SUBJECTIVE TEST SERIES XI – 13

Max. Marks : 65   **Based on Ch 01 To 08**   **Time Allowed : 2.5 Hours**

General Instructions :

(i) The question paper consists of three parts A, B and C. Each question of each part is compulsory.

(ii) Section A (Very Short Answer Type) consists of 06 questions of 1 mark each.

(iii) Section B (Short Answer Type) consists of 13 questions of 4 marks each.

(iv) Section C (Long Answer Type) consists of 7 questions of 6 marks each.

(v) Use of calculator is not permitted.

SECTION – A

(This section contains 6 questions of one marks each.)

Q01. Write all the subsets of set A = {a, b, {c, d}}.

Q02. If $^nC_8 = {}^nC_2$ then, find the value of $^nC_6$.

Q03. Write the set builder form of the interval (2, 5).

Q04. Consider the statement : "A collection of the most dangerous animals of the world." Is this a set? Justify your answer.

Q05. If A and B are two sets such that $A \subset B$ then find $A \cup B$.

Q06. Find the radian measure of $45^\circ 30'$.

SECTION – B

(This section contains 13 questions of four marks each.)

Q07. Find the value of r, if $^nC_{r-1} = 36$, $^nC_r = 84$ and, $^nC_{r+1} = 126$.

Q08. In how many ways can the letters of the word ASSASSINATION be arranged so that all the S's are together?

Q09. Using binomial theorem, prove that $6^n - 5n - 1$ is divisible by 5 for all $n \in N$.

Q10. Two persons were in lack of money. They decided to work hard and earn some money. But after some time, they decided to follow a shortcut way. They stole vault whose code consisted of 2 distinct English alphabets which were followed by 2 distinct numbers from 1 to 9 (excluding 0). In how many ways can they unlock the vault? Which decision of the persons was not correct and why?

Q11. Convert $\dfrac{1+7i}{(2-i)^2}$ in the polar form.   **OR**   Find : $\sqrt{-15-8i}$.

Q12. Prove by using induction, $\dfrac{1}{1.2.3} + \dfrac{1}{2.3.4} + \dfrac{1}{3.4.5} + ... + \dfrac{1}{n(n+1)(n+2)} = \dfrac{n(n+3)}{4(n+1)(n+2)}$, $n \in N$.

Q13. For what values of x and y ($x, y \in R$), $(x-iy)(3+5i)$ is the conjugate of complex number $-6 - 24i$?

Q14. In the first four papers of 100 marks each, Simran got 65, 72, 55 and 60 marks. If she wants to get an average of greater than or equal to 65 marks but less than 70 marks, find the range of marks she should score in the 5th paper.

Due to health problems caused by negligence of balanced diet, Simran joined the school after a gap of 15 days. What should she do to score good marks in the upcoming exams? Choose the appropriate option(s) from the followings :

(i) She should take tuitions.

(ii) She should only pray to God.

(iii) She should use unfair means in the exams.

(iv) She should work hard and discuss her problems with the teachers.

Which value has been indicated in this question? Which value would be violated if Simran resorts to unfair means?

Q15. Prove that : $\sin 3x + \sin 2x - \sin x = 4 \sin x \cos \dfrac{x}{2} \cos \dfrac{3x}{2}$.

Q16. If $\sin x = \dfrac{1}{4}$, $x \in$ II quadrant, find the values of $\sin \dfrac{x}{2}$, $\cos \dfrac{x}{2}$ and $\tan \dfrac{x}{2}$.

Q17. In any ΔABC, prove that : $2\left(b \cos^2 \dfrac{C}{2} + c \cos^2 \dfrac{B}{2} \right) = a + b + c$.

Q18. If $f(x) = x^2$, then evaluate : $\dfrac{f(1.1) - f(1)}{1.1 - 1}$.

Q19. The relation f is defined by $f(x) = \begin{cases} x^2, 0 \le x \le 3 \\ 3x, 3 \le x \le 10 \end{cases}$.

The relation g is defined by $g(x) = \begin{cases} x^2, 0 \le x \le 2 \\ 3x, 2 \le x \le 10 \end{cases}$.

Which one of these two relations represents a function? Why?

SECTION – C

(This section contains 7 questions of six marks each.)

Q20. In a survey of 700 students in a school, 180 were listed as drinking Limca, 275 as drinking Mirinda and 95 were listed as both drinking Limca as well as Mirinda. Find how many students were drinking neither Limca nor Mirinda? What value is shown here?

