V.P. AND R.P.T.P. SCIENCE COLLEGE , V.V.NAGAR
B.Sc.(MATHEMATICS) SEMESTER - 5
Multiple Choice Question Of US05DMTH26
(Number Theory - 1)

....

Unit-1

Que. Fill in the following blanks.

(1) Square of any odd number is of the form ....
(a) 5k + 1 (b) 3k + 1 (c) 7k + 1 **(d)** 8k + 1 .
(2) Square of any even number is of the form ....
(a) 4k (b) 5k (c) 7k (d) 6k
(3) If n is even integer then $3^n + 1$ is divisible by ....
(a) 5 **(b)** 2 (c) 3 (d) 4
(4) If n is odd integer then $3^n + 1$ is divisible by ....
(a) 5 (b) 3 **(c)** 4 (d) 6
(5) Every square is of the form ....
(a) 9k or 3k + 1 (b) 2k (c) 3k or 9k + 1 (d) 9k or 3k
(6) If k is any positive integer then $k^2 + k + 1$ is .... number .
(a) prime **(b)** not a square (c) square (d) even
(7) $(-2\ ,\ -6) =$ ....
(a) -2 (b) 12 **(c)** 2 (d) -12
(8) $(a\ ,\ 0) =$ .... , $\forall\ a \in \mathbb{Z}$
(a) $-a$ **(b)** $|a|$ (c) a (d) 0
(9) $(a\ ,\ 1) =$ .... , $\forall\ a \in \mathbb{Z}$
(a) $-a$ (b) $|a|$ (c) a **(d)** 1
(10) If a/b then $(a\ ,\ b) =$ .... $\forall\ a\ ,\ b \in \mathbb{Z}$.
(a) a **(b)** $|a|$ (c) $|b|$ (d) b
(11) If b/a then $(a\ ,\ b) =$ .... $\forall\ a\ ,\ b \in \mathbb{Z}$.
(a) a (b) $|a|$ **(c)** $|b|$ (d) b
(12) $(a\ ,\ b) \geq$ .... $\forall\ a\ ,\ b \in \mathbb{Z}$.
(a) a (b) b (c) 0 **(d)** 1
(13) If $a = qb + r\ ,\ 0 \leq r < b$ then $(a\ ,\ b) =$ ....
(a) $(b\ ,\ r)$ (b) $(q\ ,\ r)$ (c) $(a\ ,\ r)$ (d) r
(14) If $b = qa + r\ ,\ 0 \leq r < a$ then $(a\ ,\ b) =$ ....
(a) $(b\ ,\ r)$ (b) $(q\ ,\ r)$ **(c)** $(a\ ,\ r)$ (d) r
(15) If a/bc and $(a\ ,\ b) = 1$ then ....
(a) a **(b)** a/c (c) b/c (d) c/a
(16) If $(a\ ,\ ka + b) =$ .... $\forall\ k \in \mathbb{Z}$
(a) b (b) $(a\ ,\ ka)$ **(c)** $(a\ ,\ b)$ (d) 1
(17) If $(b\ ,\ a + kb) =$ .... $\forall\ k \in \mathbb{Z}$
(a) b (b) $(b\ ,\ kb)$ **(c)** $(a\ ,\ b)$ (d) 1
(18) $(ac\ ,\ bc) =$ .... $\forall\ c \neq 0$.
(a) $c(a\ ,\ b)$ (b) $(a\ ,\ b)$ (c) $(a\ ,\ b)c$ **(d)** $(a\ ,\ b)|c|$
(19) $(a\ ,\ c) = (b\ ,\ c) = 1$ then ....
(a) $(ab\ ,\ c) = 1$ (b) $(a\ ,\ b) = 1$ (c) $(a\ ,\ b)c = 1$ (d) $a = b = 1$
(20) $(a\ ,\ b) = 1$ then $(\ ab\ ,\ a + b\ ) =$ ....
(a) a **(b)** 1 (c) b (d) $a + b$
(21) $(525, 231) =$ ....
(a) 10 (b) 31 **(c)** 21 (d) 7
(22) $(1235, 237) =$ ....
(a) 3 (b) 31 (c) 5 **(d)** 1
(23) $(4676, 366) =$ ....
(a) 2 (b) 6 (c) 4 (d) 1

