MASTER’S P.U COLLEGE, HASSAN, 573201.

KCET ONLINE TEST-27, MAY-2020  **MATHEMATICS**  **TIME: 45Mins MARKS: 30**

**TOPIC**: **L.P.P, M.R, M.I, LINEAR IMQUALITY. DATE: 23/05/2020**

**KEY**

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

**HINTS AND SOLUTIONS**

1. (c) Mathematics is interesting is not a logical sentence. It may be interesting for some persons are may not be interesting for others.

∴ This is not a propositions.

1. (b) .

(By using associative laws and commutatine laws)

∴  is a contradiction.

1. (d) .
2. (b) *p* : A number is a prime.

*Q* : It is odd.

We have *p* ⇒ *q*

The inverse of *p* ⇒ *q* is 

*i.e.*, If a number is not a prime then it is not odd.

1. (b) *p* : It rains, *q* : I shall go to school

Thus, we have 

Its negation is  *i.e.* 

*i.e.* It rains and I shall not go to school.

1. (b) Let *p* : Paris is in France, *q* : London is in England

∴ we have 

Its negation is 

*i.e.* Paris is not in France or London is not in England.

1. (c) Let *p* : 2+ 3 = 5, *q* : 8 < 10

Given proposition is : 

Its negation is 

∴ we have 2+ 3 ≠ 5 or 8 ≮ 10.

1. (d) It is obvious.
2. (b) It is a fundamental concept.
3. (d) Given, Graph has been shown by given constraints and maximum value of *P* can be on *A* or *B* or *C* or *D*.

2*x+y*=7

*x+*2*y*=8

*A*

*C*

*B*

2*x+*2*y*=9

## *D*

*O*

*X*

*Y*









Obviously, at (1,3.5), 

1. (c)  (As minimum expenditure is concerned).
2. (b) The two vertices of given feasible region are (0, 5) and (7, 0) and third vertex can be found by solving the equations and , we get (6, 2) Now at (0, 5), at (7, 0)

 and at (6, 2),



Hence maximum value of objective function is 18 at point (6, 2).

1. (b) Obviously, *Max*. It is at (5, 15).

(5,15)

(0,20)

*x –* 3*y* = 12

*x +* 2*y* = 35

*x + y* = 20

(0,–4)

(12,0)

(20,0)

*Y*

*X*

*O*

*X*

*Y*

## O

## C

*y*=1

*x*+*y*=8

(0, 2)

(7, 1)

(3/2, 1)

(0, 8)

1. (b)

Obviously, at  and (0, 2), *Min*.

1. (b) By hypothesis, 

Since *n* is even, hence greatest coefficient

.

1. (b) Accordingly, 

⇒ 

1. (a) 

Putting 



It is divisible by 16.

1. (d) 17 = 2 (mod 5)

 = 2 (mod 5)

⇒ (mod 5) ⇒  (mod 5)

Hence required remainder = 4.

1. (a) Check through options, the condition  is valid for .
2. (d) Nothing can be said. It is depend upon condition.
3. (b) 

⇒ 



From above it is clear that  is divisible by .

**Trick :** . Put  and ; Then  is not divisible by 6, 54 but divisible by 9. Which is given by option (b) i.*e*., .

1. c) (mod 5);(mod5)

*i.e.*  (mod 5) (mod 5)

 (mod 5),  Least positive remainder is 2.

1. (d) It can be proved with the help of mathematical induction that .

<   >100 and .

1. (c) 

Taking ; 

= 100 + 768 + 5 = 873

Therefore this is divisible by 9.

1. (b) To test the origin for  and in reference to shaded area, is true for . So for the region does not include origin (0, 0), . Again for , 

Similarly for ; ∴ .

1. (a) Following figure will be obtained on drawing the graphs of given inequations.

*O*

(1,0)

(0,–3)

(0,–4)

*Y*

*X*

From 

From 

Clearly the common region of both is true for positive value of (*x*, *y*). It is also true for positive value of *x* and negative value of *y*.

1. (b) Origin is not present in given shaded area, so satisfy this condition.
2. (d)

|  |  |  |
| --- | --- | --- |
| **Type of items** | **Working time on machine** | **Man labour** |
| Shirt (*x*)  Pent (*y*) | 2 hours  3 hours | 3 hours  2 hours |
| Availability | 70 hours | 75 hours |

Linear constraints are .

1. (d) The graph of linear programming problem is as given below



*x*1*+x*2*=*6

*x*1*+*3*x*2*=*9

*–x*1*+*2*x*2*=*4

*B*(4.5, 1.5)

*A*

(1.2,2.6)

*X*2

*X*1

(0,3)

(–4,0)

(6,0)

(9,0)

(0,6)

*C*

*O*

Hence the required feasible region is given by the graph whose vertices areand .

Thus objective function is minimum at 

So and .

1. (c) or

and .