# THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)
Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

## Backlog Arrear Examination, March 2021

**Course: Numerical & Statistical Methods**

**Course Code:  MAS 2557 / 2477**                                        **Time: 3 hrs**

**Answer any 5 out of 7 :**                                        **( 5 X 15 = 75)**

1. Find a real root of the equation   $x^3 - 2x - 5 = 0$.

2. **(a)** .Values of $x$ (in degrees) and $sinx$ are given in the following table :

| x ( in degrees) | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|
| $sinx$ | 0.2588190 | 0.3420201 | 0.4226183 | 0.5 | 0.5735764 | 0.6427876 |

   **(b).** Certain corresponding values of $x$ and $\log_{10} x$ are ( 300 , 2 . 4771 ) ;  ( 304 , 2 . 4829 ) ;

   ( 305 , 2 . 4843 )  and ( 307, 2 . 4871).  Find $\log_{10} 301$

3. Using Runge- Kutta Fourth order, Given $\frac{dy}{dx} = 1 + y^2$ ,  where $y = 0$ **when** $x = 0$,

   Find $y$ (0. 2 , $y(0. 4)$  and **y (0.6)**

4. Find the **(i)** mean  **(ii)**  median  **(iii)** first quartile  **(iv)**  third quartile  **(v)** 9th decile

   **(vi)**  19th percentile for the following frequency distribution,

| class | 11 -15 | 16 -20 | 21 -25 | 26 -30 | 31 -35 | 36 - 40 | 41 - 45 | 46 - 50 | 51 - 55 |
|---|---|---|---|---|---|---|---|---|---|
| frequency | 8 | 15 | 39 | 47 | 52 | 41 | 28 | 16 | 4 |

5. Assuming that one in 80 births is a case of twins. Calculate the probability of 2 or more

   births of twins on a day when 30 births occur using

   **(i)**  Binomial distribution          **(ii)**  Poisson distribution

**6.** The following data relate to the marks of 10 students in the internal test and the university examination for the maximum of 50 in each.

| Internal | 25 | 28 | 30 | 32 | 35 | 36 | 38 | 39 | 42 | 45 |
|----------|----|----|----|----|----|----|----|----|----|----|
| External | 20 | 26 | 29 | 30 | 25 | 18 | 26 | 35 | 35 | 46 |

 

**(i)** Obtain the two regression equations and determine

**(ii)** the most likely internal mark for the university mark of 25.

**(iii)** the most likely university mark for the internal mark of 30.

**7. (a)** Find the G .M  and H.M of the following distribution

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| f | 2 | 4 | 3 | 2 | 1 |

 

**(b)** From the following data of marks obtained by 10 students in physics and chemistry.

Calculate the rank correlation co-efficient.

| physics | 35 | 56 | 50 | 65 | 44 | 38 | 44 | 50 | 15 | 26 |
|---------|----|----|----|----|----|----|----|----|----|----|
| chemistry | 50 | 35 | 70 | 25 | 35 | 58 | 75 | 60 | 55 | 35 |

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