

**APPLIED MATHEMATICS-I**  
**1<sup>st</sup> Exam/Common/2455/5402/0251/May'18**

**Duration: 3Hrs.**

**M.Marks:75**

**SECTION-A**

**Q1. Choose the correct answer.**

**5x1=5**

- (i) The modulus of  $1 + i\sqrt{3}$  is  
a)  $\sqrt{2}$       b) -1      c) 2      d) 0
- (ii) The value of  $3\pi/12$  radians in degree is  
a)  $60^\circ$       b)  $45^\circ$       c)  $90^\circ$       d)  $120^\circ$
- (iii) Characteristic of  $\log 0.07426$  is  
a)  $\bar{1}$       b)  $\bar{2}$       c) 0      d) 1
- (iv) If  $\sin(A-B) = \frac{1}{2}$  and  $\cos(A+B) = \frac{1}{2}$  then value of A and B will be  
a)  $A=15^\circ, B=45^\circ$       b)  $A=45^\circ, B=15^\circ$       c)  $A=45^\circ, B=45^\circ$       d)  $A=30^\circ, B=60^\circ$
- (v) The centroid of a triangle with two vertices (3,4) (-1,-9) is (2, -4) then third vertex is  
a) (-4, -7)      b) (4, -7)      c) (4,7)      d) (-4,7)

**Q2. State True or False.**

**5x1=5**

- a. The series of the R.H.S of the expansion  $(1+x)^n$  extends to infinity
- b. If k, k+1, k+3 are in G.P, then k=2
- c. Value of  $\tan 120^\circ$  is  $\sqrt{3}$
- d.  $\sec(270^\circ + \theta) = \operatorname{cosec}\theta$
- e. The point (3,4); (7,7); (x,4) are collinear, if x=3

**Q3. Fill in the blanks.**

**5x1=5**

- i. Radius is a ----- angle.
- ii. The revolving line is always -----
- iii. If  $\cos A = \frac{1}{2}$  then  $\cos 3A =$
- iv. The conic is parabola if -----
- v. Equation of line perpendicular to line  $ax+by+c=0$  is -----

**SECTION-B**

**Q4. Attempt any six questions.**

**6x5=30**

- a. In how many ways, 3 boys and 3 girls are seated at round table, so that no two girls sit together.
- b. Find the co-ordinates of the incentre of the triangle whose vertices are (-36,7), (20,7) and (0,-8)
- c. Resolve  $\frac{(3x+7)}{(x+3)(x^2+1)}$  into partial fractions.
- d. A (10, 4); B (-4, 9); C (-2,-1) are the vertices of a triangle ABC, find the equation of the median through A.
- e. Prove that  $\cos \alpha + \cos(\alpha+2\pi/3) + \cos(\alpha+4\pi/3) = 0$
- f. If  $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y}$  then show that  $x^x y^y z^z = 1$
- g. Prove that  $\frac{\sin A + \sin 3A + \sin 5A + \sin 7A}{\cos A + \cos 3A + \cos 5A + \cos 7A} = \tan 4A$
- h. Prove that  $\frac{\cot \theta + \operatorname{cosec} \theta - 1}{\cot \theta - \operatorname{cosec} \theta + 1} = \frac{1 + \cos \theta}{\sin \theta}$
- i. How many terms of the series 3+8+13+18+ ----- must be taken so that their sum is 1010?