

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. FOURTH SEMESTER (January – June) 2013

Mid-Semester Examination, March 2013

Date : 08/03/2013

MATHEMATICS (General)

Time : 12 noon – 1 pm

Paper : IV

Full Marks : 25

[Use separate Answer Books for each group]

Group – A

Unit - I

1. Answer **any two** questions :

[2×3]

a) Test the consequence of the integral : $\int_1^{\infty} \frac{(x-1)\sqrt{x}}{1+x+x^3+\sin x} dx$

b) Test the consequence of the integral : $\int_0^1 \frac{\log x}{(1-x)^{3/2}} dx$

c) Test the consequence of the integral : $\int_0^1 \frac{dx}{e^x + 1}$

Unit – II

2. Answer **any one** question :

[1×4]

a) Solve : $(D^2 + 1)^3 (D^2 + D + 1)^2 y = 0$ where $D \equiv \frac{d}{dx}$

b) Solve : $D^2(D-1)^2 y = x^3$

Group – B

3. Answer **any two** questions :

[2×5]

a) If two events A and B are independent, show that their complementary events \bar{A} and \bar{B} are also independent.

b) A problem in Mathematics is given to three students whose chances of solving it are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$. What is the probability that the problem will be solved?

c) If $P(A) = \frac{3}{4}$, $P(B) = \frac{5}{8}$ show that $\frac{3}{8} \leq P(A \cap B) \leq \frac{5}{8}$

4. Answer **any one** :

[1×5]

- a) Compute the mean, median and mode for the given frequency distribution of I.Q for 309 children of a specified age.

I.Q	frequency
40 – 49	1
50 – 59	2
60 – 69	3
70 – 79	5
80 – 89	17
90 – 99	65
100 – 109	69
110 – 119	79
120 – 129	37
130 – 139	19
140 – 149	7
150 – 159	3
160 – 169	2

For mode use an approximate relationship obtained from mean and median. Also comment on the skewness of the distribution if possible.

- b) Calculate \bar{x} , S , m_3 (third order central moment) and m_4 (4th order central moment) for the following set of data

11.5	10.7	10.7
10.1	9.8	9.3
9.7	10.0	8.6
8.2	10.1	9.0
8.8	10.3	9.8
9.3	11.3	8.4
11.2	10.3	9.6
10.4	9.8	11.3

