MATHEMATICS

1. If A be a 3 x 3 singular matrix of rank 2 and rank $(A|B)$ = 3, (where $(A|B)$ is the augmented matrix), then the system of linear equations Ax = B has
   A) Unique solution B) Infinitely many solutions
   C) No solution D) At least one but finitely many solutions

2. If real part of $\frac{z+1}{z+i}$ is 0, where $i=\sqrt{-1}$, then z lies on a
   A) Circle B) Straight line C) Ellipse D) Parabola

3. If the chords of the hyperbola $x^2-y^2=16$ touches the parabola $y^2=16x$, then the locus of the middle points of these chords is the curve
   A) $y^2(x+4)=x^3$
   B) $y^2(x-4)=x^3$
   C) $y^2(x-8)=3x^3$
   D) $y^2(x-8)=2x^3$

4. If $(\vec{a},\vec{b},\vec{c})$ are three vectors such that if $\vec{a}\times\vec{b}=\vec{c}$ and $\vec{b}\times\vec{c}=\vec{a}$, then
   A) If $\vec{a},\vec{b}$ and $\vec{c}$ are pair-wise perpendicular
   B) $|\vec{a}|=|\vec{b}|=|\vec{c}|=1$
   C) $|\vec{a}|=|\vec{b}|=|\vec{c}|\neq 1$
   D) $|\vec{a}|\neq|\vec{b}|\neq|\vec{c}|$

5. The three planes 4y+6z=5, 2x+3y+5z=5 and 6x+5y+9z=10
   A) Meet in appoint B) Have a line in common
   C) Form a triangular prism D) Do not meet at any point

6. Let f be a function satisfying f(x+y)=f(x)+f(y) and $f(x)=x^2$ g(x) for all real x and y, g(x) is a continuous function. Then f'(x) equals to
   A) g'(x)
   B) g(0)
   C) g(0)+f(0)
   D) 0

7. If [x] denotes the greatest integer ≤x, then the value of the integral $\int_4^{10}\frac{[x^2]dx}{[x^2-28x+196]+[x]^2}$ is
   A) 0 B) 1 C) 3 D) 4

8. Solution of the differential equation $\frac{dx}{dy}=\frac{x+y+7}{2x+xy+3}$ is
   A) $6(x+y)+11\,ln\,(3x+3y+10)=9x+c$
   B) $6(x+y)-11\,ln\,(3x+3y+10)=9x+c$
   C) $6(x+y)-11\,ln\,(x+y+\frac{10}{3})=9x+c$
   D) $6(x+y)-11\,ln\,(x+y+10)=9x+c$

9. Two dice are rolled one after another. The probability that the number on the first is less than or equal to the number on the second is
   A) $\frac{5}{12}$
   B) $\frac{7}{12}$
   C) $\frac{5}{18}$
   D) $\frac{13}{18}$

10. The proposition $p\wedge(PVq)$ is
    A) a tautology
    B) a contradiction
    C) logically equivalent to $p\wedge q$
    D) logically equivalent to $p\vee q$