BAYERO UNIVERSITY, KANO

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

2020/2021 First Semester Examinations

MTH2301 – Mathematical Methods

Instruction: Answer any five (5) questions **Time Allowed:** 3 Hours

1. (a) Find for $F(x,y)=2x+y^2$ (i) $\int_C F(x,y)\,dx$ (ii) $\int_C F(x,y)\,dy$ (iii) $\int_C F(x,y)\,ds$ where C is the line $y=2x$ starting from $x=0, y=0$ and ending at $x=1, y=2$

   (b) From your results in (a) above, Is $\int_C F(x,y)\,dx=\int_C F(x,y)\,dy=\int_C F(x,y)\,ds$

2. (a) Use Maclaurin series to evaluate $\lim_{x\to 0}\dfrac{e^x-1-x}{x^2}$

   (b) if $F(x,y)=Ln\sqrt{x^2+y^2}$, show that $x\dfrac{\delta F}{\delta x}+y\dfrac{\delta f}{\delta y}=1$

3. (a) if $F(x,y)=x^2-y^2$, $x=s\,\mathrm{Cos}\,t, y=s\,\mathrm{Sin}\,t$, find $\dfrac{\delta F}{\delta s}$ and $\dfrac{\delta F}{\delta t}$

   (b) Find the increment and total differential if $F(x,y)=x^3y$

4. (a) Evaluate $\lim_{x\to 0}\dfrac{\sqrt{2+x}-\sqrt{2}}{x}$

   (b) Does the $\lim_{x\to 4} f(x)$ exist? Where $f(x)=\begin{cases}4x+3, & x<4\\ 3x+7, & x\geq 4\end{cases}$

   (c) if $y=e^{2x}$, evaluate $\dfrac{d^2y}{dx^2}-3\dfrac{dy}{dx}+2y$

5. (a) Use Lagrange multipliers to find the global maximum and minimum of $F(x,y)=x+y+2z$ on the surface $x^2+y^2+z^2=3$

   (b) find $\dfrac{dy}{dx}$ the point $(2,1)$ from $x^3+3xy^2+y^2=21$

6. (a) If $F(x,y)=y\,\mathrm{Sin}\,x-x\,\mathrm{Sin}\,y$ verify that F_{xyy}, F_{yxy} and F_{yyx} are equal.

   (b) Show that

   (i) $f(x)=\dfrac{1}{2}x-\sqrt{x}$ satisfies the hypothesis of Rolle's theorem 0n $[0,4]$ and find the all values of c in $(0,4)$ that satisfy the conclusion of the theorem.

   (ii) $f(x)=\sqrt{25-x^2}$ satisfies the hypothesis of Mean value theorem 0n $[-5,3]$ and find the all values of c in $(-5,3)$ that satisfy the conclusion of the theorem.

7. Evaluate the following integrals

   (a) $\iint_C\left(1+(x-1)^2\right)dxdy$ where C is the region starting from $x=0, y=0$ and ending at $x=2, y=3$

   (b) $\int_0^1\int_0^3\int_1^2\left(x^2+y^2-z^2\right)dzdydx$

6th December 2022

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BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
2018/2019 Academic Session - First Semester Examinations
ITC2203: Introduction to Information Technology in Business

Instructions: *Attempt 4 Questions* **Time Allowed:** *2-Hour*

1. a) Define the term e-commerce. [3 Marks]
   b) Briefly explain all the types of e-commerce. [10 Marks]
   c) Briefly Explain vertical market and horizontal market [4.5 Marks]

2. a) Define Supply Chain Management (SCM). [4 Marks]
   b) Briefly explain the three main flows in SCM. [9 Marks] PIF
   c) Briefly explain e-market [4.5 Marks]

3. a) Define the term internet economy. [4 Marks]
   b) Differentiate between e-business and internet economy. [4.5 Marks]
   c) Briefly explain the three major segments of internet economy. [9 Marks]

4. a) With the aid of diagram explain an old economy relationship and new economy relationship. [8 Marks]
   b) Explain the advantages of new economy relationship over old economy relationship. [6 Marks]
   c) Briefly explain the two primary components of B2B e-commerce. [3.5 Marks]

5. a) What are major forces that are fueling e-commerce? [9 Marks]
   b) Explain the importance of intranet to e-commerce. [2.5 Marks]
   c) Explain data transaction security components. [6 Marks]

6. a) Briefly explain three authorization schemes. [6 Marks]
   b) Explain all types of data flow and give an example of each. [6 Marks]
   c) Assume n devices are connected using mesh topology, what is the number of cable links required?
      i) Using half duplex. [3 Marks]
      ii) Using full duplex. [2.5 Marks]

All The Best!