



# MAHARISHI UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

MAHARISHI ROAD, MANGLA, BILASPUR (CHHATTISGHAR)-495001

FINAL EXAM : SEMESTER-III, SESSION 2020-21

COURSE – BCA, PAPER – IV, SUBJECT CODE – BCA119

SUBJECT – BASIC MATHEMATICS (BRIDGE COURSE)

Max Marks- 70

Min Pass Marks : 28

- All questions are compulsory.
- Be precise in your answers.

**Que 1. Choose correct answer from the following:**

**(01 x 10 = 10)**

(i) Which of the following is not irrational?  
(a)  $(2 - \sqrt{3})^2$       (b)  $(\sqrt{2} + \sqrt{3})^2$   
(c)  $(\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3})$       (d)  $27\sqrt{7}$

(ii) If one zero of the quadratic polynomial  $x^2 + 3x + k$  is 2, then the value of k is  
(a) 10      (b) -10      (c) 5      (d) -5

(iii) The pairs of equations  $x+2y-5 = 0$  and  $-4x-8y+20=0$  have:  
(a) Unique solution      (b) Exactly two solutions  
(c) Infinitely many solutions      (d) No solution

(iv) The equation  $(x - 2)^2 + 1 = 2x - 3$  is a  
(a) linear equation      (b) quadratic equation  
(c) cubic equation      (d) bi-quadratic equation

(v) The  $n^{\text{th}}$  term of an A.P. is given by  $a_n = 3 + 4n$ . The common difference is  
(a) 7      (b) 3      (c) 4      (d) 1

(vi) Area of an equilateral triangle with side length a is equal to:  
(a)  $\sqrt{3}/2a$       (b)  $\sqrt{3}/2a^2$       (c)  $\sqrt{3}/4 a^2$       (d)  $\sqrt{3}/4 a$

(vii) The sum of all the angles of a quadrilateral is equal to:  
(a)  $180^\circ$       (b)  $270^\circ$       (c)  $360^\circ$       (d)  $90^\circ$

(viii)  $(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ)$  is equal to:  
(a) 0      (b)  $1+2\sqrt{3}$       (c)  $1-\sqrt{3}$       (d)  $1+\sqrt{3}$

(ix) If A, B and C are any three sets, then  $A \times (B \cup C)$  is equal to  
(a)  $(A \times B) \cup (A \times C)$       (b)  $(A \cup B) \times (A \cup C)$   
(c)  $(A \times B) \cap (A \times C)$       (d) None of these

(x) The number of combination of n distinct objects taken r at a time be x is given by  
(a)  ${}^{n/2}C_r$       (b)  ${}^{n/2}C_{r/2}$       (c)  ${}^nC_{r/2}$       (d)  ${}^nC_r$

**Q2. Solve any four questions of the following:-**

**(2.5 x 4 = 10)**

(a) Simplify  $13^{1/7} \cdot 17^{1/7}$

(b) If the sum of zeroes of the quadratic polynomial  $3x^2 - kx + 6$  is 3, then find the value of k.

(c) Find whether the following pair of linear equations is consistent or inconsistent:  
 $3x + 2y = 8$ ,  $6x - 4y = 9$

(d) Find the value of m so that the quadratic equation  $mx(x - 7) + 49 = 0$  has two equal roots.

(e) Which term of the progression 4, 9, 14, 19, ... is 109 ?

**Q3. Solve following questions (any four) :-****(2.5 x 4 = 10)**

(a) A man goes 24 m towards West and then 10 m towards North. How far is he from the starting point?

(b) Three angles of a quadrilateral are equal and the fourth angle is equal to  $144^\circ$ . Find each of the equal angles of the quadrilateral.

(c) If  $(1 + \cos A)(1 - \cos A) = 3/4$ , find the value of  $\sec A$ .

(d) Write the subsets of  $\{1, 2, 3\}$ .

(e) Find  $\lim_{x \rightarrow 4} f(x)$ :  $f(x) = ax^2 + bx + c$

**Q4. Solve the following questions (any four) :-****(4 x 10 = 40)**

(a) (i) Find the derivative of the given function:  
 $f(x) = 6x^3 - 9x + 4$   
(ii) Evaluate the given integral:  
 $\int 4x^6 - 2x^3 + 7x - 4 dx$

(b) (i) Expand the expression  $(2x-3)^6$  using the binomial theorem.  
(ii) Evaluate  $(101)^4$  using the binomial theorem.

(c) (i) In how many ways can 5 children be arranged in a line such that two particular children of them are always together and two particular children of them are never together.  
(ii) In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there?

(d) (i) Express the function  $f: A \rightarrow R$ .  $f(x) = x^2 - 1$ . where  $A = \{-4, 0, 1, 4\}$  as a set of ordered pairs.  
(ii) A, B and C are subsets of Universal Set If  $A = \{2, 4, 6, 8, 12, 20\}$ ,  $B = \{3, 6, 9, 12, 15\}$ ,  $C = \{5, 10, 15, 20\}$  and U is the set of all whole numbers, draw a Venn diagram showing the relation of U, A, B and C.

(e) (i) In triangle PQR, right-angled at Q,  $PR + QR = 25$  cm and  $PQ = 5$  cm. Determine the values of  $\sin P$ ,  $\cos P$  and  $\tan P$ .  
(ii) Evaluate  $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ .

(f) (i) The 7<sup>th</sup> term of an A.P. is 20 and its 13<sup>th</sup> term is 32. Find the A.P.  
(ii)  $\triangle ABC \sim \triangle DEF$ . If  $AB = 4$  cm,  $BC = 3.5$  cm,  $CA = 2.5$  cm and  $DF = 7.5$  cm, find the perimeter of  $\triangle DEF$ .

(g) (i) In a two digit number, the digit in the unit place is twice of the digit in the tenth place. If the digits are reversed, the new number is 27 more than the given number. Find the number.  
(ii) Three consecutive natural numbers are such that the square of the middle number exceeds the difference of the squares of the other two by 60. Find the numbers.

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