect to the weight function $P(x)=x$, i.e

ما هو المطلوب في السؤال؟

$\int_0^R xJ_n(\lambda_{mn}x)J_n(\lambda_{kn}x)dx=0$, $(k\neq n)$.And the norm $\|J_n(\lambda_{mn}x)\|^2=\int_0^R xJ_n{}^2(\lambda_{mn}x)dx=\dfrac{R^2}{2}J_{n+1}^2(\lambda_{mn}x)$?

8) Prove that $\int_{-1}^{1} p_n^2(x)dx=\dfrac{2}{2n+1}$?

9) What is the generating function of the Hermite polynomial ? And show that $H_n(x)=(-1)^n\exp(x^2)\dfrac{d^n}{dx^n}\left(\exp(-x^2)\right)$?

10) ((Choose one only))

1)What is the deference between hypergeometric function and confluent hypergeometric function?

2) Show that $\dfrac{\sqrt{\pi}}{2x}erf(x)={}_1F_2(\frac{1}{2},\frac{3}{2},-x^2)$?

((Good Luck))

2018.6.13

Lecturer
Rafid H.B.

M.M.Kead
Head of Department
Mousa Makey

جامعة المثنى
كلية العلوم
اللجنة الامتحانية المركزية