

APPLIED MATHEMATICS-I
1st Exam/common/2455/0251/5402/May'16

Duration : 3 Hrs.

M. Marks 75

SECTION - A

Q1.A. Choose the correct one:

1x5=5

- i. Conjugate of $3 - i$ is
 (a) $-3 - i$ (b) $-3 + i$ (c) $3 + i$ (d) $3i$
- ii. 10th term of A.P Series $5+7+9+11+ \dots$
 (a) 23 (b) 24 (c) 25 (d) 21
- iii. Middle term of $(x^2+1/x)^2$ is
 (a) $2x$ (b) 2 (c) $3x$ (d) $4x$
- iv. $\sin\theta = 1/3$ and $\cot\theta = -\sqrt{8}$ then θ lies in
 (a) First quadrant (b) Second quadrant (c) Third quadrant (d) Fourth quadrant
- v. The centroid of a triangle whose vertices are (2,-8); (14,3); and (-10,8) is
 (a) (1,1) (b) (2,2) (c) (-2,1) (d) (2,1)

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

1x5=5

- i. Area of triangle is zero then three angular points are collinear.
- ii. When equation of parabola is $y^2 = 4ax$ then Focus is $(-a,0)$.
- iii. Factorial of zero is zero.
- iv. $\tan(45^\circ + \theta) = \frac{1 + \tan \theta}{2 + \tan \theta}$
- v. If a,b,c are in G.P then $b^2 = ac$

C. Fill in the blanks.

1x5=5

- i. $P(7,3) = \underline{\hspace{2cm}}$
- ii. $\sin 18^\circ = \underline{\hspace{2cm}}$
- iii. Logarithms to the base 10 are called
- iv. The fixed straight line in parabola is called
- v. In which quadrant, the angle 750° lies

SECTION - B

Q2. Attempt any six questions.

5X6=30

- a. How many terms of the series $3+8+13+18+\dots$ Must be taken so that their sum is 1010
- b. Sum the series $5+55+555+\dots$ n terms
- c. If $a^2+b^2 = 7ab$ prove that
 $\log\left(\frac{a+b}{3}\right) = \frac{1}{2} [\log a + \log b]$
- d. Find the absolute term in the expansion of $(3x^2 - 1/x^3)^{10}$
- e. If $\sin(A+B) = \sqrt{3}/2$ and $\cos(A-B) = \sqrt{3}/2$ then find A and B.
- f. Prove that $\tan 65^\circ = \tan 25^\circ + 2\tan 40^\circ$
- g. Obtain the equation of straight line passing through the point of intersection of $2x+3y+1=0$; $3x-4y=5$ and the point (2,3)
- h. Find the perpendicular distance of the origin from the line joining (1,3) and (-3,7)

i Resolve into partial fraction $\frac{2x+3}{(x-2)(x+3)}$

SECTION – C

Attempt Any Three Questions.

10x3=30

Q3. Prove $\frac{\sin 11A \sin A + \sin 7A \sin 3A}{\cos 11A \sin A + \cos 7A \sin 3A} = \tan 8A$

Q4. Find the equation of circle passing through points (0,0); (a,0), and (0,b)

Q5. Find the equation of a circle where centre is the point (4, 5) and which passes through the centre of the circle $x^2 + y^2 + 4x - 6y = 12$

Q6. From the top of cliff 120 meter high the angle of depression of top and bottom of a tower are observed to be 30° and 60° . Find the height of tower.

Q7. Resolve into Partial Fraction $\frac{1}{x^3+1}$

Q8. Reduce the equation $\sqrt{3}x + y + 6 = 0$ to the form of $x \cos \alpha + y \sin \alpha = p$ Also finds the value of p and α .