

S.B. Roll No.....

APPLIED MATHEMATICS-I
1st 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° b) 45° c) 90° d) 120°
- (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 $3+8+13+18+ \dots$ must be taken so that their sum is 1010?