

**BACHELOR OF COMPUTER APPLICATION**  
**FIRST SEMESTER [SPECIAL REPEAT]**  
**FUNDAMENTAL CONCEPTS OF MATHEMATICS**  
**BSM-710 (BRIDGE COURSE)**  
[USE OMR SHEET FOR OBJECTIVE PART]

**SET**  
**A**

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

( Objective )

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- The length of a rectangle is three times the breadth. If the minimum perimeter of the rectangle is 160 cm, then:  
a. breadth > 20 cm  
b. length < 20 cm  
c. breadth  $\times \geq 20$  cm  
d. length  $\leq 20$  cm
- If  $-3x + 17 < -13$ , then:  
a.  $x \in (10, \infty)$   
b.  $x \in [10, \infty)$   
c.  $x \in (-\infty, 10]$   
d.  $x \in [-10, 10]$
- If  $4x + 3 < 6x + 7$ , then x belongs to the interval:  
a. (2,  $\infty$ )  
b. (-2,  $\infty$ )  
c. (- $\infty$ , 2)  
d. (-4,  $\infty$ )
- Solving  $-8 \leq 5x - 3 < 7$   
a.  $-1/2 \leq x \leq 2$   
b.  $1 \leq x < 2$   
c.  $-1 \leq x < 2$   
d.  $-1 < x \leq 2$
- The inequality representing the following graph is



- a.  $|x| < 5$

b.  $|x| \leq 5$

c.  $|x| > 5$

d.  $|x| \geq 5$
- The value of  $1 + i^2 + i^4$   
a. 0  
b. -1  
c. 1  
d. None of these
- If  $a + ib = c + id$ , then  
a.  $a^2 + c^2 = 0$   
b.  $b^2 + c^2 = 0$   
c.  $b^2 + d^2 = 0$   
d.  $a^2 + b^2 = c^2 + d^2$
- Value of i is.....  
a. -1  
b. 1  
c.  $(-1)^{\frac{1}{2}}$   
d.  $(-1)^{\frac{1}{4}}$

9. In  $z = 4 + i$ , what is the real part?  
 a. 1  
 b. 4  
 c. 5  
 d. 0
10. In  $z = 4 + i$ , what is the imaginary part?  
 a. 1  
 b. 4  
 c. 5  
 d. 0
11.  $(x + 3) + i(y - 2) = 5 + 2i$ , find the values of x and y.  
 a.  $x=8$  and  $y=4$   
 b.  $x=2$  and  $y=4$   
 c.  $x=2$  and  $y=0$   
 d.  $x=8$  and  $y=0$
12.  $(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ)$  is equal to:  
 a. 0  
 b.  $1 + 2\sqrt{3}$   
 c.  $1 - \sqrt{3}$   
 d.  $1 + \sqrt{3}$
13. The value of  $\tan 60^\circ / \cot 30^\circ$  is equal to:  
 a. 0  
 b. 1  
 c. 2  
 d. 3
14.  $1 - \cos^2 A$  is equal to:  
 a.  $\sin^2 A$   
 b.  $\tan^2 A$   
 c.  $1 - \sin^2 A$   
 d.  $\sec^2 A$
15. The value of  $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$  is:  
 a. 0  
 b. 1  
 c. 2  
 d. 4
16. If x is a set and the set contains an integer which is neither positive nor negative then the set x is.....  
 a. Set is Empty  
 b. Set is Non-empty  
 c. Set is Finite  
 d. Set is both Non-empty and Finite
17. If x is a set and the set contains the real number between 1 and 2, then the set is.....  
 a. Empty set  
 b. Finite set  
 c. Infinite set  
 d. None of the mentioned
18. Which of the following is a subset of set  $\{1, 2, 3, 4\}$ ?  
 a.  $\{1, 2\}$   
 b.  $\{1, 2, 3\}$   
 c.  $\{1\}$   
 d. All of the mentioned
19. How to define a set?  
 a. A collection of well-defined objects or element  
 b. A collection of unordered objects or element  
 c. Any random elements  
 d. A collection of special characters
20. How is a set denoted?  
 a.  $(...)$   
 b.  $\{...\}$   
 c.  $[...]$   
 d.  $*...*$

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**( Descriptive )**

Time : 2 hr. 30 mins.

Marks : 50

[ Answer question no.1 & any four (4) from the rest ]

1. Find the conjugate, modulus and multiplicative inverse of the following: 3+3+4=10  
 $2 - 3i$
  
2. a) The marks obtained by a student of class XI in first and second terminal examination are 62 and 48 respectively. Find the minimum marks he should get in the annual examination to have an average of at least 60 marks. 5+5=10  
b) Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40.
  
3. a) Express in  $a + ib$  form of the followings: 2+2=4  
i)  $i^9 + i^{19}$   
ii)  $i^{-39}$   
b) Find the value of 3+3=6  
i)  $(-i)(2i)\left(-\frac{1}{8}i\right)^3$   
ii)  $(-2 - \frac{1}{3}i)^3$
  
4. a) In a survey of 400 students in a school, 100 were listed as taking apple juice, 150 as taking orange juice and 75 were listed as taking both apple as well as orange juice. Find how many students were taking neither apple juice nor orange juice. 5+5=10  
b) State and prove the De Morgan's law.
  
5. a) Find the value of  $\sin 15^\circ$  and  $\cos 15^\circ$  5  
b) Prove that  $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$  5
  
6. a) Prove that  $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$  5  
b) Show that  $\tan 3x + \tan 2x + \tan x = \tan 3x \tan 2x \tan x$  5
  
7. a) Solve  $5x - 3 < 3x + 1$  5+5=10  
b) Solve  $\frac{5-2x}{x} < \frac{x}{5}$

8. a) In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach both physics and mathematics. How many teach physics?

5

b) If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,

5

$A = \{1, 2, 3, 4, 5\}$

$B = \{2, 4, 6, 8\}$ ,

then find the value of  $A^1 \cup B^1$ ,  $(A - B)^c$

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