2020
MATHEMATICS HONOURS
SEMESTER-1
INTERNAL ASSESSMENT
Full Marks of each Course: 10

The figures in the margin indicate full marks .
Symbols and notations used here carry their usual meaning.
Candidates are required to give their answers in their own words as far as practical.

Course: CC1
(Calculus, Geometry & Vector Calculus)

Answer all the questions with proper justification: 5x2=10

1. The general equation of second degree will represent an ellipse if

a. $\Delta \neq 0, D < 0$ b. $\Delta \neq 0, D = 0$ c. $\Delta \neq 0, D > 0$ d. $\Delta = 0, D < 0$

2. The pair of Straight lines joining the origin to the points the intersection of the parabola $y^2 = 4ax$ by the straight line y=mx+c is coincident if

a. c+4am=0 b. a=mc c. m=ac d. c=4am

3. The radius curvature of the curve $r = \frac{l}{1+e\cos\theta}$ $(e < 1)$ at $\theta = \pi$

a. 1 b. l^2 c. $1/l$ d. l

4. Asymptotes of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ are

a. $ay = \pm bx$ b. $by = \pm ax$ c. $y = \pm x(a+b)$ d. $a^2y = \pm b^2x$

5. $\lim_{x\to\infty} \frac{x^4}{e^x}$= ?

a. 1 b. 0 c. e d. none of these

Course: CC2
(Algebra)

Answer all the questions with proper justification: 5x2=10

6. The standard form of the cubic equation $x^3 - 6x^2 + 10x - 3 = 0$ putting $y = x - 2$ is

$(a)\ y^3 + 2y - 1 = 0$, $(b)\ y^3 + 2y + 1 = 0$, $(c)\ y^3 - 2y + 1 = 0$, $(d)\ y^3 - 2y - 1 = 0$.

7. The roots of the equation $x^4 + 12x = 5$ are

$(a) -1 \pm 2i, -1 \pm \sqrt{2}$, $(b) 1 \pm 2i, 1 \pm \sqrt{2}$, $(c) 2 \pm 2i, -1 \pm \sqrt{2}$, $(d) 1 \pm 2i, -1 \pm \sqrt{2}$.

8. The polar form of $1 - i$ is

(a) $\sqrt{2}(\cos\left(-\frac{\pi}{4}\right) + isin(-\frac{\pi}{4}))$ (b) $\sqrt{2}(\cos\left(\frac{\pi}{4}\right) + isin(\frac{\pi}{4}))$

(c) $\sqrt{2}(\cos\left(-\frac{3\pi}{4}\right) + isin(-\frac{3\pi}{4}))$ (d) $\sqrt{2}(\cos\left(\frac{3\pi}{4}\right) + isin(\frac{3\pi}{4}))$

9. Rank of the matrix $A = \begin{bmatrix} 1 & 0 & 3 \\ 4 & -1 & 5 \\ 2 & 0 & 6 \end{bmatrix}$ is

(a) 1 (b) 2 (c) 3 (d) none of these.

10. System of homogeneous linear equations

(a) is consistent (b) is inconsistent (c) is may be inconsistent (d) none of these