College of Science - Department of mathematics

Final Exam-211 math- First semester - 1447 H - Time: 3h

Question1: (2+2 Marks)

A) Write the following complex number $(2-i)^2+\overline{(3-3i)}$ in form of $(\boldsymbol{a}+\boldsymbol{ib})$

B) Solve the equation $8x^2+2x-3=0$

Question2 : A) simplify the following formulas : **(1+1 Marks)**

i) $\boldsymbol{log_2(16)^x}$ ii) $\boldsymbol{\ln x^{-3}-\ln x^{-5}}$

B) Find the derivatives of the following functions: **(1.5+1.5+2 Marks)**

i) $y=xe^x$, $ii)\ y=log_5(x^2-5x+2)$ $iii)\ y=x^{cos(x)}$

Question 3: **A**) Compute the following integrals: **(2+2+2+3 Marks)**

1) $\int \frac{x+5\sqrt{x}}{\sqrt{x}}\,dx$, 2) $\int x^3\sqrt[3]{2+2x^4}\,dx$

3) $\int_1^e x^2\,ln(x)\,dx$, 4) $\int \frac{x-2}{x(x^2+1)}\,dx$

B) Discuss the convergenc of the improper integral: **(2Marks)**

$$\int_2^{\infty}\frac{1}{x-1}\,dx$$

Question 4: (1+2+3 Marks)

i) Sketch the region **R** bounded by the graphs of: $y=x^2+2$, $y=x+2$

ii) Find the area of **R** .

iii) Find the volume of the Solid generated by revolving **R** about the x-axis .

Question 5: (4+3 Marks)

i)Use Gauss method to solve the following linear system

$$\begin{aligned} x-2y+z&=4\\ -x+2y+z&=-2\\ 4x-3y-z&=-4 \end{aligned}$$

ii) If : $A=\begin{bmatrix}-1 & 2\\ 1 & 1\end{bmatrix}$, $B=\begin{bmatrix}2 & 3\\ -1 & 2\end{bmatrix}$. $Find\ A^2+7B^{-1}$

Question 6: If : $f(x,y)=x^4y-2x^3y^2+y^3$

Find : $f_x(1,0)$, $f_{xx}(x,y)$, $f_{yy}(x,y)$, $and\ prof\ that\ f_{xy}(x,y)=f_{yx}(x,y)$
(1+1+1+2 Marks)