THE OPGUPTA

PAPER CODE
TOPGAMC-11-HYE-24

ADVANCED MATH CLASSES

@ Think Academy, Najafgarh

(For Mid-Term Exam. Paper)

Standard : XI
Subject : Mathematics (041)

Half Syllabus Test
PRACTICE PAPER

Maximum Marks : 40
Time : 2 Hours

General Instructions :

(a) All questions are compulsory.

(b) This question paper consists of **21 questions** divided into **five sections A, B, C, D and E**.

(c) Section A comprises of **12 questions of one mark** each (from Q01 - 12).
Section B comprises of **01 Case-study** and **01 Source-based** question with **5 sub-parts of one mark** each (from Q13 - 14).
Section C comprises of **03 questions of two marks** each (from Q15 - 17).
Section D comprises of **02 questions of three marks** each (from Q18 - 19)
Section E comprises of **02 questions of four marks** each (from Q20 - 21).

(d) There is no overall choice. However, **internal choice** has been provided in
- **01 Question of Section C**
- **01 Question of Section D**
- **01 Question of Section E**

You have to attempt only one of the alternatives in all such questions.

SECTION A

*(Question numbers 01 to 12 carry **1 mark** each.)*
*Followings are **multiple choice questions**. Select the correct option.*

01. For $z = -1 + 2i$, $|z|$ equals

(a) 5 (b) $\sqrt{5}$ (c) $-\sqrt{5}$ (d) $\pm\sqrt{5}$

02. For $3x - 2 < \frac{x}{3}$, we always have $x \in$

(a) $\left(\frac{3}{4}, \infty\right)$ (b) $\left(-\frac{3}{4}, \infty\right)$ (c) $\left(-\infty, \frac{3}{4}\right)$ (d) $\left(-\infty, \frac{3}{4}\right]$

03. If $\sin 2x = k \sin x \cos x$, then value of k is

(a) 1 (b) 2 (c) 0 (d) 3

04. Set builder form of $\{7,11,13,17,19\}$ is

(a) $\{x : x$ is a prime natural no. between 6 and 20$\}$

(b) $\{x : x \in N, x$ is a prime no. less than 20$\}$

(c) $\{x : x$ is an odd natural no. between 6 and 20$\}$

(d) $\{x : x$ is an odd natural no. less than 20$\}$

05. Value of ${}^5P_3$ is

(a) 120 (b) 40 (c) 20 (d) 60

06. **Fill in the blanks:** If $a < b$ and $c < 0$, then $\left(\frac{a}{c}\right)$ _____ $\left(\frac{b}{c}\right)$.

(a) $<$ (b) $\leq$ (c) $>$ (d) $\geq$

07. If $A=\{1, 2\}$, $B=\{5, 6, 7\}$ and $C=\{5, 6, 7, 8\}$, then which of the following is correct?

(a) $n[A\times(B\cup C)]=6$ (b) $n[A\times(B\cup C)]=14$

(c) $n[A\times(B\cup C)]=0$ (d) $n[A\times(B\cap C)]=6$

08. For the function $f(x)=-|x-2|$, the range is

(a) $[0,\infty)$ (b) $(-\infty,0)$ (c) $(0,\infty)$ (d) $(-\infty,0]$

09. Let A and B be 2 disjoint sets and U be the universal set, then $A'\cup((A\cup B)\cap B')$ equals

(a) ϕ (b) U (c) A (d) B

10. $\tan\left(-\frac{17\pi}{6}\right)$ equals

(a) $-\frac{1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) $-\sqrt{3}$

*Followings are **Assertion-Reason based questions** (from **Q11 - Q12**).*

Read the following statements carefully to mark the correct option out of the options given below.

(a) Assertion (A) is true, Reason (R) is true; Reason (R) is a correct explanation for Assertion (A).
(b) Assertion (A) is true, Reason (R) is true; Reason (R) is not a correct explanation for Assertion (A).
(c) Assertion (A) is true, Reason (R) is false.
(d) Assertion (A) is false, Reason (R) is true.

11. **Assertion (A) :** An angle of $\frac{11}{7}$ is equivalent to 90°.

Reason (R) : Angle in radian = Angle in degree $\times\frac{\pi}{180}$.

12. **Assertion (A) :** Domain of $f(x)=\sqrt{x-4}$ is $x>4$.

Reason (R) : $y=\sqrt{f(x)}$ is defined if $f(x)\geq 0$.

SECTION B

*This section contains **one Case-study and one Source-based question** (from **Q13 - Q14**). Each of these questions contains **5 sub-parts (i-v)**. Each sub-part carry 1 mark.*

13. Think Academy organized a small gathering of 100 students on the occasion of Teacher's day. The management decided that three different types of drinks should be distributed among the students - Fruit Juice, Lassi and Tea. It was reported that 10 students had all the three drinks Fruit Juice, Lassi and Tea; 20 had Fruit Juice and Lassi; 30 had Lassi and Tea; 25 had Tea and Fruit Juice; 12 had Fruit Juice only; 5 had Lassi only and 8 had Tea only.

