**Department of Mathematics**

M.Sc. (I Year/I Sem )Question Bank

**Paper – iv** (104), Subject: **Elementary Number Theory**

**Unit – I**

1. Which of the following is true [ ]

a) n|n

b) d|n & n|m then d|m

c) d|n then ad|an

d) d|n and d|m then d|an+bm

e) All of these

2. a, b are integers by division algorithm we can say a=bq+r, q, r z and

which of the following is true [ ]

a)

b) r < b

c) r < 0

d)

e) None of these

3. a, b are two integers not both of them zero and ‘d’ is a positive integer such that d/a & d/b and c is any integer with c/a and c/b then we say ‘d’ is Greatest common divisor of a & b if \_\_\_\_\_\_\_ [ ]

a) d < c b) c < d

c) c d d) d < c and c < d



e) None of these

4. Given integers ‘a’ and b, there is one and only one number ‘d’ with the following propertie(s) [ ]

a)

b) d|a and d|b

c) e|a and e|b e|d



d) , d|a and d|b & e|a and e|b e|d



e) None of these

5. If a prime p does not divide a, then (p,a) = \_\_\_\_\_ [ ]

a) 0 b) 1

c) 0 or 1 d) -1

e) All of these

6. If a|bc and if (a,b) = 1, then which of the following is true [ ]

a) c|a b) c|b

c) a|c d) a c



e) None of these

7. If (a,b) = 1, then (a+b, a-b) = [ ]

a) 1 b) 2

c) either 1 or 2 d) 3

e) All of these

8. If (a,b) = 1 then (a+b, a2-ab+b2) = [ ]

a) 1 b) 2

c) 3 d) either 1 or 3

e) None of these

9. If (a,b) = 1 and if c|a and d|b, then (c,d) = [ ]

a) 1 b) 2

c) either 1 or 2 d) 3

e) None of these

10. If an|2bn and n > 1 then which of following is true [ ]

a) b|a b) a|b

c) a b d) a=b



e) None of these

11. If a|c and b|c and (a,b)=1 then which of the following is true [ ]

a) ab c b) ab|c



c) c|ab d) ac|b

e) All of these

12. If (a,b)=1 then (2a+b, a-b) = [ ]

a) 1 b) 3

c) either 1 or 3 d) either 1 or 2

e) All of these

13. Find (6,20)= \_\_\_\_\_ [ ]

a) 1 b) 2

c) 3 d) 4

e) None of these

14. Find (221, 422) [ ]

a) 1 b) 2

c) 3 d) None of these

15. Let a,b any two positive integers then (a,b) [a,b]= \_\_\_\_\_ [ ]

a) (a,b) b) [a,b]

c) a.b d) a.b



e) None of these

16. a,b are any two positive integers then (a,b) = 1 iff [ ]

a) (a,b) = a.b

b) [a.b] = (a,b)

c) [a,b] a.b



d) [a.b] = a.b

e) All of these

17. If p is a prime and P|ab then which of the following is true [ ]

a) P|a b) P|b

c) P|a or P|b d) P a and P b



e) None of these

18. Every integer n > 1 is either prime number or product of \_\_\_\_ [ ]

a) composit numbers

b) odd numbers

c) even numbers

d) Prime numbers

e) All of these

19. Find g.c.d. of 826, 1890 [ ]

a) 2 b) 4

c) 6 d) 14

e) None of these

20. The infinite series is [ ]

a) Convergent

b) Divergent

c) Continuous

d) Uniformly convergent

e) All of these

21. How many Prime numbers are less than 50 [ ]

a) 13 b) 14

c) 15 d) 16

e) None of these

22. Given integers a,b not both of them zero then x, y Z such that (a,b)= \_ [ ]



a) ab + by b) ax+by

c) xy + b d) ab+ax

e) None of these

23. Which of the following is not true [ ]

a) 2 | 6 b) 3 | 6

c) 11 | 99 d) 13 | 91

e) None of these

24. Let a,b be any two positive integers then (a,b) = \_\_\_\_ [ ]

a) b)

c) (a.b) [a,b] d)

e) None of these

25. Find (117, 2171) [ ]

a) 13 b) 14

c) 15 d) 16

e) None of these

26. (ac, bc) = [ ]

a) c (a,b) b)

c) (a, bc) d) (ac,b)

e) None of these

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**UNIT – II**

**Paper – iv** (104), Subject: **Elementary Number Theory**

1. Mobius function is denoted by [ ]

a) b)

c) I (n) d)

