NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch: BE/CSE	**Year / Semester** : III/V	Format No.	NAC/TLP-07a.13
Subject Code :MA8551	**Subject Name** :ALGEBRA AND NUMBER THEORY	Rev. No.	02
Unit No : V	**Unit Name:** CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS	Date	30-09-2020

OBJECTIVE TYPE QUESTION BANK

S.No.	Objective Questions [MCQ / True or False / Fill up with Choices)	BTL
1	If p is prime, then (p-1)! ≡_________ (mod p) a) 0 b) -2 c) -1 ***d)1***	L3
2	The remainder of 18! is divisible by 437 is ***a) 2*** b) 0 c) 1 d)-1	L5
3	The remainder of 63! is divisible by 71 is a) 2 b) 0 c) 1 ***d)-1***	L5
4	If p is a prime, then (p-1).(p-2).(p-3). . . . .(p-k) ≡ ______ (mod p) a) k! b) (k-1)! ***c) $(-1)^k k!$*** d) -k!	L4
5	If x = 1.3.5. . . . .(p-1), where p is an odd prime, then x^2 ≡ _______(mod p) a) -1 b) -2 c) $(-1)^{\frac{p}{2}}$ ***d)*** $(-1)^{\frac{p+1}{2}}$	L4
6	If n is a positive integer such that (n-1)! ≡-1(mod n), then n is _________ ***a) a prime*** b) composite c) even d)odd	L3
7	If p is prime and a is any integer not divisible by p, then a^{p-1} ≡____ (mod p) a) 2 ***b) -1*** c) 1 d)-2	L5
8	The remainder when 2^{1000} is divided by 17 is a) 2 b) 0 ***c) 1*** d)-1	L5
9	The remainder when $13^{18}+19^{12}$ is divided by 247 is a) 2 b) 0 ***c) 1*** d)-1	L5
10	The remainder when $1^{p-1}+2^{p-1}+3^{p-1}$ . . . $+(p-1)^{p-1}$ is divided by p is a) 2 b) 0 c) 1 ***d)-1***	L4
11	The remainder when 5^{2003} is divided by 11 is a) -3 b) 3 c) -4 ***d)4***	L3

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12	Let p be a prime and a any integer such that p ∤ a then the solution of the linear congruence ax ≡b(mod p) is given by x ≡ _____(mod p) a) $a^{-1}b$ b) ab^{-1} c) $(ab)^{-1}$ **d) $a^{p-1}b$**	L3
13	ϕ (7) = __________ **a) 6** b) 7 c) 8 d)-6	L3
14	Let m be a positive integer a be any integer such that _________. Then $a^{\phi(m)}$ ≡1(mod m). a) (a, m) = 2 **b) (a, m) = 1** c) (a, m) =-1 d)(a, m) = d	L3
15	Let p be a prime and α is a positive integer. Then $\phi(p^\alpha)$= _______ a) $p\left(1-\frac{1}{p}\right)$ b) $p\left(1-\frac{1}{p}\right)^\alpha$ c) $p^{\alpha-1}\left(1-\frac{1}{p}\right)$ **d)** $p^\alpha\left(1-\frac{1}{p}\right)$	L3
16	Let n = $p_1^{\alpha_1}.p_2^{\alpha_2}...p_k^{\alpha_k}$ be the canonical decomposition of the positive integer n. Then $\phi(p^\alpha)$= _______ **a)** $n\left(1-\frac{1}{p_1}\right)\left(1-\frac{1}{p_2}\right)...\left(1-\frac{1}{p_k}\right)$ b) $n^\alpha\left(1-\frac{1}{p_1}\right)\left(1-\frac{1}{p_2}\right)...\left(1-\frac{1}{p_k}\right)$ c) $n^\alpha\left(1-\frac{1}{p_1}\right)^{\alpha_1}\left(1-\frac{1}{p_2}\right)^{\alpha_2}...\left(1-\frac{1}{p_k}\right)^{\alpha_k}$ d) none of the above	L3
17	ϕ (1105)= ___________ a) 766 b) 767 **c) 768** d) 769	L3
18	Find one positive integer n such the ϕ (n)=6 a) 6 b) 16 c) 8 **d) 18**	L4
19	τ (12)= ________ **a) 6** b) 7 c) -6 d)-7	L4
20	$\tau(5^8)$ = ____________ a) 8 **b) 9** c) 1 0 d)-9	L5

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21	σ (28)=____________ a) 54 b) 55 ***c) 56*** d) 57	L5
22	$\sigma(3^7)$ = ____________ a) 3299 b) 3290 c) 3250 ***d) 3280***	L5
23	If n = 2^k, then ϕ (n) = _____ a) n ***b)*** $\frac{n}{2}$ c) $\frac{n}{3}$ d) 2n	L3
24	If n = 28, then $\sum_{d\|n}\phi(d)$ = a) 82 b) 20 ***c) 28*** d) 29	L3
25	If n = p^α , where p is a prime and α is any positive integer, then $\tau(p^\alpha)$=_____ a) p b) p+1 c) α ***d)*** α ***+1***	L5
26	If n = p^α , where p is a prime and α is any positive integer, then $\sigma(p^\alpha)$=_____ ***a)*** $\frac{p^{\alpha+1}-1}{p-1}$ b) $\frac{p^{\alpha}-1}{p-1}$ c) $\frac{p^{\alpha}+1}{p-1}$ d) $\frac{p^{\alpha+1}+1}{p-1}$	L5
27	If p is a prime and a is any integer such that p $\nmid$ a. Then _____ is inverse of a modp. a) a^p b) a^{p-1} ***c)*** a^{p-2} d) a^{p-3}	L5
28	What is the two different number m and n for which $\tau(m)$= $\tau(n)$ a) m = 6, n=5 b) m = 9, n=15 c) m = 7, n=10 ***d) m = 13, n=17***	L4
29	If n is a power of 2, then $\sigma(n)$ is always _____ ***a) odd*** b) even c) a prime d) none of the above	L4
30	If p is a positive integer such that $\phi(p)$= p-1, then p is ____ a) odd b) even ***c) a prime*** d) none of the above	L4