International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Assignment Autumn-2019 | Program: B.Sc. Engg. (EEE)
Course Code: MATH-1107 | Course Title: Mathematics-I
Starting Time: 10:00am | Full Marks: 40
Time :12:00 hours | **Set: E**

[Answer the followings questions; figures in the right margin indicate full marks.]

If $f(u) = \log(x^A + y^B + z^C - 3xyz)$, $g(x) = (x-p)^p(x-q)^q$,
where A is the last two digit , B is the sum of last two digit of your ID number , C is any odd number, p is the sum of your ID number and q is the reverse order of last two digit of your ID number.

1(a).	$Evaluate\ \left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^3 f(u)$	**CO1**	**E**	**02**
1(b).	Investigate the maximum and minimum value of $g(x)$ by using first time derivative. Write the comment of the result.	**CO1**	**Cr**	**02**
1(c).	Verify Euler's theorem to consider a homogeneous function of p, q, z whose degree is the reverse order of last two digit of your ID number. Write the physical impact of Euler's theorem in EEE.	**CO1**	**An**	**02**
1(d)	If $u = \sin^{-1}\left(\frac{m}{n}\right) + \cot^{-1}\left(\frac{n}{m}\right)$, then find the value of $m\frac{\partial u}{\partial m} + n\frac{\partial u}{\partial n}$ Where m, n be the first two letters of your name.	**CO1**	**U**	**02**
2(a).	Evaluate the following Integrals : $(i)\int \frac{dx}{x(1+x^{n+1})}$ $(ii)\int \frac{dx}{x(x+n)(x-n+1)(x^n+2)}$ $(iii)\int \frac{dx}{a+b\cos x}$ Where n is the sum of your ID number.	**CO1**	**E**	**06**
2(b).	Explain the physical meaning of $\int f(x)dx$ and also its effect in EEE.	**CO1**	**An**	**02**
3(a).	Establish the reduction formula for $\int \tan^m x \cos^n x\, dx$ and hence evaluate $\int \tan^A x \cos^B x\, dx$ where Abe the reverse order of last two digit and B is the sum of first two digit of your ID number	**CO2**	**Ap**	**03**
3(b).	Write two properties of definite integral and verify it with considering an example which degree is sum of last two digit of your ID number.	**CO2**	**U**	**02**
3(c).	Show that $\int_0^{\pi/2} \sin^A\theta \cos^B\theta\, d\theta = \frac{\Gamma\left(\frac{A+1}{2}\right)\Gamma\left(\frac{B+1}{2}\right)}{2\,\Gamma\left(\frac{A+B+2}{2}\right)}$ and verify it for $\int_0^{\pi/2} \sin^7\theta \cos^6\theta\, d\theta$, Where A, B be the last two letters of your name.	**CO2**	**An**	**03**
4(a).	Evaluate $\iiint_R (Axy^2 - Bxy + Cy^2z)dxdydz$, where R: $0 \le x \le A, 0 \le y \le B, 0 \le z \le C$ where A be the second , , B be thethird digit of your ID number and C is the square root of sum of third and last digit of your ID number.	**CO2**	**E**	**02**
4(b).	Evaluate the followings integrals :$(i)\int_0^N \int_{5-y}^{\sqrt{25-y^2}} \sqrt{x}\, ydydx$ $(ii)\int_0^{ln3} \int_0^{lnN} (x-y)e^{x+y}dydx$ where N is the	**CO2**	**E**	**04**

square of the sum of first and last digit of your ID number.

4(c).	Evaluate $\int_a^b x^4\,dx$ as the limit of a sum.	**CO2**	**E**	**02**
5(a).	$Obtain\ the\ perimeter\ of\ \frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, where a, b are any even and odd number which is not perfect square. Also write the name of the curve.	**CO2**	**Ap**	**02**
5(b).	Obtain the volume and area of the curved surface of a parabolid of revolving the parabola $x^2 = Pa$y about y-axis and bounded by the section $y = y_1$ where P is the square of the sum of your ID number.	**CO2**	**Ap**	**02**
5(c).	Evaluate the area of the region bounded by the parabolas $y^2 =$ Max and $\sqrt{b} = 4$ay ,where M is the sum of largest two digit of your ID number.	**CO2**	**E**	**02**
5(d).	Find the volume of $r = a(1-\cos\theta)$, Also write the name of the curve and explain a, r .	**CO2**	**R**	**02**

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