Q21. Expand using Binomial Theorem : $\left(1 - \dfrac{2}{x} + \dfrac{x}{2}\right)^4, x \ne 0$.

Q22. Solve graphically : $3x + 4y \ge 12$, $x - 2y \le 3$, $x \ge 0$, $y \ge 1$.

Q23. If $\tan x = \dfrac{3}{7}$, $\pi \le x \le \dfrac{3\pi}{2}$, then find the value of all trigonometric functions.

Q24. (i) Evaluate $i^{39} + i^{-79}$. Also express the result in the standard form.

(ii) What is the additive inverse of $-4 + 3i$?

(iii) Write the argument of $-1 - i\sqrt{3}$.

Q25. (i) Solve : $-3 \le 4 - \dfrac{7x}{2} \le 18$ for all $x \in Z$.

(ii) What is the coefficient of x^5 in the binomial expansion of $(x + 2)^8$?

(iii) Expand $\left(\dfrac{1}{x} - \dfrac{x}{2}\right)^5$.

Q26. Rohit's two cousins are represented by R and N. Let R be a relation on N defined by $R = \{(a, b) : a, b \in N \text{ and } a = b^2\}$. Check whether the following are true?

(i) $(a, a) \in R$ for all $a \in N$.

(ii) $(a, b) \in R$ implies that $(b, a) \in R$.

(iii) $(a, b) \in R$ and $(b, c) \in R$ implies that $(a, c) \in R$.

Give reason in each case to support your answer. What is the value of this question?

HINTS / ANSWERS

Q01. ϕ, {a}, {b}, {{c, d}}, {a, b}, {b, {c, d}}, {{c, d}, a}, {a, b, {c, d}}.

Q02. 210.

Q03. $\{x : x \in R, 2 < x < 5\}$.

Q04. No, this statement is not a set. Since the definition of most dangerous animals of the world may vary person to person.

Q05. B.

Q06. $\dfrac{91\pi}{360}$.

Q07. 3.

Q08. 151200.

Q10. 46800. The decision to steal the vault was not correct as it may land them in trouble.

Q11. $\sqrt{2}\left(\cos\dfrac{3\pi}{4} + i\sin\dfrac{3\pi}{4}\right)$.   **OR** $\pm(1 - 4i)$.

Q13. Value of x = 3 and y = –3.

Q14. Greater than or equal to 73 marks but less than 98 marks.
Simran should go for option (iv) She should work hard and discuss her problems with the teachers. The value of balanced diet in life has been indicated in the question. If Simran resorts to unfair means then, it will hamper her character in longer run and it may also put her in trouble in the exam.

Q16. $\sqrt{\dfrac{4+\sqrt{15}}{8}}, -\sqrt{\dfrac{4-\sqrt{15}}{8}}, -(4+\sqrt{15})$.

Q17. Use $\cos^2\dfrac{C}{2} = \dfrac{1+\cos C}{2}$ and $\cos^2\dfrac{B}{2} = \dfrac{1+\cos B}{2}$.

Q18. 2.1.

Q19. See Solution of this question in OP Gupta's MATHEMATICIA, Chapter 02 Q46.

Q20. 340. Value : The intake of cold drinks should be avaoided.

Q21. $\dfrac{x^4}{16} + \dfrac{x^3}{2} + \dfrac{x^2}{2} - 4x - 5 + \dfrac{16}{x} + \dfrac{8}{x^2} - \dfrac{32}{x^3} + \dfrac{16}{x^4}$.

Q23. $\sin x = -\dfrac{3}{\sqrt{58}}, \cos x = -\dfrac{7}{\sqrt{58}}, \operatorname{cosec} x = -\dfrac{\sqrt{58}}{3}, \sec x = -\dfrac{\sqrt{58}}{7}, \cot x = \dfrac{7}{3}$.

Q24. (i) 0 + 0 i.
(ii) 4 – 3i.
(iii) $-\dfrac{2\pi}{3}$.

Q25. (i) {–4, –3, –2, –1, 0, 1, 2}.
(ii) 448.
(iii) $\dfrac{1}{x^5} - \dfrac{5}{2x^3} + \dfrac{5}{2x} - \dfrac{5x}{4} + \dfrac{5x^3}{16} - \dfrac{x^5}{32}$.

Q26. See Solution of this question in OP Gupta's MATHEMATICIA, Chapter 02 Q18. Value of the question : Good relations should always be honoured.