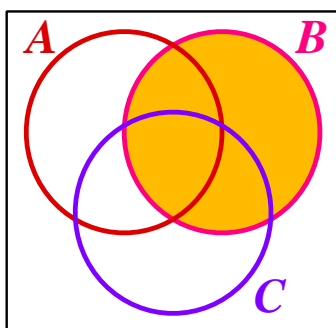


**4.1 Venn Diagram Backwards**

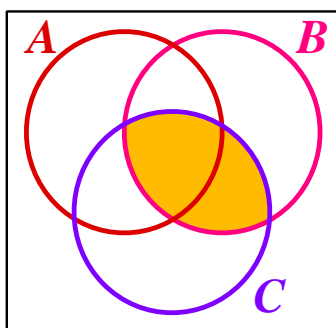
Previously, the questions involving shading on a Venn diagram have given a piece of Set Theory algebra, and asked that the region specified be shaded. However, such questions can be asked the other way round; the shading is given and the algebra describing the region asked for.

**4.2 Example**

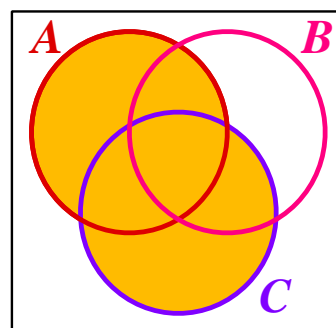
On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.



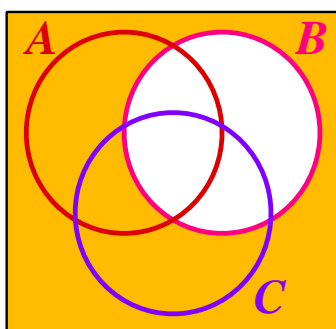
Shade :



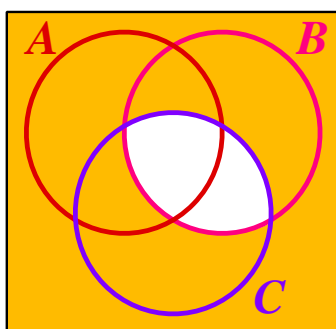
Shade :



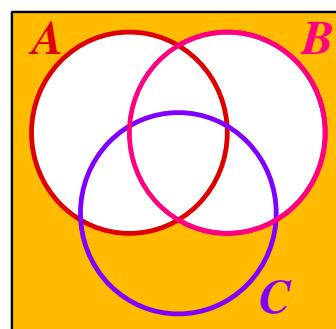
Shade :



Shade :



Shade :



Shade :

[ 6 marks ]

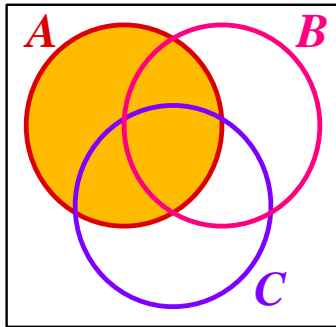
Often, more than one answer is possible, although there is usually an elegant, simplest answer, which is to be striven for.

### 4.3 Exercise

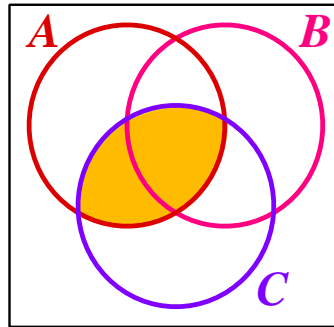
Marks Available : 40

#### Question 1

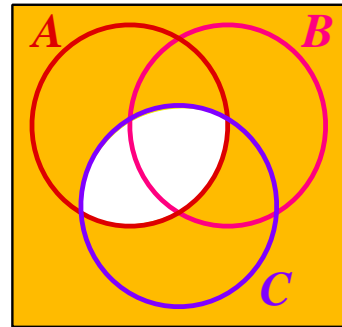
On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.



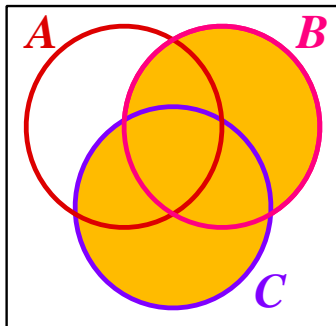
Shade :



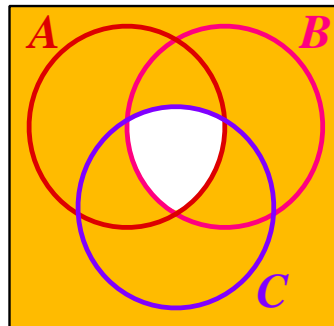
Shade :



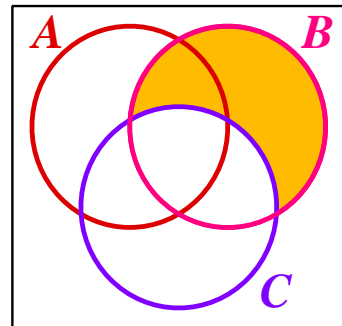
Shade :



Shade :



Shade :



Shade :

[ 6 marks ]

