



INDIAN SCHOOL MUSCAT FIRST TERM EXAMINATION MATHEMATICS

CLASS: XI

Sub. Code: 041

Time Allotted: 3 Hrs.

25.09.2018

Max. Marks: 100

General Instructions:

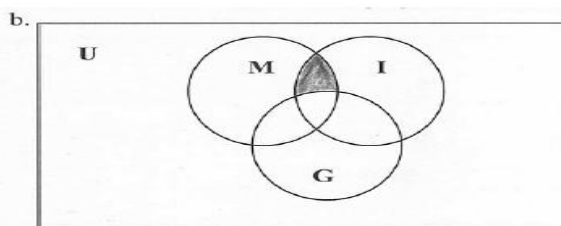
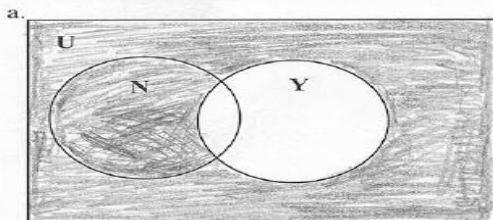
- (i) All questions are compulsory.
- (ii) The question paper consists of 29 questions divided into four sections A, B, C and D. Section A contains 4 questions of 1 mark each, Section B contains 8 questions of 2 marks each, Section C contains 11 questions of 4 marks each & Section D contains 6 questions of 6 marks each.
- (iii) There is no overall choice. However, an internal choice has been provided in three questions of 4 marks each and three questions of 6 marks each. You have to attempt only one of the alternatives in all such questions.
- (iv) Use of calculator is not permitted.

SECTION - A

1. Write the following set in set builder form ; { 2, 5, 10, 17, 26, 37, 50 }
2. If $(-1, 1) \in A \times A$ and $n(A) = 2$. Write the elements of set A and the value of $n(A \times A)$.
3. Write radian measure of $40^\circ 20'$.
4. Find the value of $-i^{99} + i^{998} + i^{25}$

SECTION - B

5. Using set notations, write separately for part a and b, what does the shaded part of the following Venn diagrams represent?



6. Determine the domain and range of the relation R defined by $R = \{(x, x + 6) : x \in \{3, 4, 5, 6, 7, 8\}\}$
7. Find the value of $\cos 15^\circ$.

8. Find the general solution of $\tan 2x = -\frac{1}{\sqrt{3}}$
9. If $\left(\frac{1-i}{1+i}\right)^{10} = a + ib$, find the value of a and b.
10. Find the conjugate of $\frac{2-i}{(1-2i)^2}$
11. If ${}^nP_r = 840$ and ${}^nC_r = 35$, then find the value of r
12. If for a sample size of 60 observations $\sum x^2 = 18000$ and $\sum x = 960$, then find its variance.

SECTION - C

13. Verify De' Morgan's laws for the following sets where U represents universal set.
 $U = \{1,2,3,4,5,6,8,9\}$, $P = \{2,4,8,9\}$ and $Q = \{1,3,5,8\}$
14. Find the domain and range of the function $f: f(x) = \sqrt{16 - x^2}$
15. A solution is to be kept between 40°C and 45°C . What is the range of temperature in degree Fahrenheit, if the conversion formula is $5F = 9C + 160$?
16. Justify that function $f: \{1,2,3,4\} \rightarrow \{1,3,5,7\}$, $f(x) = \{(1,1), (2,3), (3,5), (4,7)\}$ is a function. Further if $f(x) = ax + b$, then find the values of a and b.

OR

A function f is defined as $f(x) = \begin{cases} 1-x, & x \leq 0 \\ 1+x, & x \geq 0 \end{cases}$. Write the range of the function. Draw the graph of the function.

17. Prove by principle of mathematical induction that :

$$1.2 + 2.3 + 3.4 + \dots + n(n+1) = \frac{n(n+1)(n+2)}{3}$$

18. What is the number of ways of choosing 4 cards from a pack of 52 playing cards if
 - (i) All four cards belong to different suits
 - (ii) All four cards are face cards
 - (iii) one card is diamond and other three are black.

OR

How many different words with or without meaning can be formed using any 2 distinct vowels and any 2 distinct consonants from all 26 alphabets of English language which has 5 vowels and 21 consonants?

19. Write the following complex number in the polar form $2i - 2\sqrt{3}$
20. Find the mean deviation about mean for the following data.

x	5	10	15	20	25
f	7	4	6	3	5

21. Find the possible number of words with or without meaning that can be formed by arranging all the alphabets of the word INDEPENDENCE such that
 - (i) the vowels are never together

