University of Al-Qadisiyah
College of Engineering
Department of Materials Engineering
Final Examination. (2015-2016)
Examiner: Mr. Mushtaq F. Almensory

Subject: Mathematics
Class: 1st Year
Time: 3 hours
Max. Mark: 100 mark
Date: 16/05/2016

Answer all questions 10 marks for branch.

Q1/A /Find the limits. (1) $\lim_{t\to 1}\frac{t^2+t-2}{t^2-1}$, (2) $\lim_{t\to -1}\frac{t^2+3t+2}{t^2-t-2}$, (3) $\lim_{t\to 1}\frac{5y^3+8y^2}{3y^4-16y^2}$

Q1/B /At what points are the functions continuous, (1) $y=\frac{x+1}{x^2-4x+3}$, (2) $y=\frac{x+3}{x^2-3x-10}$, (3) $y=\frac{coxx}{x}$

Q2/A / Proof that the $\lim_{\theta\to 0}\frac{\sin\theta}{\theta}=1\ (\theta\ in\ radains)$

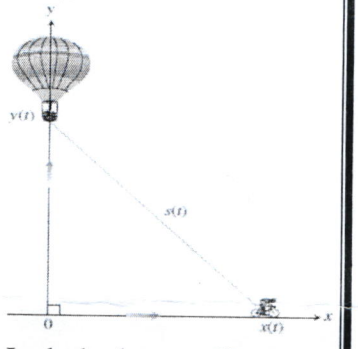
Q2/B/ Differentiate by definition the function $f(x)=x+\frac{9}{x}, x=-3$ and find the slope of the tangent line at the given value of the independent variable.

Q3/ (answer two branch).

Q3/A /At time t, the position of a body moving along the s-axis is $s=t^3-6t^2+9t\ m$.

a. Find the body's acceleration each time the velocity is zero.
b. Find the body's speed each time the acceleration is zero.
c. Find the total distance traveled by the body from t =0 to t =2.

Q3/B /A balloon is rising vertically above a level, straight road at a constant rate of 1 ft/sec. Just when the balloon is 65 ft above the ground, a bicycle moving at a constant rate of 17 ft/sec passes under it. How fast is the distance $s(t)$ between the bicycle and balloon increasing 3 sec later?



Q3/C/Use the steps of the graphing to graph the equation $y=-2x^3+6x^2-3$ in Include the coordinates of any local and absolute extreme points and inflection points.

Q4/A/Suppose that f and g are integrable and that $\int_1^2 f(x)dx=-4$, $\int_1^5 f(x)dx=6$, $\int_1^5 g(x)dx=8$. Find
a. $\int_2^2 g(x)dx$, ***b*** $\int_5^1 g(x)dx$, ***c***. $\int_1^2 3f(x)dx$, ***d***. $\int_2^5 f(x)dx$, ***e***. $\int_1^5[f(x)-g(x)]dx$, ***f***. $\int_1^5[4f(x)-g(x)]dx$,

Q4/B/ Find the total areas of the shaded region in (Fig.1)

Q5/ (answer two branch).

Q5/A/ Find the volume of the solid generated by revolving the shaded region about the x- axis.(Fig.2)

Q5/B/ Use the shell method to find the volume of the solid generated by revolving the shaded region about the y-axis.(Fig.3)

Q5/C/ Evaluate the integral $\int_0^{\pi/3} xtan^2xdx$, by using substitution prior to integration by parts.

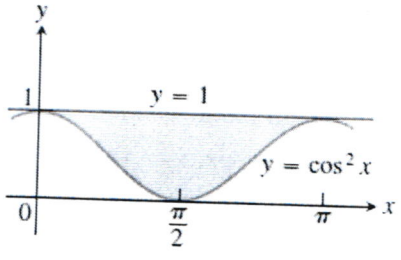


Fig.1

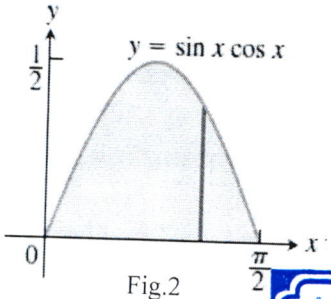


Fig.2

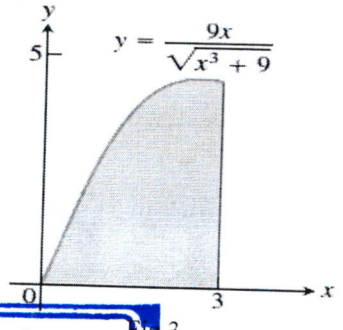


Fig.3

Good Luck

قسم هندسة المواد
اللجنة الامتحانية