(24) $1112 =$ ....
(a) $(7\ \ 8\ \ 8)_8$ (b) $(8\ \ 7\ \ 8)_{12}$ (c) $(7\ \ 8\ \ 8)_2$ **(d)** $(7\ \ 8\ \ 8)_{12}$
(25) $(10001011000)_2 =$ ....
(a) 1121 **(b)** 1112 (c) 1212 (d) 2121
(26) $(24871, 3468) =$ ....
(a) 1 (b) 85 **(c)** 17 (d) 34
(27) $(120, 504, 882) =$ ....
(a) 3 (b) 2 (c) 18 **(d)** 6
(28) $(135, 513) =$ ....
(a) 1 **(b)** 27 (c) 17 (d) 5
(29) $(2565, 3114) =$ ....
(a) 9 (b) 3 (c) 18 (d) 1
(30) $(a, b)^n =$ ....
(a) (a^n, b^n) (b) (a, b) (c) $[a^n, b^n]$ (d) 1
(31) If $(a, b) = 1$ then $(a + b, a - b) =$ ....
(a) 1 **(b)** 1 or 2 (c) 2 (d) 2 or 3

UNIT-2

(1) $[12, 30] =$ ....
(a) 6 **(b)** 60 (c) 360 (d) 30
(2) $[25, 30] =$ ....
(a) 750 (b) 60 **(c)** 150 (d) 5
(3) $[525, 235] =$ ....
(a) 525 (b) 26475 **(c)** 24675 (d) 5
(4) $(a\ ,\ b)[a\ ,\ b] =$ .... $\forall\ \ a\ ,\ b \in \mathbb{Z}$.
(a) 1 (b) ab **(c)** $|ab|$ (d) $(a\ ,\ b)$
(5) $(a\ ,\ b)[a\ ,\ b] =$ .... $\forall\ \ a\ ,\ b \geq 0$.
(a) 1 **(b)** ab (c) $|ab|$ (d) $(a\ ,\ b)$
(6) If $a/k\ ,\ b/k\ ,\ k > 0$ then $\left(\dfrac{k}{a}\ ,\ \dfrac{k}{b}\right) =$ ....
(a) 1 (b) $k\ (a\ ,\ b)$ (c) $\dfrac{k}{(a\ ,\ b)}$ **(d)** $\dfrac{k}{[a\ ,\ b]}$
(7) If $a, b > 0$ then $(a + b)[a, b] =$ ....
(a) $a[a, a + b]$ (b) $a[b, a + b]$ (c) $b(a, a + b)$ **(d)** $b[a, a + b]$
(8) If $a, b, c > 0$ then $[a, b, c] =$ ....
(a) $\dfrac{(ab\ ,\ bc\ ,\ ca)}{abc}$ (b) $\dfrac{a + b + c}{(ab\ ,\ bc\ ,\ ca)}$ (c) $\dfrac{abc}{(a\ ,\ b\ ,\ c)}$ **(d)** $\dfrac{abc}{(ab\ ,\ bc\ ,\ ca)}$
(9) $(a + b, [a, b]) =$ ....
(a) $[a, b]$ **(b)** (a, b) (c) $(a + b, ab)$ (d) $(a, b)[a, b]$
(10) $[a^n, b^n] =$ .... **(a)** $[a, b]^n$ (b) (a, b) (c) $[a, b]$ (d) $(a, b)^n$
(11) Every prime number greater than 3 is of the form ....
(a) $3k - 1$ **(b)** $3k + 1$ (c) $4k + 1$ (d) $4k - 1$
(12) If $p > 3$is any prime number then .... and .... can not be prime simultaneously. (a) $p + 1, 3p + 1$ (b) $2p + 1, 3p + 1$ **(c)** $2p + 1, 4p + 1$ (d) $2p + 1, 3p + 1$
(13) If $n_m = 111...111(m - times)$ is prime number then m is .... number.
(a) composite (b) Fermat **(c)** prime (d) perfect
(14) 111111 is .... number.
(a) composite (b) Fermat (c) prime (d) perfect
(15) There are .... prime numbers .
(a) infinitely many (b) finitely many (c) 2345436 (d) 57967843
(16) If P_n is n^{th} prime number then ....
(a) $P_n < 2^{2^{n-1}}$ **(b)** $P_n < 2^{2^n}$ (c) $P_n \leq 2^{2^n}$ (d) $P_n > 2^{2^n}$
(17) If p is prime number then .... for all $a, b \in bn$ (a) $a^2 = pb^2$ (b) $b^2 = pa^2$ (c) $a \neq pb^2$ **(d)** $a^2 \neq pb^2$

