

**Savitribai Phule Pune University**

Interdisciplinary School of Scientific Computing

**End Sem. Exam. Dec. 2019**

**Course No. :** SC – 104

**Title :** Foundation of Scientific Computing- II

#### Date: 17 Dec. 2019 Marks : 50

Time : 10:30am to 1:00pm

**Note :**  1) Q.1 is compulsory. Answer any six of the remaining questions.

2) Answers to all sub questions of a question should appear together.

Q.1 Attempt any seven. (2 marks each.)

1. Plot the graph of  , 

lim

x→0

1. Evaluate the limit 
2.  is not continuous at 

Is this discontinuity removable ? Justify your answer.

1. Calculate  from the equation 
2. Locate and classify the critical points of 
3. Calculate the area bounded by the curve and 

∞

∑

n = 1

1. Is the series  convergent?
2. Using the integration of power series find the series expansion for 

∞

∑

n = 0

1. Find the radius of convergence of the power series 
2. Find the solution of the equation 

**P.T.O**

Q.2 Consider the function 

(i) Find the regions in which  is increasing or decreasing, concave up and concave (2)

down.

(ii) Locate and classify the critical points. Find the points of inflection. (2)

(iii) Plot the function for  (2)

Q.3 (a) Find the dimensions of the right circular cylinder of maximum volume that can be inscribed in a sphere (4)

of radius 

**OR**

1. A right circular cone has attitude 12 ft. and the base radius 6 ft. Another right circular Cone is inscribed (4)

in the given cone with its vertex at the base of the original cone and base parallel to the base of larger

cone. Find the dimensions of the inscribed cone so that it has the maximum volume.

1. Using the Mean Value Theorem, show that  (2)

Q.4 Evaluate the integrals. ( 3 marks each.)

 (a) (i)  OR (II) 

(b) (ii)  OR (ii) 

Q.5 Evaluate the following integrals. ( 3 marks each.)

(a) (i)  OR (ii) 

(b) (ii)  OR (ii) 

Q.6 (a) Find the distance travelled by the particle from  if its position at time  (2)

seconds is given by

 

1. Consider the closed curve.



Find the surface area of the solid generated by rotating this curve around the line  (4)

**OR**

(b) The region bounded by the parabola  and the line  is rotated around the line (4)

 Determine the volume of the solid generated.

Q.7 (a) Determine the region of convergence of the following power series. (Any one, 2 marks each.)

∞

∑

n = 1

∞

∑

n = 0

(i)  (ii) 

(b) Calculate the Fourier Series for (4)

 

Q.8 (a) Find the solution of any one. (3)

(i) 

(ii) 

(b) Find the solution of any one. (3) (i) 

(ii) 

Q.9 (a) Find the solution of (4)



∞

∑

n = 1

(b) Using the series expansion of for < 1, find the sum of the series   (2)

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