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INTERNAL EXAMINATION-2022 SUBJECT-MATHEMATICS (H) DC-05
SEMESTER-03 FULL MARKS-14

TIME-45 MINUTES

Answer all the questions.

1. a. The integral $\int_0^2 \frac{dx}{(2x-x^2)}$ is 1X6 =6

   i.Divergent ii. Convergent iii. 0 iv. 1

   b.

   The oscillation of a bounded function f on an interval [a,b] is
   i. Supremum of $\{ |f(x_1)-f(x_2)| : x_1, x_2 \in [a,] \}$
   ii. *Infimum* of $\{ |f(x_1)-f(x_2)| : x_1, x_2 \in [a,] \}$
   iii. Both (a) & (b)
   iv. Neither (a) nor (b)

   c. Given I =$\int_0^\infty e^{-x}x^{n-1}dx$,then

   i.I is divergent when n≤ 0
   ii. I is convergent when 0<n<1
   iii. I is convergent when n≥ 1
   iv. I is divergent when n≥ 1

   d. The integral $\int_0^\infty sinxdx$

   i.exists ii. Exists and equal to zero iii. Exits and equal to 1 iv. Does not exist.
   e. State Darboux Theorem.

   f. Give an example of a function which is bounded but not integrable.

2. Test the convergency of $\int_0^1 \frac{dx}{\sqrt[2]{x(1-x)}}$ 4
3. Evaluate : $\int_0^{\frac{\pi}{2}} \sqrt[3]{cotx}$dx 4