MASTER’S P.U COLLEGE, HASSAN, 573201.

KCET ONLINE TEST-20, MAY-2020  **MATHEMATICS** **TIME: 45Mins MARKS: 30**

**TOPIC**: **MATRICES, DETERMINANTES.**

**KEY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **B** | **D** | **C** | **B** | **B** | **A** | **D** | **B** | **A** | **D** | **A** | **D** | **A** | **C** | **A** |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **C** | **D** | **C** | **D** | **B** | **B** | **D** | **C** | **C** | **D** | **C** | **A** | **B** | **A** | **A** |

**HINTS AND SOLUTIONS**

1. (b) ; 
2. (d)  = , by 

=by =

, by =  (by expansion along )

Therefore,or 

But  are non-zero and hence the product  cannot be zero. So the only alternative is that .

1. (c) 

=  = 

= ⇒ .

1. (b)  Applying = 

Applying  and 



On expansion we get,

⇒ 

⇒   

 .

1. (b) 



.

1. (a) Equation given, ,  or 

or ,  or 

or  ∴  or .

1. (d) Given, One root = 5 and equation .

Expanding the given equation, we get

 ⇒  ⇒ 

Since 5 is the one root of given equation, therefore 

⇒  ⇒ 

⇒  or  and –7.

1. (b) We can write the given determinant as a product of two determinants as follows (on simplification), which is independent of *a*, *b*, *c* and *d*.
2. (a) Applying , we get

,

, if *n* is not multiple of 3).

1. (d) Given, 

Expanding the given determinant, we get  or 

This equation may be written as 

Therefore,  is one of the cube roots of – 1.

1. (a) 

=  

= {Since .

1. (d) Let *A* be the first term and *R* be the common ratio of the G.P. then,

 …..(i)

 …..(ii)

 …..(iii)

Multiplying (i), (ii) and (iii) by

and respectively and adding we get, 

.

1. a) 

= 

,

which is clearly negative because of the given conditions.

1. (c) The system of homogeneous equations







has a non-trivial solution (since are not all zero)

If 

*i.e.,* if 

*i.e.,*  if .

1. (a) If *A* is square matrix of order 3, then

.

1. (c) As the system of equations has a non-trivial solution

   by 

   

   .

1. (d) We know  ∴ 

∴  Now question gives 

∴  or .

1. (c) Since  = .
2. (d) ⇒ **** , then, .
3. (b) 

  

= .

1. (b) .
2. (d) 





⇒ .

1. (c)      (Solving simultaneously)

Therefore from (i), .

1. (c) Since 

And ,.... ⇒  .

1. (d) Let , 





.

1. (c)  .
2. (a) We have

 =   .

1. (b) Given, 

∴ 

∴ 

Now = 

=  

Thus, 

1. (a) Since for given  . Thus *A* is orthogonal.
2. (a) As we know, a square matrix  is called an upper triangular matrix if  for all .

Such as, 

Number of zeros = .