Comilla University

Department of Computer Science and Engineering 2nd year 1st Semester Final Examination-2020

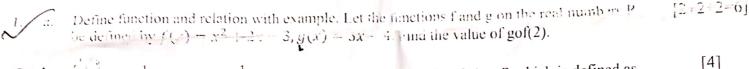
Session: 2018-19

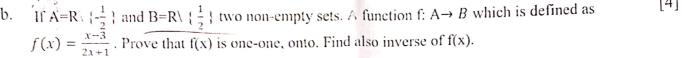
Course Name (Course Code): Algebra, Trigonometry and Matrices (MATH 2108)

Full Marks : 60

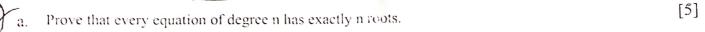
Time Allowed: 3 Hours

[Answer any fire (5) from the following questions. Figures to the right indicate full marks. Answer each part of the question consecutively. Writing anything in the question is strictly prohibited.]



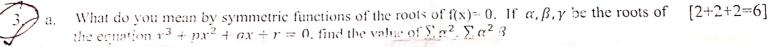


c. Show that
$$f(x) = \ln(x + \sqrt{1 + x^2})$$
 is an odd function. [2]



b. If A and B are any two sets then prove that
$$(A \cup B)^c = A^c \cap B^c$$
 [4]

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$$\sim$$
 c. If a, b, c are the roots of the equation $x^3 + px^2 + qx + r = 0$, find the value of (b + c) (c + a) (a + b) in p, q and r. [3]



$$x^4 - x^3 - 7x^2 + x + 6 = 0$$

Define complex number with graphical representation. Find the nature of the roots of the equation
$$6x^4 - 25x^3 + 81x^2 - 9x - 13 = 0$$
 [3+3=6]

b. Show that in the Argand's plane a variable Point
$$P \equiv z$$
 subject to the condition $|z+1|+|z-1|=3$ describe an ellipse,

Define hyperbolic function and Gregory's series. Show that
$$\frac{\pi}{8} = \frac{1}{1.3} + \frac{1}{5.7} + \frac{1}{9.11} + - - - - - - - - -$$

- Define line integral where \bar{r} is position vector of a point. If $\bar{A} = (3x^2 + 6y)\hat{\imath} 14yz\hat{\jmath} + 20xz^2\hat{k}$ 7. Evaluate $\int_{C} \bar{A}.d\bar{r}$ from (0,0,0) to (1,1,1) along the following paths c
 - $x=t, y=t^2, z=t^3$
 - The straight line joining (0,0,0) to (1,0,0) then (1,1,0) and then to (1,1,1).

[3+3]

Find the angle between the surface $z=x^2+y^2$ and $z=(x-\frac{\sqrt{6}}{6})^2-(y-\frac{\sqrt{6}}{6})^2$ at the point

$$P = (\frac{\sqrt{6}}{12}, \frac{\sqrt{6}}{12}, \frac{1}{12})$$

- $P = \left(\frac{\sqrt{6}}{12}, \frac{\sqrt{6}}{12}, \frac{1}{12}\right)$ c. Prove that $\nabla^2 \left(\frac{1}{r}\right) = 0$
- State and Prove Green's theorem in the plane. 8.
 - Use Stokes theorem to evaluate $\oint_C \bar{F} \cdot d\bar{r}$, if $\bar{F} = xz\hat{\imath} + xy\hat{\jmath} + 3xz\hat{k}$ and c in the boundary of the portion of the plane 2x+y+z=2 in the first octant, traversed counterclockwise as viewed from above.