

Birla Institute of Technology & Science, Pilani (Raj.)

Second Semester 2016-2017, BITS F114 (General Mathematics II)

Mid Semester Examination (Closed Book)

Time: 90 Min.

Date: March 07, 2017 (Tuesday)

Max. Marks: 30

1. Write solution of each question on fresh page.
2. Write **END** in the answer sheet just after the final attempted solution.

Q. 1 Sketch and shade the region in polar system given by

$$1 \leq r \leq 2, \quad \pi/4 \leq \theta \leq 3\pi/4.$$

[3 Marks]

Q. 2 Find the first order partial derivatives of the function

$$f(x, y, z) = x \sin(xy^2z^2)$$

[3 Marks]

Q. 3 Show that the limit of the function

$$\frac{x^2 - x\sqrt{y}}{x^2 + y}$$

does not exist as $(x, y) \rightarrow (0, 0)$.

[4 Marks]

Q. 4 Find the local maxima and minima of the function

$$f(x, y) = 2(x^2 - y^2) - x^4 + y^4.$$

[8 Marks]

Q. 5 Use double integral to find the area of the region bounded by the curves $y = \sqrt{x}$ and $y = x^3$.
Also sketch the given region.

[6 Marks]

Q. 6 Evaluate the double integral of the function $f(x, y) = x(x^2 + y^2)$ over the positive quadrant of the circle $x^2 + y^2 = 4$.

[6 Marks]

————— **END** —————