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

Subject: Mathematical Statistics I
Stage: Third
Date: / / 2018
Time: 3 Hours

23. 01. 2018

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

45

Q1: Let x and y have the joint probability density function:

$$f(x,y) = \begin{cases} \frac{5}{16}xy^2, & for\ 0 < x < y < 2 \\ 0, & otherwise \end{cases}$$

What is the marginal density function of x? (8 Marks)

Q2: Find the Binomial probability distribution whose mean is 3 and variance is 2. (8 Marks)

Q3: if x is a Poisson variable such that $p(x = 1) = 2p(x = 2)$, find mean and variance of x, find also the $p(x = 0)$. (8 Marks)

Q4: If $x \sim Gam(\theta, \alpha)$, then find the mean, variance and mgf of x. (9 Marks)

Q5: Let x be a random variable with mgf $M_x(t)$, if a and b are constants, then show that: $M_{x+a}(t) = e^{at}M_x(t)$. (9 Marks)

Q6: Suppose x be a random variable that distributes as an uniform distribution with interval $[-b, b], b > 0$, find the value b such that $p(x > 1) = \frac{1}{3}$. (9 Marks)

Q7: Let α and β be any two positive real numbers of Beta distribution. Then show that: $B(\alpha, \beta) = \frac{\Gamma(\alpha)\Gamma(\beta)}{\Gamma(\alpha+\beta)}$, where $\Gamma(z) = \int_0^\infty x^{z-1}e^{-x}\,dx$ (9 Marks)

Best of luck

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Ministry of Higher Education
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Al-Muthanna University
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Department of Mathematics
and Computer Applications

Subject: Ring Theory I
Stage: Third
Date: / /2018
Time : 3 hr

21. 01. 2018

((Assessment of the final exam for the First semester))
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Note: For each question 12 marks.

Q_1: Give example for the following:

1- Ring is not integral domain.

2- Commutative ring without unity.

3- Ring is not commutative.

4- Union two ideals is not ideal.

5- Primary is not prime.

6- integral domain is not field.

Q_2: Prove the ring of integer numbers $(Z,+,.)$ is principle ideal ring.

Q_3: 1- There are two definitions for the Ideal. What those definitions and show that them are equivalent?

2- find the solution for the equation $m^2+2m+1=0$ in the rings $(Z_2,+_{2\cdot 2})$ and $(Z_{12},+_{12},\cdot_{12})$.

Q_4: In the ring $(Z_{32},+_{32},\cdot_{32})$.

1- What ideals in Z_{32}.

2- Is Z_{32} has divisor of zero? Why?

3- Find RadZ_{32}.

4- Find maximal ideal in Z_{32}.

5- Find nilideal in Z_{32}.

6- Find nilpotent element in Z_{32}.

Q_5: Answer all in the following:

1- State and prove Kurll-Zorn Theorem.

1-Let $(I,+,.)$ be a proper ideal in the commutative ring with identity $(R,+,.)$ then prove $(I,+,.)$ is prime ideal iff $(R/I,+,.)$ is an integral domain.

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GOOD LUCK

Ministry of Higher Education & Scientific Research
Al-Muthanna University
College of Science
Department of mathematics & computer applications

Subject: Numerical analysis I
Stage: Third
Date: / /2018
Time : 3 hours

19 01 2018 45

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

Hint :choose only eight equastion

Q1\\ Use modified Newton –Raphson's method to solve $(x-2)^2-ln(x)=0$ (do 3 iterations)
**(5 Marks)

Q2\\ Use triangular factorization to solve
$x+2y+4z=3;\ 3x+8y+14z=13;\ 2x+6y+13z=4.$
**(5 Marks)

Q3\\ Determine the value of $f(25)$, use Lagrange interpolation method using following data:
$(0,-250), (10,0), (20,50),(30,-100).$
**(5 Marks)

Q4\\ Use secant method to solve $f(x)=2sin(x\pi)-x.$ (do 3 iterations)

**(5 Marks)

Q5\\ Use *Jacopi's* method to solve
$4x_1+x_2+x_3=10;\quad 2x_1+10x_2+3x_3=9;\quad 3x_1+4x_2+11x_3=0.$ (do 4 iterations)
**(5 Marks)

Q6\\ Use false possion method to solve $cos(x)-x=0$, let $x_0=0.5$, $x_1=\pi/4$. (do 3 iterations)
**(5 Marks)

Q7\\ Use Nivelle's method to find $f(0.45)$, $f(x)=e^x$, $x=[0.3, 0,4, 0.5, 0.6]$

**(5 Marks)

Q8\\ Use the following data to find $f(0.71)$, where $f(x)=tan(x)$
$x=[\ 0.7, 0.72, 0.\ 74, 0.76, 0.78].$
**(5 Marks)

Q9\\ Determine the number of iterations that you to solve $f(x)=x^3+4x^2-10$ with accuracy 10^{-3} in interval $[1\ ;\ 2]$ using Bisection method.
**(5 Marks)

Best of luck

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Subject: Partial Differential Equations I
Stage: 3rd stage
Date: / / 2018

17 01 2018

45

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

Q1/ A/ True or false: (a) The Fourier series for the function $2f(x)$ is obtained by multiplying each term in the Fourier series for $f(x)$ by 2. (b) The Fourier series for the function $f(2x)$ is obtained by replacing x by $2x$ in the Fourier series for $f(x)$. (c) The Fourier coefficients of $f(x) + g(x)$ can be found by adding the corresponding Fourier coefficients of $f(x)$ and $g(x)$. (d) The Fourier coefficients of $f(x)\, g(x)$ can be found by multiplying the corresponding Fourier coefficients of $f(x)$ and $g(x)$.