e) All of these

2. = \_\_\_\_\_\_ [ ] a) 0 b) 1

c) -1 d) 2

e) All of these

3. =\_\_\_\_ [ ] a) 0 b) 1

c) -1 d) 3

e) None of these

4. If n 1, [ ]



a) 1 if n=1 b) 0 if n > 1

c) 0 if n < 1 d) 1 if n=1 & 0 if n > 1

e) All of these

5. The Euler totient function is denoted by [ ]

a) b)

c) I (n) d)

e) All of these

6. [ ]

a) 1 b) 2

c) 4 d) 6

e) None of these

7. [ ]

a) 9 b) 8

c) 4 d) 5

e) None of these

8. If [ ]

a) b)

c) d) n

e) None of these

9. For [ ]

a) b)

c) d) n

e) None of these

10. The Mangoldt function is denoted by [ ]

a) b)

c) d) I (n)

e) None of these

11. =\_\_\_\_\_\_ [ ]

a) Log 2 b) Log 6

c) 0 d) Log 5

e) None of these

12. =\_\_\_\_\_ [ ]

a) Log 2 b) Log 3

c) log 1 d) 0

e) none of these

13. If [ ]

a) Log d b) Log n

c) n d) n|d

e) All of these

14. Which of the following property of Euler totient function [ ]

a) , P is Prime

b) where d=(m,n)

c) where (m,n) =1

d) a|b ⇒

e) All of these

15. f,g are two arthematical functions then g(n)= [ ]

a) f(n) =

b) f(n)

c) f(n) = g(d)

d) f(n) =

e) None of these

16. If n is prime then [ ]

a) n + 1 b) n

c) n – 1 d) n – 2

e) None of these

17. (f \* g) (n) = \_\_\_\_\_ [ ]

a) b)

c) d)

e) None of these

18. The inverse of Euler totient function = [ ]

a) b)

c) d)

e) None of these

19. Liouvilles function is denoted by \_\_\_\_\_\_ [ ]

a) b)

c) d)

e) None of these

20. = [ ]

a) -1 b) 0

c) 1 d) 3

e) None of these

21. =\_\_\_\_\_\_ [ ]

a) 1 if n is perfect square

b) 0 if =

c) 1 if n is not perfect square

d) 1 if n is perfect square and 0 if

e) None of these

22. Which of the following statement is not true [ ]

a) Every complete multiplication function is multiplicative

b) Every multiplicative need not be complete multiplicative function

c) Every Mobius function is multiplicative

d) Every Euler totient function is multiplicative

e) None of these

23. Let ‘f’ be a multiplicative then ‘f’ completely multiplicative iff [ ]

a)

b)

c)

d)

e) None of these

24. Find [ ]

a) Log 2 b) Log 3

c) Log 4 d) Log 1

e) None of these

25. The range of Identity function is \_\_\_\_ [ ] a) { 1, -1 } b) {0, 1}

c) {-1, 0} d) {-1,0,1}

e) None of these

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**UNIT – I**

**Elementary Number Theory Answer Key**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | e | All of these |  | 14 | a | 1 |
| 2 | d |  | 15 | c | a.b |
| 3 | b | (c < d) | 16 | d | [a.b] = a.b |
| 4 | d | (, d|a and d|b, e|a and e|b e|d) | 17 | c | P|a or P|b |
| 5 | b | (1) | 18 | d | Prime numbers |
| 6 | c | a|c | 19 | d | 14 |
| 7 | c | either 1 or 2 | 20 | b | Divergent |
| 8 | d | either 1 or 3 | 21 | c | 15 |
| 9 | a | 1 | 22 | b | ax+by |
| 10 | b | a|b | 23 | e | None of these |
| 11 | b | ab|c | 24 | d |  |
| 12 | c | either 1 or 3 | 25 | a | 13 |
| 13 | b | 2 | 26 | b |  |

**UNIT – II**

**Answer Key**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | b |  |  | 14 | e | All of these |
| 2 | c | -1 | 15 | a | f(n) = |
| 3 | a | 0 | 16 | c | n – 1 |
| 4 | d | 1 if n=1, 0 if n > 1 | 17 | a |  |
| 5 | a |  | 18 | c |  |
| 6 | b | 2 | 19 | a |  |
| 7 | c | 4 | 20 | c | 1 |
| 8 | b |  | 21 | d | 1 if n is perfect square and 0 if = |
| 9 | a |  | 22 | e | None of these |
| 10 | c |  | 23 | c |  |
| 11 | c | 0 | 24 | a | Log 2 |
| 12 | b | Log 3 | 25 | b | {0, 1} |
| 13 | b | Log n |  | | |