THE O.P. GUPTA
ADVANCED MATH CLASSES
Mathematics (Standard & Basic)
Topic - Real Numbers

RTS-01

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RANKERS
TEST SERIES FOR X

Max. Marks - 40
Time - 90 Minutes

SECTION A

*Following multiple choice questions are of **1 Mark** each (Q01-10).*
Select the correct option in each one of them.

Q01. The LCM of a smallest 2-digit number and smallest composite number is
(A) 12 (B) 4 (C) 20 (D) 40

Q02. The total number of factors of a prime number is
(A) 1 (B) 0 (C) 2 (D) 3

Q03. If HCF $(2520, 6600) = 120$, LCM $(2520, 6600) = 252 \times k$, then value of k is
(A) 1650 (B) 550 (C) 16632000 (D) 155

Q04. The LCM of the smallest prime number and the smallest odd composite number is
(A) 10 (B) 6 (C) 9 (D) 18

Q05. The sum of exponents of prime factors in the prime-factorization of 196 is
(A) 3 (B) 4 (C) 5 (D) 6

Q06. The LCM of two prime numbers p and q, $p > q$ is 221. Then the value of $(3p - q) =$
(A) 4 (B) 28 (C) 38 (D) 48

Q07. If two positive integers p and q are written as $p = x^2y^2$, $q = xy^3$; where x and y are prime numbers, then HCF (p, q) is
(A) xy (B) xy^2 (C) x^3y^3 (D) x^2y^2

Q08. The ratio between the LCM and HCF of 5, 15, 20 is
(A) 9 : 1 (B) 4 : 3 (C) 11 : 1 (D) 12 : 1

*Followings are **Assertion-Reason based questions** (Q09 & 10).*
In the following questions, a statement of Assertion (**A**) is followed by a statement of Reason (**R**).
Choose the correct answer out of the following choices.
(A) Both **A** and **R** are true and **R** is the correct explanation of **A**.
(B) Both **A** and **R** are true and **R** is not the correct explanation of **A**.
(C) **A** is true but **R** is false.
(D) **A** is false but **R** is true.

Q09. **Assertion (A) :** $-\sqrt{5}$ is irrational number.
Reason (R) : If m is an odd number greater than 1, then $\sqrt{m}$ is irrational.

Q10. **Assertion (A) :** Let 'a' and 'b' be two positive integers such that $a = p^3q^4$ and $b = p^2q^2$ where 'p' and 'q' are prime numbers. If $HCF(a, b) = p^mq^n$ and $LCM(a, b) = p^rq^s$, then $(m + n) : (r + s) = 4 : 7$.
Reason (R) : The sum or difference of a rational and an irrational number is an irrational number.

$[1 \times 10 = 10$

SECTION B

*Followings are of **2 Marks** each (Q11-12).*

Q11. Prove that $2 + 5\sqrt{3}$ is irrational, given that $\sqrt{3}$ is an irrational number.

Q12. (a) If the HCF of 1032 and 408 is expressible in the form $1032p - 408 \times 5$, then find the value of $p - 2$.

OR

(b) Why $11 \times 13 \times 17 \times 19 - 17$ is a composite number? Explain.

$[2 \times 2 = 4$

SECTION C

*Followings are of **3 Marks** each (Q13-16).*

Q13. Prove that $\sqrt{7}$ is irrational number.

Q14. Three bells ring at intervals of 6, 12 and 18 minutes. If all the three bells ring at 6 a.m., when will they ring together again?

Q15. (a) Find the smallest number, which when divided by 39, 52 and 91 leaves a remainder of 13 in each case.

OR

(b) What is the least multiple of 7 which when divided by 4, 12 and 16 leaves remainder 3 in each case?

Q16. Prove that $\sqrt{2}+\sqrt{5}$ is irrational.

$[3\times 4=12$

SECTION D

*Followings are of **5 Marks** each (Q17-18).*

Q17. Find the greatest number that will divide 382, 509 and 636 leaving remainders 4, 5 and 6 respectively.

Q18. (a) Find LCM and HCF of 78, 91 and 195. Check whether LCM $(a,b,c)\times$ HCF $(a,b,c)=a\times b\times c$.

OR

(b) If $\sqrt{ab}$ is an irrational number, prove that $(\sqrt{a}+\sqrt{b})$ is irrational number.

$[5\times 2=10$

SECTION E

*Following is a case-study based question of **4 Marks** (Q19); having three sub-parts (i), (ii) and (iii).*

Q19. Teaching Mathematics through activities is an effective way to deepen the understanding of students and increase their interest in the subject. Keeping this in mind, Ms. Mukta planned a **prime number game** for her students.

She started the game by announcing the number 2 and asked the first student to multiply it by any prime number before passing the result to the second student. Second student also multiplied it by a prime number and passed it to third student.

That is, each subsequent student followed the same rule : multiplying the received number by a prime number and passing it on. This process continued until the final student obtained the number 173250.

Based on the above information, answer the questions given below.

(i) What is the least prime number used by students?

(ii) Which prime number has been used maximum times?

(iii) (a) How many students are in the class?

OR

(b) What is the highest prime number used by students?

$[1+1+2=4$

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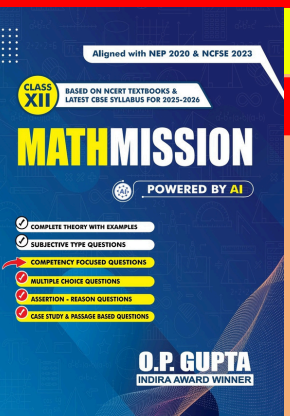

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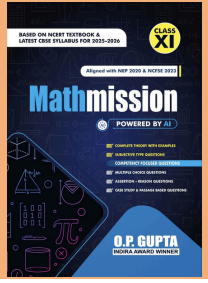

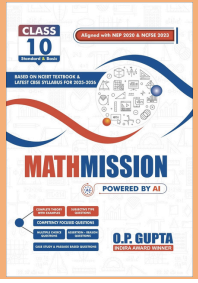

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