UNIT-3

(1) T(20) = ...
(a) 3 (b) 4 (c) 5 **(d)** 6
(2) T(10) = ...
(a) 3 (b) 12 (c) 18 **(d)** 4
(3) T(11) = ...
(a) 3 (b) 12 **(c)** 2 (d) 11
(4) S(10) = ...
(a) 18 (b) 12 (c) 20 (d) 10
(5) S(11) = ...
(a) 3 **(b)** 12 (c) 2 (d) 11
(6) P(10) = ...
(a) 100 (b) 80 (c) 18 (d) 10
(7) P(11) = ...
(a) 3 (b) 2 (c) 100 **(d)** 11
(8) If a is prime then T(a) = ...
(a) a **(b)** 2 (c) 1 (d) 3
(9) If a is prime then S(a) = ...
(a) a (b) $a-1$ **(c)** $a+1$ (d) $a+2$
(10) If a is prime then P(a) = ...
(a) a (b) a - 1 (c) 1 (d) a + 1
(11) T(60) = ...
(a) 60 **(b)** 12 (c) 18 (d) 61
(12) S(60) = ...
(a) 61 (b) 60 (c) 12 **(d)** 168
(13) P(60) = ...
(a) 120 (b) 60 **(c)** 60^6 (d) 60^5
(14) P(20) = ...
(a) 6 (b) 80 (c) 800 **(d)** 8000
(15) If a is square number then S(a) is ....
(a) even **(b)** odd (c) prime (d) 0
(16) .... is a Mersenne number .
(a) 16 (b) 6 (c) 15 **(d)** 31
(17) .... is a Mersenne number .
(a) 100 **(b)** 127 (c) 1 (d) 125
(18) Any prime factor of M_p is .... p
(a) $<$ (b) $=$ **(c)** $>$ (d) $\leq$
(19) .... is Fermat's number .
(a) 5 (b) 6 (c) 7 (d) 15
(20) .... is Fermat's number .
(a) 4 (b) 6 **(c)** 17 (d) 15
(21) .... is Fermat's number .
(a) 100 (b) 116 (c) 327 **(d)** 257
(22) .... is Perfect number .
(a) 12 **(b)** 6 (c) 9 (d) 25
(23) $F_0F_1F_2$............F_{n-1} = ...
(a) F_n+2 (b) F_{n+2} **(c)** F_n-2 (d) F_{n-2}
(24) Any prime factor of M_p is ....
(a) $\geq p$ (b) $=$ p **(c)** $>p$ (d) $<p$
(25) Odd prime factor of M_p , $(p>2)$ is of the form ....
(a) 2pt **(b)** 2pt + 1 (c) 2pt - 1 (d) 2pt + 2
(26) If $\phi(m)$ is odd then m = ...
(a) 2 **(b)** 1 (c) 3 (d) 5
(27) If $\phi(m) = 14$ then m = ...
(a) 2 (b) 1 (c) 3 **(d)** does not exist

