RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER TAKE-HOME TEST, SEPTEMBER 2020
SECOND YEAR [BATCH 2018-21]

Date : 03/10/2020 **MATHEMATICS GENERAL**
Time : 11.00 am – 3.00 pm **Paper** : IV Full Marks: 50

Instructions to the Candidates

- Write your **College Roll No, Year, Subject** & **Paper Number** on the top of the **Answer Script**.
- Write your **Name, College Roll No, Year, Subject** & **Paper Number** on the **text box of your e-mail**.
- Read the instructions given at the beginning of each paper/group/unit carefully.
- Only handwritten (by blue/black pen) answer-scripts will be admissible.
- Try to answer all the questions of a single group/unit at the same place.
- All the pages of your answer script must be numbered serially by hand.
- In the last page of your answer-script, please mention the total number of pages written so that we can verify it with that of the scanned copy of the script sent by you.
- For an easy scanning of the answer script and also for getting better image, students are advised to write the answers in single side and they must give a minimum 1 inch margin at the left side of each paper.
- After the completion of the test, you should scan the entire answer script by using Clear Scan: Indy Mobile App/any other Scanner device and make a **single file of PDF** format in your own name and send or share it to [redacted]

Group: A
Integral Calculus II

Answer any **four** questions from question no. 1-6 in this group. [4 x 5 = 20 marks]

1. Test for convergence of the following integrals:
   (a) $\int_1^3 \frac{dx}{(x-2)^2}$. [2.5]
   (b) $\int_2^\infty \frac{dx}{(x^2-1)^{\frac{2}{3}}}$. [2.5]
2. Test for convergence of the following integrals:
   (a) $\int_0^\infty \frac{dx}{x(1+x)}$. [2.5]
   (b) $\int_0^1 \frac{dx}{(1-x)x^{\frac{2}{3}}}$. [2.5]
3. Evaluate the following integrals:

(a) $\int_0^\infty e^{-5x^2}dx$. [2.5]

(b) $\int_0^\infty 3^{-x^2}dx$. [2.5]

4. Find the area bounded by $y^2 = 4ax$ and $x^2 = 4ay$. [5]

5. Find the area bounded by $y^2 = x$ and $x = 2$. [5]

6. Find the length of the curve $ay^2 = x^3$ between the points $x = 0$ and $x = 5a$. [5]

Group: B

Probability and Statistics

Answer any **three** questions from question no. 7-10. [3 x 10 = 30 marks]

7. Find median and mode for the following frequency distribution.

Height(Inches)	60-62	63-65	66-68	69-71	72-74
Frequency	5	18	42	27	8

[5+5]

8. A sample of 280 undergraduate students of Vidyamandira was asked to give their opinion regarding the chance of Kolkata's win in the IPL 2018 prior to game. Each student was to respond either to 'very high' or 'very poor' or cannot 'comment' on the issue. The following data were obtained.

Responses	Number of students
Very high	152
Very poor	051
Cannot comment	077

Draw a pie chart for the obtained data and give your opinion on the basis of the pie chart.

[5+5]

9. i. Two unbiased dice are thrown find the probability of obtaining
(a) a total of 8 points
(b) at least one ace (i.e. = 1). [4]

ii. There are (2n+1) coupons bearing numbers 1, 2, 3, ..., (2n+1) in a box. If three coupons are drawn at random from the box, then find the probability that the chosen number are in A.P. [6]

10. i. The mean weight of 150 students in a certain class is 60 kg. The mean weight of boys is 70 kg and girls is 55 kg. Find the number of boys and girls in the class. [5]

ii. Given that $\overline{x} = 3.68$. Find the two missing numbers.

x	0	1	2	3	4	5	6	7	Total
Frequency	2	8	11	?	29	?	12	3	100

[5]

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