



MATHEMATICS CLASS - XII

Date 09- 05 - 2010

Duration : 1 Hours

Max. Marks : 80

UNIQUE TEST - 1

INSTRUCTIONS

Do not break the seal of the question paper booklet before instructed to do so by the invigilator

Section A contains 15 question and Section-C contains 5 questions and total number of pages are 8. Please ensure that the Questions paper you have received contains ALL THE QUESTIONS in each section and PAGES.

SECTION - A

- Question 1 to Question 8 has four choices (A), (B), (C), (D) out of which **only one is correct** & carry **4 marks** each. 1 mark will be deducted for each wrong answer.
- Question 9 to Question 11 has four choices (A), (B), (C), (D) Out of which **one or more than one is/are correct** and carry **5 marks** each. 2 mark will be deducted for each wrong answer.
- Question 12** is Reasoning type question, contains Statement-1 (Assertion) & Statement-2 (Reason) Questions has 4 choices (A), (B), (C), (D) out of which **only one is correct** & carry **4 marks**, 1 mark will be deducted for wrong answer.
- Question 13 to Question 15 are based upon a **paragraph**. Each Question has 4 choices (A), (B), (C), (D) out of which **only one is correct** & carry **3 marks** each. 1 mark will be deducted for each wrong answer.

SECTION - C

- Questions 1 to Questions 5 are **subjective question** (whose answer are upto 4 digits) & carry **4 marks** each. No negative marking for this section.

Note :- Whoever will solve all the three Question No. 4, 6 (Section A) and 2 (Section C) correctly will be rewarded suitably.
(* conditions apply)

NOTE : GENERAL INSTRUCTION FOR FILLING THE OMR ARE GIVEN BELOW.

- Use only **HB pencil** or **blue/black pen (avoid gel pen)** for darkening the bubble.
- Indicate the correct answer for each question by filling appropriate bubble in your OMR answer sheet.
- The Answer sheet will be checked through computer hence, the answer of the question must be marked by shading the circles against the question by dark **HB pencil** or **blue/black pen**.
- While filling the bubbles please be careful about **SECTIONS** [i.e. Section-A include single correct answers, multi correct answers, reasoning type, paragraph type), Section-B (include match the column), Section-C (include subjective answers)].

| SECTION-A | SECTION-B | SECTION-C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|------------------------------|-------------------------------|---------------------------------|--|---|---|
| <p>For example if only 'A' choice is correct then, the correct method for filling the bubble is</p> <p style="text-align: center;">A B C D E ● ○ ○ ○ ○</p> <p>For example if only 'A & C' choices are correct then, the correct method for filling the bubble is</p> <p style="text-align: center;">A B C D E ● ○ ● ○ ○</p> <p>the wrong method for filling the bubble are</p> <p style="text-align: center;">⊙ ⊗ ⊕ ⊖ ⊗</p> <p>The answer of the questions in wrong or any other manner will be treated as wrong.</p> | <p>For example If Correct match for (A) is P; for (B) is R, S; for (C) is Q; for (D) is P, Q, S then the correct method for filling the bubble is</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>A</td><td>P</td><td>Q</td><td>R</td><td>S</td><td>T</td></tr> <tr><td>B</td><td>●</td><td>○</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>C</td><td>○</td><td>○</td><td>●</td><td>○</td><td>○</td></tr> <tr><td>D</td><td>○</td><td>●</td><td>○</td><td>○</td><td>○</td></tr> </table> | A | P | Q | R | S | T | B | ● | ○ | ○ | ○ | ○ | C | ○ | ○ | ● | ○ | ○ | D | ○ | ● | ○ | ○ | ○ | <p>Ensure that all columns are filled. Answers, having blank column will be treated as incorrect. Insert leading zero(s) if required :</p> <table style="width: 100%; text-align: center;"> <tr> <td>'6' should be filled as 0006</td> <td>'86' should be filled as 0086</td> <td>'1857' should be filled as 1857</td> </tr> <tr> <td>●●●●○ ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧⑧⑧⑧⑧ ⑨⑨⑨⑨⑨</td> <td>●●○①① ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨</td> <td>○①①①① ●①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨</td> </tr> </table> | '6' should be filled as 0006 | '86' should be filled as 0086 | '1857' should be filled as 1857 | ●●●●○ ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧⑧⑧⑧⑧ ⑨⑨⑨⑨⑨ | ●●○①① ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨ | ○①①①① ●①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨ |
| A | P | Q | R | S | T | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | ● | ○ | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | ○ | ○ | ● | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | ○ | ● | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| '6' should be filled as 0006 | '86' should be filled as 0086 | '1857' should be filled as 1857 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ●●●●○ ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧⑧⑧⑧⑧ ⑨⑨⑨⑨⑨ | ●●○①① ①①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨ | ○①①①① ●①①①① ②②②②② ③③③③③ ④④④④④ ⑤⑤⑤⑤⑤ ⑥⑥⑥⑥⑥ ⑦⑦⑦⑦⑦ ⑧●⑧⑧ ⑨⑨⑨⑨⑨ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SECTION – A