(28) If m is odd number then $\phi(2m) =$ ....
(a) $\phi(m)$ (b) $2\phi(m)$ (c) 2 (d) does not exist
(29) If m is even number then $\phi(2m) =$ ....
(a) $\phi(m)$ **(b)** $2\phi(m)$ (c) 2 (d) does not exist

UNIT-4

(1) $[x]$ is greatest integer .... than x .
(a) not greater (b) greater (c) not less (d) less
(2) $x = [x] + a$, where ....
(a) $0 \le a \le 1$ **(b)** $0 \le a < 1$ (c) $0 < a < 1$ (d) $0 < a \le 1$
(3) $[x]$ .... x .... $[x] + 1$.
(a) $\le , \le$ (b) $< , <$ **(c)** $\le , <$ (d) $< , \le$
(4) $[[x]] =$ ....
(a) x (b) $x + 1$ (c) $x - 1$ **(d)** $[x]$
(5) $[x] \in$ ....
(a) $\mathbb{Z}$ (b) $\mathbb{N}$ (c) $\mathbb{R}^+$ (d) $\mathbb{Q}^+$
(6) $[x + y]$..............
(a) $\ge [x] + [y] + 1$ (b) $< [x] + [y] + 1$ **(c)** $\le [x] + [y] + 1$ (d) $\le [x] + [y]$
(7) $[x + y]$..............
(a) $\ge [x] + [y]$ (b) $\ge [x] + [y] + 1$ (c) $\le [x] + [y]$ (d) $< [x] + [y]$
(8) Total number of multiplier of 7 among the integers from 1 to 200 are ....
(a) 28 (b) 30 (c) 27 (d) 29
(9) Total number of multiplier of 7 among the integers from 1 to 500 are ....
(a) 70 (b) 72 **(c)** 71 (d) 69
(10) Total number of multiplier of 7 among the integers from 200 to 500 are ....
(a) 44 (b) 45 (c) 42 **(d)** 43
(11) Highest power of 2 in 50! is ....
(a) 45 (b) 74 (c) 42 **(d)** 47
(12) Highest power of 4 in 50! is ....
(a) 24 (b) 74 **(c)** 23 (d) 47
(13) Highest power of 3 in 50! is ....
(a) 22 (b) 24 (c) 23 (d) 25
(14) Mobious function μ ....
(a) ≤ 1 (b) ≤ 2 (c) ≤ -1 (d) 1
(15) $\mu(6) =$ ....
(a) 1 (b) 0 (c) -1 (d) 2
(16) $\mu(12) =$ ....
(a) 1 **(b)** 0 (c) -1 (d) 3
(17) $(u_{16} , u_{12}) =$ ....
(a) 4 (b) 12 **(c)** 3 (d) 16
(18) $(u_{15} , u_{25}) =$ ....
(a) 15 (b) 4 (c) 3 **(d)** 5
(19) $3u_{n+1} - u_{n-1} =$ .... $\forall n \ge 2$.
(a) u_{n-3} **(b)** u_{n+3} (c) u_{n+2} (d) u_n
(20) $\sum\limits_{i=1}^{6} {u_i}^2 =$ ....
(a) u_7u_8 **(b)** u_6u_7 (c) u_6 (d) u_6u_5
(21) If $2/u_n$ then ....
(a) $2/n$ (b) $n/2$ (c) $n/3$ **(d)** $3/n$
(22) $\phi(m) \le$ .... , $\forall$ $m > 1$.
(a) m-1 (b) m (c) m+1 (d) m - 2
(23) If m is prime then $\phi(m)$.................. $m - 1$.
(a) $\neq$ (b) $>$ (c) $<$ **(d)** $=$
(24) If m is not prime then $\phi(m)$.................. $m - 1$.
(a) $\neq$ **(b)** $<$ (c) $>$ (d) $=$

(25) $\phi\,(300) =$ ....

(a) 80 (b) 90 (c) 60 (d) 300

(26) $\phi\,(128) =$ ....

(a) 128 (b) 16 **(c)** 64 (d) 32