

ACMT Education College
SESSIONAL EXAMINATION -2016
DIPLOMA 1ST YEAR
APPLIED MATHEMATICS-I(DEN 101)

TIME: 2 HRS

M.M.: 50

Attempt any five questions. Each question carries 10 marks.

Q.1:- Solve the following equation:

(i) $3x^2 + 15x - 2 = 2\sqrt{x^2 + 5x + 1}$ (ii) $x + 2y = 1$, $x^2 + y^2 = 10$

Q.2:- (i) The Fibonacci sequence is defined by $a_1 = 1 = a_2$, $a_n = a_{n-1} + a_{n-2}$ ($n > 2$) .

Find $a_{n+1} \div a_n$, for $n = 1, 2, 3, 4, 5$,

(ii) which term of the A.P. $8 - 6i$, $7 - 4i$, $6 - 2i$, is:-

(a) purely real (b) purely imaginary?

Q.3:-(i) If S_n denotes the sum of n terms of an A.P. whose common difference is d , show that

$$d = S_n - 2S_{n-1} + S_{n-2}, n > 2$$

(ii) Find the sum of first 50 natural numbers .

Q.4:- (i) Find the A.M. between 5 and 9.

(ii) m A.M.s have been inserted between 1 and 31 in such a way that the ratio of the 7th and the $(m-1)$ th means is 5:9 . find the value of m .

Q.5:-(i) If the m th term of an A.P. be $1/n$ and the n th term be $1/m$, then show that (mn) th term is 1.

(ii) If $S_1, S_2, S_3, \dots, S_m$ be the sums of the first n terms of m A.P.s whose first terms are $1, 2, 3, \dots, m$ respectively and common differences $1, 3, 5, \dots, 2m-1$ respectively.

Show that ,

$$S_1 + S_2 + S_3 + \dots + S_m = mn(mn+1) \div 2$$

Q.6:-(i) find the value of k if $-2/7, x, -7/2$ are in G.P.

(ii) The sum of two numbers is 6 times their geometric mean .show that the numbers are in the ratio $3+2\sqrt{2} : 3-2\sqrt{2}$.

Q.7:-(i) Find the value(s) of p if S_n for the G.P. $,P,1/P,.....$ is $25/4$.

(ii) If A and G be the A.M. and G.M. between positive numbers a and b respectively ,then show that a and b are the roots of the equation $x^2 -2Ax + G^2 = 0$.

Q.8:- (i) Resolve the following fraction into partial fractions:

$$(5x^2+18x+17)/(1-x)^2(2x+3)$$

(ii) Find n if :

(a) $(n+1)! = 12.(n-1)!$ (b) $(n+2)! = 20. n!$

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