**INDIA INTERNATION SCHOOL MANGAF, KUWAIT**

**HOLIDAY HOMEWORK 2018 – 19**

**CLASS 12**

1. Let S be the set of all students studying in Delhi University. A relation in S is given by R=. Check whether R is an equivalence relation. Discuss how co-education is helpful in developing gender sensitivity and reducing gender bias.
2. Let S=. A relation R on S is defined by R= (i) check whether R is an equivalence relation. (ii) Discuss the moral values which are are groomed in an individual by being a member of joint family.
3. Let A be the set of all 40 students of class XII in a school, who speak truth. Let f: A🡪N (set of natural numbers) be a function defined by term=roll numbers of students ‘x’ in this class.

(i)Show that f is not a bijective functions.

(ii) Explain the importance of speaking truth in our life.

1. Check whether the relation ***R*** in **|R** defined by ***R*** = is reflexive, symmetric or transitive.
2. Show that *f* :***R*** -  ***R*** - given by *f*(x) = is invertible and it is inverse of itself.
3. Let ***S*** = . Then prove that an operation on ***S*** defined by (a1+b2) = (a1 +a2)+ (b1 + b2) for all a1, a2, b1 and b2 ***Z*** is a binary operation on ***S***
4. The path of racing car is defined by

20-x, 0

1, x=20

F(x)= 15-x, 20

If x is distance covered (km)in time f(x) minutes then find the accident prone portion of the path. Should the driver pass through that portion?

1. If ***A*** = , then prove that ***An*** =, where n is any positive integer.
2. Using elementary transformations, find the inverse of the matrix:
3. If ***A-1*** = and ***B*** = , find .
4. Evaluate the determinant
5. Prove that =
6. Show that = 2abc
7. An aero plane is ascending vertically at the rate of 100 km/h. if the radius of earth is r km, how fast is the area of the earth, visible from the plane increasing at 3 minutes after it started ascending? Given that the visible area A at height h is given by (A=).
8. Find the intervals in which the function f(x) =+, x0 is strictly increasing or decreasing.
9. Determine for which value of x, the function f(x) = is increasing or decreasing. Also find the points on the graph of function at which the tangent is parallel to x-axis.
10. Show that f(x) =sinx-2cosx-2 is increasing in (0,).
11. Using differentials, find approximate values of.
12. The radius of a sphere is 3cm. If an error of 0.03 cm is made in measuring the radius of the sphere, find the error and the percentage error in measuring its surface area.
13. Find the approximate value of tan-1(0.999).
14. Show that the maximum value of x+ is less than its minimum value.
15. Show that sinx (1+cosx) has a maximum value at x= in the interval [0,].
16. A jet of an enemy is flying along the curve y=x2+2. The soldier is placed at the point (3, 2). Find the shortest distance between the soldier and the jet.
17. Show that the triangle of maximum area that can be inscribed in a given circle is an equilateral triangle.
18. A given quantity of metal is to be cast into a half cylinder with a rectangle base and semi-circular ends. Show that in order that the total surface area is minimum, the ratio of the length of cylinder to the diameter of its semi-circular ends is.
19. Show that the triangle of maximum area that can be inscribed in a given circle is an equilateral triangle.
20. A given quantity of metal is to be cast into a half cylinder with a rectangle base and semi-circular ends. Show that in order that the total surface area is minimum, the ratio of the length of cylinder to the diameter of its semi-circular ends is.
21. Discuss the applicability of ***R***olle’s theorem for the following functions: (i) *f*(x) = (ii) *f*(x) = on

(iii) *f*(x) = tanx, (iv) *f*(x) = 3 + in