G.R. No.

Paper Code – U128-101 (T1)

MARCH 2019 / IN-SEM (T1)

F. Y. B.TECH. (COMMON) (SEMESTER - II)

COURSE NAME: Engineering Mathematics-II
COURSE CODE: ES12181

(PATTERN 2018)

Time: [1 Hour]   [Max. Marks: 20]

(*) Instructions to candidates:
1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed.
4) Use suitable data where ever required.

Q 1) Attempt any **two**.

a) Solve : $\left(\dfrac{y^2}{(y-x)^2} - \dfrac{1}{x} \right) dx + \left(\dfrac{1}{y} - \dfrac{x^2}{(x-y)^2} \right) dy = 0$ [4]

b) Solve : $(1+y^2) dx = (\tan^{-1} y - x) dy$.   [4]

c) A body originally at 80 ^{0}C cools down to 60 ^{0}C in 20 minutes, the temperature of the air being 40 ^{0}C. What will be the temperature of the body after 40 minutes from the original?   [4]

Q 2) Attempt any **two**.

a) Trace the curve $x^2 y^2 = a^2 (y^2 - x^2)$.   [4]

b) Trace the curve $x = a(t + \sin t)$, $y = a(1 + \cos t)$.   [4]

c) Trace the curve $r = a \sin 3\theta$.   [4]

Q 3) Attempt any **one**.

a) Find equation of the sphere passing through the circle $x^2 + y^2 + z^2 = 1$, $2x + 3y + 4z = 5$ and which intersects the sphere $x^2 + y^2 + z^2 + 3x - 3y + 3z - 56 = 0$ orthogonally.   [4]

b) Find equation of right circular cylinder whose axis is $\dfrac{x-2}{2} = \dfrac{y-1}{1} = \dfrac{z}{3}$ and which passes through the point $(0,0,3)$.   [4]