

APPLIED MATHEMATICS – I

1st Exam /Common/2455/0251/5402/MAY '17

Duration : 3 Hrs

M. Marks : 75

SECTION A

Q. 1) Choose the correct answer

(5 × 1 = 5)

- (i) 5th term of series 3, 8, 13, 18 _____
a) 21 b) 22 c) 23 d) 24
- (ii) The total number of terms in $(x + a)^8$
a) 7 b) 8 c) 9 d) 10
- (iii) value of $\cos 90^\circ$
a) 0 b) 1 c) -1 d) none of these
- (iv) modulus of $1 + i\sqrt{3}$ is equal to
a) 2 b) 1 c) 10 d) -2
- (v) The radius of the circle $x^2 + y^2 - 4x + 6y - 25 = 0$
a) $\sqrt{37}$ b) $\sqrt{38}$ c) 38 d) 37

Q. 2) State true or false

(5 × 1 = 5)

- (i) The midpoint of A(-3,2) and B(5,4) is (1, -3)
- (ii) angle 1325° lies in Ist quadrant
- (iii) $\sec(90^\circ - \theta) = \operatorname{cosec} \theta$
- (iv) Two lines are parallel if their slopes are equal
- (v) a, b, c are in A.P. if $b = \frac{a+c}{2}$

Q. 3) Fill in the blanks

(5 × 1 = 5)

- (i) The value $\sin 45^\circ \cos 30^\circ - \cos 45^\circ \sin 30^\circ$ is _____
- (ii) The area of triangle whose vertices are (4,4), (3,-16) and (3,-2) is _____
- (iii) If the end points of the diameter of circle are (2,3) and (6,5) then the centre of circle is _____
- (iv) value of $\cos \frac{\pi}{2} + i \sin \frac{\pi}{2} =$ _____
- (v) value of $\frac{8!}{6!}$ is _____

SECTION B

Q. 4) Attempt any 6 Questions

(6 × 5 = 30)

- (i) Which term of the series $3 + 7 + 11 + 15 + \dots$ is 47?
- (ii) Sum the series $3 + 33 + 333 + \dots$ to n terms.
- (iii) Find the 4th term in the expansion of $\left(\frac{x}{a} + \frac{a}{x}\right)^{10}$
- (iv) if $\sin(A + B) = 1$, $\cos(A - B) = \frac{\sqrt{3}}{2}$ then find A and B
- (v) Prove that $\frac{\cos 17^\circ + \sin 17^\circ}{\cos 17^\circ - \sin 17^\circ} = \tan 62^\circ$
- (vi) Find the co-ordinates of a point which divides the line joining the points (1,3) and (6,-3) Internally in the ratio 2 : 1
- (vii) Find the equation of the straight line passing through (2,5) and perpendicular to $5x + 2y + 8 = 0$
- (viii) Find the \perp distance of the point (3,4) from the line $12x - 5y + 7 = 0$
- (ix) Show $3\log \frac{3}{4} + 2\log \frac{4}{5} - 2\log \frac{3}{10} = \log 3$

SECTION C

Q. 5) Attempt any 3 Questions

(3 × 10 = 30)

- (i) Resolve $\frac{x^2}{(x-1)(x-2)(x-3)}$ into partial fraction
- (ii) if x be so small that its square and higher powers are neglected show that
- $$\frac{(1+x)^{1/2} + (1-x)^{2/3}}{(1+x)^{2/3} + (1-x)^{1/2}} = 1 - \frac{1}{6}x$$
- (iii) (a) Find the equation of the circle whose centre is the point (2, 3) and which passes Through the point (5, 7)
- (b) Find the equation of the circle passing through the points (0, 0) , (1, 0) , (0,1)
- (iv) (a) Prove that $\frac{\sqrt{3} \cos 23^\circ - \sin 23^\circ}{2} = \cos 53^\circ$
- (b) Prove that $\sin 150^\circ \cos 120^\circ + \cos 330^\circ \sin 660^\circ = -1$
- (v) (a) if the three vertices of a rectangle are the points (2, -2) , (8,4) , (5,7) find the Co-ordinate of the fourth vertex.
- (b) Find the equation of line joining two points (1, 2) and (2, 3)