Total No. of Questions – [03]

Total No. of Printed Pages: 01

G.R. No.	

MARCH 2020 / 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 : $\dfrac{dy}{dx} = \dfrac{\tan y - 2xy - y}{x^2 - x\tan^2 y + \sec^2 y}$ [4]

b) Solve : $\left(1+x^2\right)\dfrac{dy}{dx} + xy = 1$ [4]

c) Solve : $\dfrac{dx}{dy} - x\tan y = x^4 \sec y$ [4]

Q 2)   Attempt any **two**.

a) A body at temperature 100^0C is placed in a room whose temperature is 20^0C and   [4]
cools to 60^0C in 5 minutes. Find its temperature after a further interval of 5 minutes.

b) A constant electromotive force E volts is applied to a circuit containing a constant   [4]
resistance R ohms in a series and constant inductance L henries. If the initial
current is zero, show that the current builds up to half of its theoretical maximum in
$\dfrac{L}{R}\ln(2)$ seconds.

c) A particle is moving in a straight line with an acceleration $k\left[x + \dfrac{a^4}{x^3}\right]$ directed   [4]
towards origin. If it starts from rest at a distance 'a' from the origin, prove that it will
arrive at origin at the end of time $\dfrac{\pi}{4\sqrt{k}}$.

Q 3)   Attempt any **one**.

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

b) Find the length of one loop of the curve $r^2 = a^2 \sin 2\theta$.   [4]