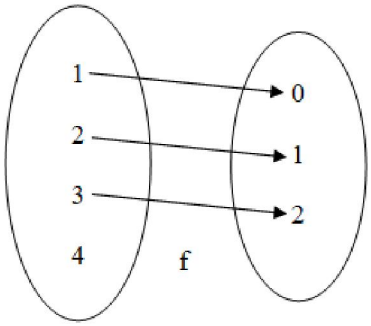
Based on the above information, attempt **any four** questions.

(i) Find the number of students who did not take any drinks.
(ii) Find the number of students who took Fruit Juice.
(iii) Find the number of students who took Lassi.
(iv) Find the number of students who took Tea.
(v) Find the number of students who took Fruit Juice and Lassi but not Tea.

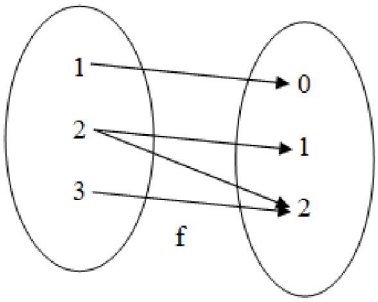
14. Given a relation in x and y, we say 'y is a function of x' if for every element x in the domain, there corresponds exactly one element y in the range.

Based on the above information, attempt **any four** questions.

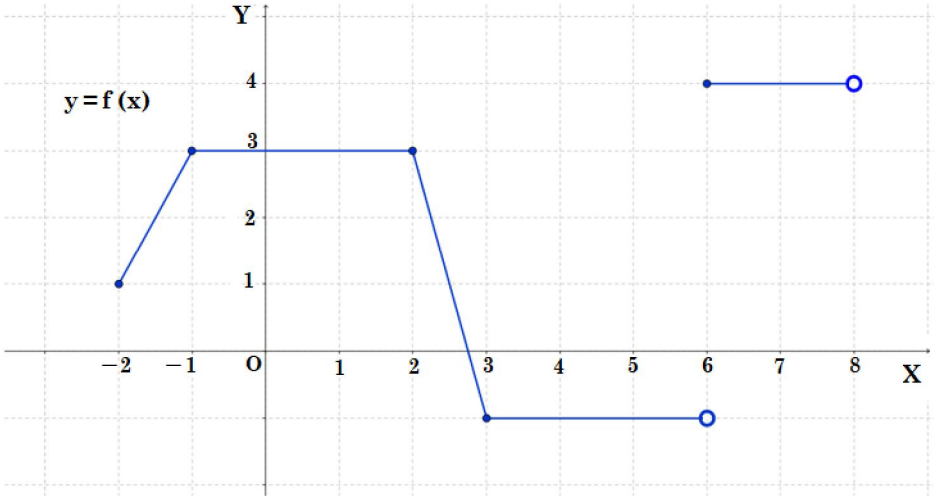
(i) Determine whether the following is a function or not.



(ii) Determine whether the following is a function or not.



(iii) Determine the domain and range of the function $y = f(x)$, whose graph is shown below.



(iv) Examine the graph shown in (iii). Mention the integral value(s) of x at which $f(x) = 3$.

(v) Check if $f = \{(a, z), (b, y), (b, x), (c, w), (d, v)\}$ is a function or not. Justify your answer.

SECTION C

*(Question numbers 15 to 17 carry **2 marks** each.)*

15. How many words, with or without meaning, can be formed using all the letters of EQUATION, using each letter exactly once?

16. Evaluate : $\cot\left(\frac{\pi}{8}\right)$.

OR

A wheel makes 360 revolutions in one minute. Through how many radians does it turn in six seconds?

17. Simplify : $\left(\frac{1}{1+i} - \frac{i}{1-i}\right)$. Express the result in $a + ib$ from.

SECTION D

*(Question numbers 18 to 19 carry **3 marks** each.)*

18. For the sets $U=\{1,2,3,4,5,6,7,8,9\}$, $A=\{2,4,6,8\}$ and $B=\{2,3,5,7\}$, verify that $(A\cup B)'=A'\cap B'$.

OR

Number of elements in two finite sets A and B are m and k respectively. Also the total number of subsets of first set A is 56 more than the total number of subsets of second set B, then find the values of m and k.

19. Solve for x and represent your solution on the number line $[3x-4]=7$, where $[.]$ represents the greatest integer function.

SECTION E

*(Question numbers 20 to 21 carry **4 marks** each.)*

20. Find the range of $f(x)=\dfrac{1}{2x^2-x-3}$.

OR

Redefine the function $f(x)=|x-3|-|x+2|$ and, hence sketch its graph.

21. Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \dfrac{1}{16}$.

This document contains MCQs for Mathematics (041) of class XI.
✪ Answers / Solutions is available on **YouTube channel – Mathematicia By O.P. Gupta**
You can **share this document** with other students!

With a lot of Blessings!

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