College of Science.
Department of Mathematics

كلية العلوم
قسم الرياضيات

Final Exam
Academic Year 1446 Hijri- First Semester

Exam Information معلومات الامتحان			
Course name	**Integral Calculus**		**اسم المقرر**
Course Code	**Math106**		**رمز المقرر**
Exam Date	**2024-12-18**	**1446-6-17**	**تاريخ الامتحان**
Exam Time	**01: 00 PM**		**وقت الامتحان**
Exam Duration	**3 hours**	**ثلاث ساعات**	**مدة الامتحان**
Classroom No.			**رقم قاعة الاختبار**
Instructor Name	**د.جواهر المفرج**		**اسم استاذ المقرر**

Student Information معلومات الطالب		
Student's Name		**اسم الطالب**
ID number		**الرقم الجامعي**
Section No.		**رقم الشعبة**
Serial Number		**الرقم التسلسلي**

General Instructions:

- Your Exam consists of 8 PAGES (except this paper)
- Keep your mobile and smart watch out of the classroom.
- Calculators are not allowed

تعليمات عامة:

- عدد صفحات الامتحان 8 صفحة. (بإستثناء هذه الورقة)
- يجب إبقاء الهواتف والساعات الذكية خارج قاعة الامتحان.
- الالة الحاسبة ممنوعة

هذا الجزء خاص بأستاذ المادة

This section is ONLY for instructor

#	Course Learning Outcomes (CLOs)	Related Question (s)	Points	Final Score
1	CLO 2.1	Q1	/22	
2	CLO 2.4	Q2	/6	
3	CLO 2.3	Q3	/6	
4	CLO 2.5	Q4	/6	
5				
6				
7				
8				

EXAM COVER PAGE

King Saud University
Department of Mathematics

Final Exam

Course Title: Math 106 (Integral Calculus)

Date: First Semester-Wednesday 18 December 2024; 1–4 pm

Instructions:

- This examination paper has 9 pages (including this page).
- Calculators are NOT allowed.

(. . .) Name ..... ID ..... Section .....

Question	Grade
Q1	
Q2	
Q3	
Q4	
Total	

Question 1

(a) Use Riemann sums to find $\int_0^2 (x^2 + 4)dx$. [3 points]

(b) Evaluate the integrals:

i. $\displaystyle\int \frac{\left(1+x^{\frac{2}{3}}\right)^4}{x^{\frac{1}{3}}}dx.$ [2 points]

ii. $\displaystyle\int \frac{\ln x+1}{\sqrt{9-x^2(\ln x)^2}}dx.$ [2 points]

iii. $\displaystyle\int \frac{dx}{x\sqrt{1-x^8}}$. [3 points]

iv. $\displaystyle\int x\sec^2 x dx$. [3 points]

v. $\int \sin^2 x \cos^5 x dx.$ [3 points]

vi. $\int \frac{x+3}{(x^2+9)^{\frac{3}{2}}} dx.$ [3 points]

vii. $\displaystyle\int \frac{x^3+3}{(x+1)(x^2+1)}dx.$ [3 points]

Question 2

(a) Compute $\lim_{x\to+\infty}(1+e^{-2x})^{e^x}$. [3 points]

(b) Find $\int_3^{+\infty}\frac{dx}{x(\ln x)^3}$. [3 points]

Question 3

(a) Find the surface area obtained by revolving the curve $x = t^3$, $y = 3t + 1$, $0 \leq t \leq 1$ about the $y-$axis. [3 points]

(b) Sketch the region inside $r = 3\sin\theta$ and outside $r = 3 - 3\sin\theta$ and find its area. [3 points]

Question 4

(a) Sketch the region bounded by the curves $y = \sqrt{x+6}$, the $x-$axis, $y = x$, and find its area. [3 points]

(b) Find the volume of the solid obtained by revolving the region bounded by $y = (x-2)^2$, $y = 1$ about the $y-$axis. [3 points]