**2020**

**MATHEMATICS GENERAL**

**Paper: CC2/GE2**

**SET-1**

**Internal Assessment**

**Full Marks: 10**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
Notations and symbols have their usual meaning.

**Answer all questions:** $2\times5$

1) The sequence $\{(-2)^n\}$ is
   a) Bounded and convergent
   b) Bounded but not convergent
   c) Convergent but not bounded
   d) Unbounded and divergent

2) The sequence $\{x_n\}$, where $x_n=\left(1+\frac{1}{n}\right)^n$ converges to
   a) e  b) $e^2$  c) $\sqrt{e}$  d) none of these

3) The order of the P.D.E $\frac{\partial z}{\partial x}+\frac{\partial z}{\partial y}=0$ is
   a) 1  b) 2  c) 0  d) 3

4) If θ be the angle between the vectors $\vec{a}$ and $\vec{b}$, such that $\left|\vec{a}\times\vec{b}\right|=\left|\vec{a}.\vec{b}\right|$. then θ is
   a) 0  b) 45°  c) 60°  d) 180°

5) For any integer a, gcd (a, a+2) is
   a) either 1 or 3  b) either 1 or 2  c) either 2 or 5  d) either 2 or 3

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**Theory Examination**

**Full Marks: 32**

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**Answer any FOUR questions:** $8\times4$

1) Find the value of $\lim_{x\to0}\frac{xe^x-\log(1+x)}{x^2}$

2) Find the P.D.E of $z=e^{2y}\varphi(x-y)$, where $\varphi$ is arbitrary function.

3) If a particle in equilibrium is subjected to four forces $\overrightarrow{F_1}=3\vec{i}-5\vec{j}+10\vec{k}$, $\overrightarrow{F_2}=2\vec{i}+3\vec{j}-7\vec{k}$, $\overrightarrow{F_3}=2\vec{i}+12\vec{j}-3\vec{k}$ and $\overrightarrow{F_4}$. Find the value of $\overrightarrow{F_4}$.

4) Find the solution of the linear congruence $5x\equiv3(mod\ 7)$

5) If $1^p+2^p+\ldots\ldots\ldots\ldots+(p-1)^p\equiv0(mod\ p)$ then find the value of p.

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**Tutorial Examination**

**Full Marks: 08**

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**Answer any ONE question:** $8\times1$

1) Find the solution of the P.D.E $ap + aq = z$

2) If $p$ and $p^2+8$ are both prime numbers, then find the value of $p$.