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| **CLASS REVISION TEST-1****MATHS** |
| **EX.NO**  |  | **AD.NO** |  | **GRADE**  | **XII-EINSTEIN** |
| **DATE**  | **20/11/19** | **MARKS** | **80** | **TIME** | **3 Hrs** |

**SECTION - A**

**I. Choose the correct answer/Fill in the blanks:- 20x1=20**

1. Let us define a relation R in R as a R b if a $\geq $ b. Then R is

 a. an equivalence relation

 b. reflexive, transitive but not symmetric

 c. symmetric, transitive but not reflexive

 d. neither transitive nor reflexive but symmetric

2. If 3 tan-1*x* + cot-1 *x* = $π$, then *x* equals

 a. 0 b. 1 c. -1 d. 1/2

3. The domain of the function cos-1 (2*x* – 1) is

 a. $\left[0, 1\right]$ b. $\left[-1, 1\right]$ c. (-1, 1) d. $\left[0, π\right]$

4. If *f*(*x*) = *x*2 sin $\frac{1}{x}$, where *x* $\ne $ 0, then the value of the function *f* at *x* = 0, so that the function is continuous at *x* = 0, is

 a. 0 b. -1 c. 1 d. none of these

5. *f* : N N : *f*(*x*) = 2*x* is ……………………….

6. If *f*(*x*) = 2*x* and g(*x*) = $\frac{x^{2}}{2}$ + 1, then which of the following can be a discontinuous function

 a. *f*(*x*) + g(*x*) b. *f*(*x*) - g(*x*) c. *f*(*x*) . g(*x*) d. $\frac{g(x)}{f(x)}$

7. tan-1$\sqrt{3}$- sec-1 (-2) is equal to ………………….

8. A one-one onto function is called an ……………. function.

9. Let A = $\left\{1, 2, 3\right\}$, then the relation R = $\left\{\left(1, 1\right), \left(2, 2\right), \left(3, 1\right)\right\}$ on A is

 a. reflexive b. symmetric c. transitive d. None of these

10. If sin-1 *x* = *y*, then

 a. 0 $ \leq $*y* $\leq $ $π$ b. - $\frac{π}{2}$ $\leq $ *y* $\leq $ $\frac{π}{2}$ c. 0 < *y* < $π$ d. - $\frac{π}{2}$ < *y* < $\frac{π}{2}$

11. A function *f* : X to Y is known as ……… if *f* is both one-one and onto.

12. What is the principal value of tan-1$\left(\tan(\frac{2π}{3})\right)$?

13. Let *f* : Q Q : *f*(*x*) = 2*x* + 3, then value of *f*-1 (*y*) is ………..

14. The principal value of sin-1 $\left(\sin(\frac{2π}{3})\right)$is ……………..

15. If *f*(*x*) = $\left[4-(x-7)^{3}\right]$, then *f*-1 (*x*) = …………….

16. Find the composite mapping fog of the maps *f* : R R, *f* (*x*) = sin *x*, g : R R, g(*x*) = *x*2.

17. Write the principal value of $\left[tan^{-1}\left(-\sqrt{3}\right)+ tan^{-1} (1)\right]$.

18. Range of function *y* = sin-1 *x* is ………………….

19. Prove that the function f : R R, given by *f*(*x*) = 2*x*, is one-one and onto.

20. R = A x A $⊆$ (A x A) is the …………… relation on A.

**SECTION - B**

**II. Answer the following questions:- 6x2=12**

 21. If sin-1 *x* + sin-1 *y* + sin-1 *z* = $\frac{3π}{2}$, then find the value of *x*100 + *y*100 + *z*100 - $\frac{9}{x^{101} + y^{101} + z^{101}}$ .

22. If tan-1 $\left(\frac{a}{x}\right)$ + tan-1 $\left(\frac{b}{x}\right)$ = $\frac{π}{2}$, find the value of *x*.

23. Simplify cot-1 $\frac{1}{\sqrt{x^{2}-1}}$ for *x* < -1.

24. A function *f* is defined by

 

 Show that *f* is continuous at *x* = 0.

25. If *f*(*x*) = *x* + 7 and g (*x*) = *x* – 7, find *fog* (7).

26. If 3 tan -1 *x* + cot-1 *x* = $π$, then find the value of *x*.

 **SECTION - C**

**III. Answer the following questions briefly:- 6x4=24**

27. In each of the following cases, state whether the function is one-one, onto or bijective. Justify your answer.

 i. *f* : R R defined by *f* (*x*) = 3 – 4*x*

 ii. *f* : R R defined by *f* (*x*) = 1 + *x*2

28. If (tan-1 *x*)2 + (cot-1 *x*)2 = $\frac{5π^{2}}{8}$ then find the value of *x*.

29. Show that *f* : $\left[-1, 1\right]$ R, given by *f* (*x*) = $\frac{x}{(x+2)}$ is one-one.

 Find the inverse of the function *f* : $\left[-1, 1\right]$ Range of *f*.

30. Prove that tan-1 *x* + cot-1 (*x* + 1) = tan-1 (*x*2 + *x* + 1).

31. If tan-1 $\left[\frac{1}{1+1.2}\right]$ + tan-1 $\left[\frac{1}{1+2.3}\right]$ + … + tan-1 $\left[\frac{1}{1+n(n+1)}\right]$ = tan-1 $θ$, then find the value of $θ$.

32. If *y* = cot-1 $\left(\sqrt{\cos(x)}\right)$ - tan-1 $\left(\sqrt{\cos(x)}\right)$, then prove that sin *y* = tan2 $\frac{x}{2}$ .

 **SECTION - D**

**IV. Answer the following questions briefly:- 4x6=24**

33. Let A = R - $\left\{3\right\}$ and B = R - $\left\{1\right\}$. Consider the function

 *f* : A B defined by *f* (*x*) = $\left(\frac{x-2}{x-3}\right)$. Is f one-one and onto? Justify your answer.

34. If cos-1 $\frac{x}{a}$ + cos-1 $\frac{y}{b}$ = $∝$ then prove that $\frac{x^{2}}{a^{2}}$ + $\frac{y^{2}}{b^{2}}$ - $\frac{2xy}{ab}$ cos$∝$ = sin2 $∝$.

35. Let *f* : $\left[0, \infty \right]$ R be a function defined by *f* (*x*) = 9*x*2 + 6*x* – 5. Prove that *f* is not invertible. Modify, only the codomain of *f* to make *f* invertible and then find its inverse.

36. Let N be the set of all natural numbers and let R be a relation in N x N defined by

 (a, b) R (c, d) $⇒$ ad = bc

 For all (a, b), (c, d) $\in $ N x N, show that R is an equivalence relation on N x N.