

APPLIED MATHEMATICS-I

1st Exam/Common/2455/0251/5402 May 2015

Duration 3 hrs

M.Marks: 75

Section A

Q 1

(15 marks)

A. Choose the correct one:

- I. The modulus of $\sqrt{3} + i$
 - a. 2
 - b. 1
 - c. -2
 - d. 0
- II. The end point of diameter of circle are (2,3) and (6,5). The centre of the circle is
 - a. (4,-4)
 - b. (-4,4)
 - c. (4,4)
 - d. (4,0)
- III. The value of $\sin 75^\circ$ is
 - a. $\frac{\sqrt{3}+1}{2}$
 - b. $\frac{\sqrt{3}+1}{\sqrt{2}}$
 - c. $\frac{\sqrt{3}+1}{2\sqrt{2}}$
 - d. $\frac{\sqrt{2}+1}{3}$
- IV. Number of terms in expansion of $(1+3x)^{-3}$ are
 - a. 4
 - b. 5
 - c. 6
 - d. 2
- V. 7th term of the series $\frac{1}{2} + \frac{1}{3} + \frac{2}{9} + \dots$
 - a. $\frac{125}{729}$
 - b. $\frac{32}{729}$
 - c. $\frac{32}{625}$
 - d. $\frac{25}{729}$

B. State whether the following statements are true or false:

- I. The mid point of A(-3,2) and (5,4) is (1,-3).
- II. The angle -1837 lies in IV quadrant.
- III. Factorial of negative integers is defined.
- IV. The radius of circle $X^2+Y^2-8X-16Y+78=0$ is $\sqrt{2}$.
- V. If K, K+1, K+3 are in GP then K=2.

C. Fill in the blanks:

- I. The value of $\cos 48^\circ \sin 18^\circ - \sin 48^\circ \cos 18^\circ$ is equal to _____.
- II. The value of $\frac{8!}{4!} =$ _____.
- III. Log of 1 to any base a (a \neq 0) is always _____.
- IV. The conic is ellipse if _____.
- V. Value of $\cos \bar{\lambda} + i \sin \bar{\lambda} =$ _____.

Section B

Q2. Attempt any six questions

(5x6)

- a. Find the value of K if (K,1), (5,5) and (10,7) are collinear.
- b. Sum the series $\frac{4}{3} + 1 + \frac{3}{4} + \dots - \infty$
- c. Find absolute term in expansion of $\left(3x^2 - \frac{1}{x^3}\right)^{10}$.
- d. Find equation of straight line through (4,5) and parallel to $2x-3y-5=0$.
- e. Prove that $\tan 28^\circ = \frac{\cos 17^\circ - \sin 17^\circ}{\cos 17^\circ + \sin 17^\circ}$
- f. Show that $\sin 51^\circ + \cos 81^\circ = \cos 21^\circ$
- g. Sum the series upto n terms $8+88+888+\dots$
- h. Two vertices of triangle are (2,3) and (-3,4). Its centroid is (1,3). Find third vertex.
- i. Prove that $7 \log \frac{10}{9} - 2 \log \frac{25}{24} + 3 \log \frac{81}{80} = \log 2$

contd....

Section C

Note: Attempt any three questions

(10x3)

3. Resolve into partial fraction $\frac{x+4}{(x-4)(x^2-3x+2)}$
4. Prove that $4 \sin A \sin(60^\circ - A) \sin(60^\circ + A) = \sin 3A$
5. Find equation of circle passing through (5,7), (6,6) and (2,-2).
6. A boy observes the angle of elevation of a mountain top to be 60° and after walking directly away from it on level ground through 100 m, the angle of elevation is 45° . Find height of mountain and the distance between mountain and first position of the boy.
7. If x is so small that its square and higher powers are neglected.

Show that $\frac{\sqrt{9+7x} - (16+3x)^{1/4}}{(4+5x)} = \frac{1}{4} - \frac{17x}{384}$

8. Find equation of the straight line passing through the intersection of $x+2y+3=0$ and $3x+4y+7=0$ and perpendicular to line $y-x=9$.