[STRAIGHT OBJECTIVE TYPE]

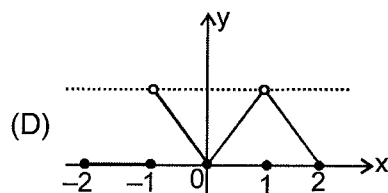
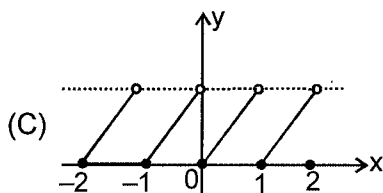
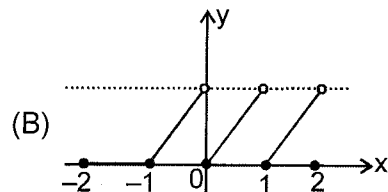
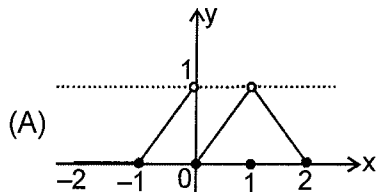
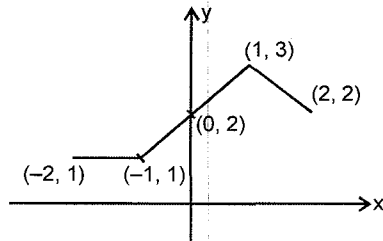
Q.1 to 8 has four choices (A), (B), (C), (D) out of which ONLY ONE is correct

1. Find Range of the function $f(x) = \left[\frac{1}{\cos\{x\}} \right]$ is :
 (where $[*]$ denotes greatest integer function & $\{ * \}$ denotes fractional part function)
 (A) I, set of integers (B) N, set of natural numbers
 (C) $\{2, 3, 4, \dots\}$ (D) none of these
2. $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = [x]^2 + \sqrt{x^2}$ is (where $[*]$ denotes greatest integer function)
 (A) $I \cap S$ (B) $\bar{I} \cap S$ (C) $I \cap \bar{S}$ (D) $\bar{I} \cap \bar{S}$
 (where I denotes injective mapping & S denotes surjective mapping)
3. $f(x) = \sqrt{\left[\log_2 \left(\frac{x}{[x]} \right) \right]}$ then the possible values of x are
 (where $[*]$ denotes greatest integer function)
 (A) $(-\infty, \infty) - [0, 1)$ (B) $(-\infty, 0)$ (C) $[1, \infty) \cup \{n | n \in \mathbb{I}\}$ (D) $(0, \infty)$

(SPACE FOR ROUGH WORK)



4. If the graph of $f(x)$ is as below then which of the following represents the graph of $\{f(x)\}$ (where $\{ * \}$ denotes fractional part function)



(SPACE FOR ROUGH WORK)

5. Function $f(x) = \left[\frac{4x}{\pi} \right] \operatorname{sgn}(x^2 - x + 1)$ is
 (where $[*]$ denotes greatest integer function)
 (A) one-one but not even in $[-2, 2]$ (B) one-one but odd in $[-2, 2]$
 (C) many one but not even in $[-2, 2]$ (D) many one but odd in $[-2, 2]$
6. If $f(x) = \begin{cases} x-1 & x \geq 1 \\ 2x^2-2 & x < 1 \end{cases}$, $g(x) = \begin{cases} x+1 & x > 0 \\ -x^2+1 & x \leq 0 \end{cases}$ & $h(x) = |x|$ then find $[f(g(h(x)))]$ as $x \rightarrow 0^+$
 (where $[*]$ denotes greatest integer function)
 (A) 1 (B) 0 (C) -1 (D) does not exist
7. Domain of the function $f(x) = \sqrt{\ln\{\cos(\sin x)\}}$ is
 (A) $x \in \mathbb{R}$ (B) $x \in \{(2n+1)\frac{\pi}{2} \mid n \in \mathbb{I}\}$
 (C) $x \in \{n\pi \mid n \in \mathbb{I}\}$ (D) None of these
8. If $y = \frac{x^2+x+5}{x^2+x+1} \forall x \in \mathbb{R}$ then the numebr of integral values that y can take
 (A) 4 (B) 5 (C) 6 (D) Infinite values

(SPACE FOR ROUGH WORK)



[MULTIPLE OBJECTIVE TYPE]

Q.9 to 11 has four choices (A), (B), (C), (D) out of which **one or more than one** is/are correct.