B/ Find the PDE from the relation $z = f(x, y)$, and hence, verify that the functions $cos(xy)$, e^{xy} are solutions.

** (10 Marks)

Q2/ A/ Compute the general solution of the first order PDE.

$$u_x + e^x u_y + e^z u_z = (2x + e^x)e^u$$

B/ Solve the PDE. $p + q = x + y + z$

** (12 Marks)

Q3/ Show that the equations $z = xp + yq$ *and* $2xy(p^2 + q^2) = z(yp + xq)$ are compatible and solve them.

** (6 Marks)

Q4/A/ Find the general Solution for the PDE.

$$(x^2 D_x^2 - xy D_x D_y - 2y^2 D_y^2 + x D_x - 2y D_y)z = ln\left(\frac{y}{x}\right) - \frac{1}{2}$$

B/ Solve $z(z^2 + xy)(xp - yq) = x^4$

** (12 Marks)

Q5/A/ Find Fourier series for $f(x) = \begin{cases} \cos x & ; |x| < \frac{1}{2}\pi \\ 0 & ; \text{ otherwise} \end{cases}$

B/ Solve the following PDE $p^2 z^4 + q^2 z^2 = 1.$

** (12 Marks)

Q6/ Find the equation of integral surface of the linear PDE

$xy^3 p + x^2 z^2 q = y^3 z$, which is passing through the curves $y = z^3$, $x = -z^3$.

** (8 Marks)

Good Luck

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Subject: Mathematical Analysis I
Stage: 3rd
Date: / /2017
Time :3hours

13. 01. 2018

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((Final exam for the first semester))
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Remark\\ Twelve marks for every question and six marks for every branch

Q1\ Prove or disprove the following statements:

(1) If $\{x_n\}$ is a convergent sequence then $\{x_n\}$ be Cauchy sequence.

(2) Let $\{x_n\}$ and $\{y_n\}$ are two sequence . If $x_n \to x$ and $y_n \to y$ then $\frac{x_n}{y_n} \to \frac{x}{y}$.

(3) There exist infinite of irrational numbers between any two real numbers.

(4) There is not root for the equation $x^2 = 2$ in the field of rational numbers.

Q2\ A\ Let A be anon empty subset of $\Re$ and let $a,b \in \Re$ then $\inf A = a$ iff

(1) $a \le x$ for all $x \in A$.

(2) For all positive real number $\varepsilon > 0$ there exist $y \in A$ s.t $y < a + \varepsilon$.

B\ Prove that the field of rational numbers is not complete.

Q3\ Let $d : R^n \times R^n \to R$ which defined by $d(x,y) = \max\{|x_1 - y_1|, |x_2 - y_2|, \dots, |x_n - y_n|\}$, for all $x = (x_1, x_2, \dots, x_n)$, $y = (y_1, y_2, \dots, y_n) \in R^n$. Does d be a metric function over R^n ?

Q4\ A\Let X be a set of all real valued function and Remman's integrable over [0,1] then $d : X \times X \to R$ which defined by $d(f,g) = \int_0^1 |f(x) - g(x)| dx \ \ \forall f, g \in X$ be a pseudo-metric function.

B\ let $X = [0,1]$ and $d : X \times X \to R$ which defined by $d(x,y) = |x - y| \ \ \forall x, y \in X$. Discuss $\beta_1(\frac{1}{2})$ and $\beta_{\frac{1}{4}}(0)$.

Q5\A\ Let (R, d_u) is a usual metric space .Does $d : R \to R$ which defined by $f(x) = x^2, \forall x \in R$ be continuous?

B\ Let (R, d_u) is a usual metric space then every open interval be an open Ball .

Best luck

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Subject: visual basic
Stage: third
Date: / /2018
Time : Three hours
Dept: Mathematics and Computer Applications

45

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

Note (6 marks for each question)

Q1\\
a-list the element of IDE.
b-there is a value of message box,how can make message box returned value and use it,show that with example.

Q2\\
a-what is the (select case) explain with example show the two format of it .
b-write visual basic code to check the entered number if it is even calculate $z=x^2+3cosx$ otherwise,check if the number positive find factorial of it, design form with two text box and one command entered the value by using input function.

Q3\\ what are the types of (if-then) and(if-then else) explain with example for each type .

Q4\\
a-what is the code of the following:-
1- Load picture in to image box.
2- Identifies the files display in the list type.
3- Show driver in drive listbox.
4- Empty text box.
5- Change the color of label.
6- Change the tittle of form

b-For a simply supported beam subjected to a uniform load (W) on the length of span (L) and a concentrated load (P) on a mid span (L/2). When the user click checkbox1, enter the value of (P) and display the value of bending moment (Mom) in a separate text box, when the user click on the checkbox2, enter the value of (W) and display the value of bending moment (Mom) in a separate textbox. Write a program in a separate command button (Calculate) to find the value of (Mom) at mid span of beam subjected to (W) or (P) or both of them.

Q5\\
a- design visual basic project contain two picture box and two command(enter,convert) ,enter to(enter the element of A(9) by using input function and print it in picture box1) and convert(to convert A to B(3*3) and print it into picture box 2).
b- fill the following blanks:-
1- Array is ………… of memory location.
2- The list box will display………… of strings
3- Three controls let you access to computer's file system are …………… , …………….. and …………..
4- GUI is mean ………………

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