



KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY
Hiranya Kumar Bhuyan School of Science & Technology

Home Assignment

Bachelor of Arts (MATHEMATICS)

INTEGRAL CALCULUS & DIFFERENTIAL EQUATION [GMAS4 01]

4th Semester, 2020

Total Marks 50

Assignments are required to be written in your own language, copying in toto from the learning material will carry less score.

প্রদত্ত কৰ্ম নিজৰ ভাষাত লিখা বাঞ্ছনীয়। উত্তৰ লিখোতে বিশ্ববিদ্যালয়ৰ স্ব-শিক্ষণ সামগ্ৰী তথা লগৰ শিক্ষার্থীৰ পৰা ছবছ নকল নকৰিব, অন্যথা নম্বৰ কমাই দিয়া হ'ব।

1. Answer the following questions-

(2 X 4= 8)

প্রশ্ন নং ১ : তলৰ প্রশ্নবোৰৰ উত্তৰ উলিওৱাক :

a. Integrate the following : অনুকলক কৰক :

$$\int \frac{\sin(\tan^{-1} x)}{1+x^2} dx$$

b. Find the differential equation of all the family of curves

$$y = Ae^{3x} + Be^{5x} \text{ for different values of } A \text{ and } B.$$

A আৰু B ৰ বিভিন্ন মানৰ বাবে $y = Ae^{3x} + Be^{5x}$ বক্ৰকুলৰ অৱকল সমীকৰণ নিৰ্ণয় কৰক।

c. Solve the following differential equation :

অধোলিখিত অৱকল সমীকৰণটো সমাধান কৰক :

$$y = xp + p^3$$

d. Evaluate মান নিৰ্ণয় কৰক :

$$\int_{-1}^1 \frac{x^2 \sin^{-1} x}{\sqrt{1-x^2}} dx$$

2. Answer the following questions-

(3 X 4= 12)

প্রশ্ন নং ২ : তলৰ প্রশ্নবোৰৰ উত্তৰ উলিওৱাক :

a. Show that দেখুৱাওক যে $\int_0^{\pi} x \cos^4 x dx = \frac{3\pi^2}{16}$

b. Find the area above the x-axis, included between the parabola $y^2 = ax$ and the circle $x^2 + y^2 = 2ax$. $y^2 = ax$ অধিবৃত্ত আৰু $x^2 + y^2 = 2ax$ বৃত্তই আগুৰা x-অক্ষৰ ওপৰৰ অংশৰ কালি নিৰ্ণয় কৰক।

c. Solve the following differential equation : অধোলিখিত অৱকল সমীকৰণটো সমাধান কৰক।

$$(6x + 2y - 10) \frac{dy}{dx} - 2x - 9y + 29 = 0$$

d. If $I_n = \int x^n \cos bx dx$ and $J_n = \int x^n \sin bx dx$ then show that $bl_n = x^n \sin bx - nJ_{n-1}$.

যদি $I_n = \int x^n \cos bx dx$ আৰু $J_n = \int x^n \sin bx dx$ দেখুওৱাক যে $bl_n = x^n \sin bx - nJ_{n-1}$.

3. Answer the following questions-

(5 X 2= 10)

প্ৰশ্ন নং ৩ : তলৰ প্ৰশ্নবোৰৰ উত্তৰ উলিওৱাক :

a. Find the value of the following integral as the limit of a sum

সমষ্টি এটাৰ সীমা হিচাপে প্ৰকাশ কৰি মান নিৰ্ণয় কৰক।

$$\int_0^3 (2x + 1) dx$$

b. Solve the following differential equation: অধোলিখিত অৱকল সমীকৰণটো সমাধান কৰক।

$$(D^3 - 7D - 6)y = (x + 1)e^{2x}$$

4. Answer the following questions-

প্ৰশ্ন নং ৪ : তলৰ প্ৰশ্নবোৰৰ উত্তৰ উলিওৱাক :

(10 X 2= 20)

a. (i) Find the area common between the curves $y^2 = 4ax$ and $x^2 = 4ay$.

$y^2 = 4ax$ আৰু $x^2 = 4ay$ অৰ উমৈহতীয়া অংশৰ কালি নিৰ্ণয় কৰক।

(ii) Find the area of the surface of revolution generated by revolving about the y-axis the

arc of $x = y^3$ from $y = 0$ to $y = 1$.

বক্ৰৰ $x = y^3$ আৰু $y = 0$ আৰু $y = 1$ অৰ মাজত থকা চাপ y-অক্ষ সাপেক্ষে পৰিক্ৰমণ কৰাৰ

ফলত উৎপন্ন হোৱা ঘনৰ পৃষ্ঠকালি নিৰ্ণয় কৰক।

b. Solve the following differential equations by the method of variation of parameters :

প্ৰাচল পৰিৱৰ্তন পদ্ধতিৰ সহায়ত তলৰ অৱকল সমীকৰণবোৰ সমাধান কৰক।

$$(i) \frac{d^2 y}{dx^2} + y = \operatorname{cosec} x \cot x$$

$$(ii) (D^2 - 9)y = e^{2x} + x$$

*** ***** ***

Assignment Guidelines

A. Guidelines to Co-ordinators:

1. Assignments are parts of teaching-learning process and compulsory.
2. The spirit behind this is to help learners to understand the subject and prepare themselves better for the term-end examination.
3. Assignment responses are to be evaluated and feedback are required to be communicated to the learners, by giving back the assignments with evaluators comments. Such assignments are to be collected at the time of issuing admit cards and be stored in the centre's office till the end of next semester.

4. Assignment marks are to be sent to the Controller of Examinations as soon as the examination routines are published.
5. Keeping the above points in mind *Co-ordinators will fix the time/date of submission of assignments by the learners as may be convenient to follow the guidelines in true spirits.*

B. Guidelines to learners :

1. As soon as the SLMs are received the learners will write the assignments in their own handwriting (assignment questions may be downloaded from the website, if necessary) to be submitted to Co-ordinators as per the dates fixed for the purpose. Timely submission of assignments at the Study Centres will help in quick processing of results of respective learners. Otherwise this will create unnecessary delay in declaration of results.
2. Writing of assignment (work) and submission of the same in time is compulsory.

Registrar

N.B. The learners will have to collect receipt after submitting the assignment with the signature and seal of the collector of study centre and will have to keep with him/her till the declaration of result.

.....
Receipt :

Received the assignment from Mr/Ms Enrollment number of **4th semester (Mathematics) (2020)** on 2020.

Date:

Signature of collector with seal

*** **