9. If $f(x)$ satisfies $e^{f(x)} = 4 - 2^{-x}$ then which of the following statement/s is/are true
 (A) as x increases, $f(x)$ increases (B) as x increases, $f(x)$ decreases
 (C) as x decreases, $f(x)$ increases (D) as x decreases, $f(x)$ decreases
10. If $f : \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = x^3 - mx^2 + 9x - 18$, then the integral value/s of m for which the function $f(x)$ is invertible.
 (A) -3 (B) 0 (C) 3 (D) 6
11. If $f(x) = \tan\left(\frac{5\pi}{2}[x]\right)$, then which of the following statements is/are correct
 (where $[*]$ denotes greatest integer function)
 (A) $f(x)$ is periodic with period 2 (B) $f(x)$ is periodic with period $\frac{2}{5}$
 (C) $f(x)$ is even (D) $f(x)$ is many one

(SPACE FOR ROUGHWORK)



[REASONING TYPE]

Q.12 is Reasoning type question, contains Statement-1 (Assertion) and Statement-2 (Reason) Each questions has four choices (A), (B), (C), (D) out of which **only one** is correct.

12. Let x & y be positive real numbers such that $y^3 + y \leq x - x^3$ then
Statement-1 : $y < x < 1, \forall x, y \in \mathbb{R}$
Statement-2 : value of x always lie between 0 & 1.
 (A) Statement (1) is True, statement (2) is True and statement (2) is correct explanation for Statement (1)
 (B) Statement (1) is True, statement (2) is True and statement (2) is NOT the correct explanation for Statement (1)
 (C) Statement (1) is true, statement (2) is false
 (D) Statement (1) is false, statement (2) is true

[COMPREHENSION TYPE]

Q.13 to Q.15 are based upon a paragraph. Each questions has four choices (A), (B), (C), (D) out of which **only one** is correct.

$$\text{If } f(x) = \sqrt[3]{\frac{9}{\log_2(3-2x)}}^{-1} \text{ \& } g(x) = \sqrt{(x+1)(2\sqrt{2}-x)}$$

13. Domain of $f(x)$ is
 (A) $(-\infty, 3/2) - \{1\}$ (B) $(1, 3/2)$ (C) $(3/2, \infty)$ (D) None of these
14. What is the value of 'a' which satisfies $f^{-1}(a-4) = 1/2$
 (A) 3 (B) 4 (C) 5 (D) 6
15. Find the values of x for which $\text{gof}(x)$ is defined.
 (A) $(-\infty, 1/2) \cup (1, \infty)$ (B) $(-\infty, 1/2)$ (C) $(1, \infty)$ (D) $(-\infty, 1)$

(SPACE FOR ROUGHWORK)

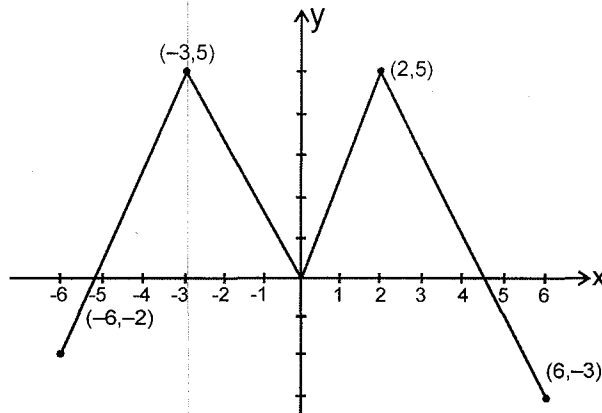


SECTION C

[SUBJECTIVE]

Q.1 to 5 are subjective type questions

1. The graph of function $f(x)$ is as shown below then the number of solution/s of $f(f(x)) = 5$



2. If $y = x$ cuts the curve $x^3 + 3y^3 - 30xy + 72x - 55 = 0$ at A, B & C, then the value of $\frac{4\sqrt{2}}{55} \cdot OA \cdot OB \cdot OC$ is (where O is origin)
3. $f : \mathbb{N} \rightarrow \mathbb{R}$ & $f(1) = 1$. If $f(1) + 2f(2) + 3f(3) + \dots + nf(n) = n(n+1)f(n)$ for $n \geq 2$, then the value of $\frac{1}{f(2000)}$ is
4. Let a, b, c, d be distinct integers such that the equation $(x-a)(x-b)(x-c)(x-d) - 9 = 0$ has an integral root r, then the value of $a + b + c + d - 4r$ is
5. Consider the function $g(x)$ defined as $g(x) \cdot (x^{(2^{2008}-1)} - 1) = (x+1)(x^2+1)(x^4+1)\dots(x^{2^{2007}} - 1) - 1$, then the value of $g(2)$ is

(SPACE FOR ROUGH WORK)



(SPACE FOR ROUGH WORK)

