Assignment Booklet

COURSE

Mathematics (General)

COURSE-TYPE

Core

COURSE CODE

MTMGCOR01T

COURSE NAME

Differential Calculus

SEMESTER NUMBER: 1

DEPARTMENT OF MATHEMATICS BARASAT GOVERNMENT COLLEGE 10, K.N.C. ROAD, BARASAT KOLKATA-700124

2018-19

Dear Student,

As explained/directive by Board of Studies for Mathematics subject of WBSU, you will have one assignment for each 6 credit course. The block coverage of the assignments is indicated in the assignments itself. You are advised to read the instructions provided here before attempting the assignments.

The last date of submission of assignment is 20/11/2018 (Tuesday). You are advised not to wait for last date to submit the assignments. You have to submit the same to the H.O.D. or Course coordinators, as the case may be.

Instruction for Formatting Your Assignments

• On the top of the first page your Assignment Answer Sheet, please write the details exactly in the following format

Registration Number:	Date/Year:	Semester:
College Roll Number:	Department:	
Course Code:	Course Type:	
Course Name/Title:		
Name of Student:		
Res. Address:		
Land/Mobile Number:		

- Please follow the above format strictly to facilitate evaluation and avoid delay.
- Use only both side of foolscap size writing paper for writing your answer.
- Use separate sheet to answer different Groups (if any) in the assignments.
- Your answer should be precise.
- While solving problems clearly indicate the Group (if any), question number along with the part being solved .
- Recheck your work before submitting it.

Answer sheet received after the due date shall not be accepted. We strongly feel that you should retain a copy of your assignments to avoid any unforeseen situations.

Wishing you all good luck.

H.O.D. Department of Mathematics, Barasat Govt. College.

Mathematics Course Code: MTMGCORE01T

Maximum Marks: 50 Weightage: 20%

Last Date of Submission: November, 20, 2018

Note: All questions are compulsory. Marks assigned to the questions have been shown in the bracket. Answer each group in separate sheets. This assignment is based on all area/units of MTMGCORE01T.

Group A (FM 15)

5×3=15

1. Study the discontinuity points of $f(x) = \sin x - [\sin x]$.

2. If $y = \cos(m \sin^{-1} x)$, show that $(1 - x^2)y_{n+2} = (2n+1)xy_{n+1} + (n^2 - m^2)y_n = 0$. Find also $y_n(0)$.

3. $f(x,y) = x^2 + xy + y^2$, x = uv, $y = \frac{u}{v}$. Show that $uf_u + vf_v = 2xf_x$ and $uf_u - vf_v = 2yf_y$.

Group B (FM 20)

1)	Find the radius of curvature of the cycloid x=a(t-sint),y=a(1-cost) at any point.	
	Find the maximum radius of curvature, for which value of t it occurs?	4+1
2)	Find the asymptotes of the curve $x^3-6x^2y+11xy^2-6y^3+x+y+1=0$.	5
3)	Show that the equation of the tangent to the curve $r = a(1 - \cos\theta)$ at the point $\theta = 2\alpha$ is	
	$r\sin(3\alpha - \theta) = 2a\sin^3\alpha$	5
4)	Determine the singularity of the curve $(2x + y)^2 - 6xy(2x + y) - 7x^3 = 0$ at the origin.	5

Group C (FM 15)

- 1. Assuming the possibility of expansion, expand $e^x \log(1 + x)$ in ascending powers of x. 5
- 2. Adjust the values of the constants *a*, *b*, *c*, so that $\frac{a \sin x bx + cx^2 + x^3}{2x^2 \log (1+x) 2x^3 + x^4}$ may tend to a finite limit as *x* tends to zero; also determine the limit. 5
- 3. If $f'(x) = (x a)^{2m}(x b)^{2n+1}$, when *m* and *n* are positive integers, show that x = a gives neither a maximum nor a minimum value of f(x), but x = b gives a minimum.