#### Question 2

Given that  $D = \{\text{Names of days in a week}\}$

What is  $n\{\text{Names of days in a week}\}$

[ 1 mark ]

**Question 3**

Let  $S = \{\text{Square numbers less than } 40\}$   
 $F = \{\text{Factors of } 32\}$   
 $T = \{\text{Triangular numbers less than } 40\}$

(i) List the elements of set  $S$

[ 1 mark ]

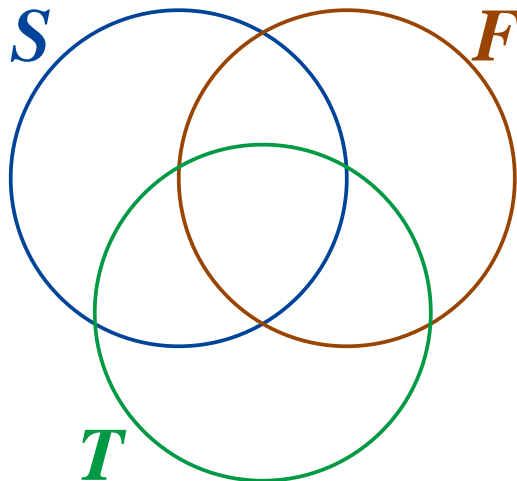
(ii) List the elements of set  $F$

[ 1 mark ]

(iii) List the elements of set  $T$

[ 1 mark ]

(iv) Complete the Venn diagram to show the relationship between  $S$ ,  $F$  and  $T$ .



[ 3 marks ]

(v) By counting elements, if any, determine :

(a)  $n(F)$

(d)  $n(S \cup F \cup T)$

(b)  $n(S \cup F)$

(e)  $n(S \cap F \cap T')$

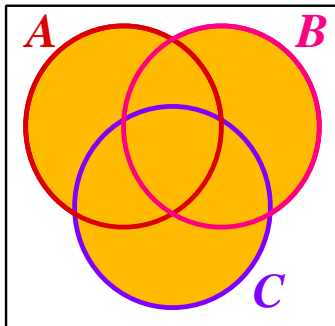
(c)  $n(S \cap F)$

(f)  $n((S \cap F) \cup T)$

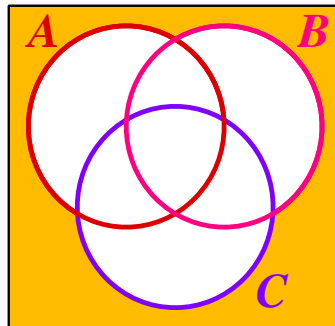
[ 6 marks ]

**Question 4**

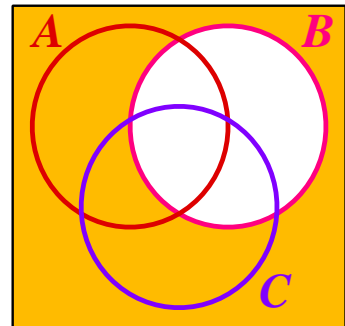
On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.



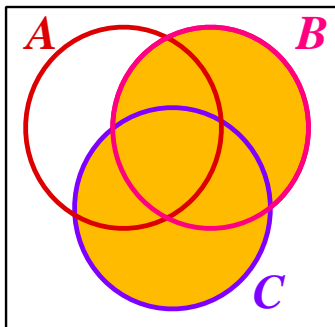
Shade :



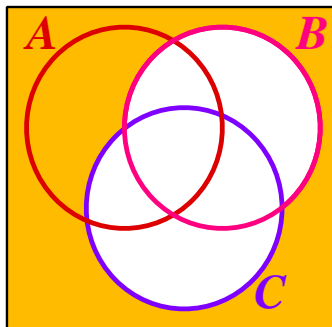
Shade :



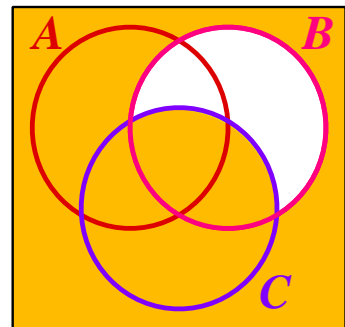
Shade :



Shade :



Shade :



Shade :

[ 6 marks ]

**Question 5**

In this question,

$V = \{\text{vowels}\}$

$C = \{\text{consonants}\}$

Describe in words the set  $V \cup C$

[ 1 mark ]

### Question 6

Let  $\varepsilon$  = All positive integers

Let  $A$  = {The factors of 100}

Let  $B$  = {The factors of 60}

( i ) List the elements of set A

[ 2 marks ]

( ii ) List the elements of set B

[ 2 marks ]

( iii ) For each of the following, decide if the given statement is TRUE or FALSE

( a )  $n(A) = 9$

( f )  $n(A \cap B) > 5$

( b )  $n(B) \neq 9$

( g )  $7 \notin (A \cup B)$

( c )  $3 \in (A \cup B)$

( h )  $101 \in A'$

( d )  $3 \in (A \cap B)$

( i )  $101 \in (A' \cup B')$

( e )  $50 \notin B'$

( j )  $12 \in (A \cup B)'$

[ 10 marks ]