

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-14

Code: 4GC14

B.Tech. I Year Supplementary Examinations January 2022

Mathematics-I

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. The temperature of the body drops from 100^oc to 75^oc in ten minutes when the surrounding air is at 20^oc temperature. What will be its temperature after half an hour? 14M

OR

2. Solve $x \frac{dy}{dx} + y = x^3 y^6$ 14M

UNIT-II

3. If $a < b$, prove that $\frac{b-a}{(1+b^2)} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{(1+a^2)}$ using Lagrange's Mean value theorem. Deduce the following:

(i) $\frac{f}{4} + \frac{3}{25} < \tan^{-1}\left(\frac{4}{3}\right) < \frac{f}{4} + \frac{1}{6}$ (ii) $\frac{5f+4}{20} < \tan^{-1}(2) < \frac{f+2}{4}$ 14M

OR

4. Obtain the maclaurins series expansions of the following function
(i) e^x (ii) $\sin x$ (iii) $\cosh x$ 14M

UNIT-III

5. Trace the curve $r = a(1 + \cos \theta)$ 14M

OR

6. Find the area of the region bounded by the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ 14M

UNIT-IV

7. $L\{e^{2t} + 4t^3 - 2 \sin 3t + 3 \cos 3t\}$ 14M

OR

8. Using Convolution theorem, find $L^{-1}\left\{\frac{s}{(s^2 + a^2)^2}\right\}$ 14M

UNIT-V

9. Find the angles between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point (2, -1, 2) 14M

OR

10. Using Green's theorem evaluate $\int_c (2xy - x^2) dx + (x^2 + y^2) dy$ where 'c' is the closed curve of the region bounded by $y = x^2$ and $y^2 = x$ 14M
