* B S - 1 3 8 6 *

BS-1386 Seat No. 3400

B. Sc. (Sem. IV) Examination

March / April - 2014

Mathematics : ES-22

(Business Mathematics - IV)

Time : 2 Hours] [Total Marks : 50

1 (a) Attempt any two : **10**

(i) Discuss the validity of the argument :

If he works hard then he will be succesfful.

If he is successful then he will happy.

Therefore, hardwork leads to happiness.

(ii) In a class of 25 students; 12 students have taken maths; 8 have taken maths but not physics. Find the number of students who have taken maths and physics and those who have taken physics but not maths.

(iii) If A, B are two subsets of the universal set U; then prove that

$(A' \cup B') \cup (A' \cup B)' = A$.

(b) Attempt any two : **10**

(i) Asked if you will vote for AAP; the following responses are recorded :

	Yes	*No*	*Don't know*
Adult Male	10	20	5
Adult Female	20	15	5
Youth just to enter adulthood	10	5	10

Write
A=set of adults; C=set of women and children
Y=set of 'Yes' answers ; N=set of 'No' answers
Find :

(i) $n(C')$

(ii) $n(A \cap C)$

(iii) $n(Y \cup N)'$

(ii) Prove that :

$(p \wedge q) \Rightarrow (p \vee q)$ is a tautology but

$(p \vee q) \Rightarrow (p \wedge q)$ is not.

(iii) A company studies the product preferences of 20,000 consumers. It was found that each of the products A, B, C liked by 7020, 6230 and 5980 respectively and all the products were liked by 1500; products A and B were liked by 2580; products A and C were liked by 1200 and products B and C were liked by 1950.
Prove that the sutdy results are not correct.

(c) Attempt any five : 5

If $A = \{0, 1, 2\}$; state whether the following statements are ture of false :

(i) $\phi \in A$

(ii) $\{\phi\} \subset A$

(iii) $\{1, 2\} \in A$

(iv) $2 \subset A$

(v) $A \in A$

(vi) $\{A\} \subset A$

2 (a) Attempt any four : 20

(i) How many different words can be made out of the letters in the word MEHSANA. In how many of these will the vowels occupy the even places ?

(ii) In a mercantile firm 4 posts fall vacant and 35 candidates apply for the posts. In how many ways can a selection be made; if one particular candidate is always included.

(iii) A boat's crew consist of 8 men ; 3 of whom can only row on one side and 2 only on the other. Find the number of ways in which the crew can be arranged.

(iv) How many arrangements can be made with the letters of the word MATHEMATICS and in how many of them vowels occurs together ?

(v) A gentleman invites a party of 13 quests to a dinner and places 8 of them at one table and the remaining 5 at another, the tables being round. Find the number of ways in which he can arrange the guests.

(b) Attempt any five : 5

(i) If ${}^{n}C_{n-3} = {}^{n}C_{n-5}$; then find ${}^{2n}C_{2}$.

(ii) If ${}^{10}C_{10-r} = 120$ and ${}^{10}P_{r} = 604800$; then find r.

(iii) If $n(U) = 880$, $n(A) = 240$, $n(B) = 336$, $n(C) = 224$, $n(A \cap B \cap C) = 24$; then find $n(A' \cap B \cap C)$.

(iv) If p and q are statements, then prove that $\sim (p \Rightarrow q) = p \wedge \square q$.

(v) Simplify $\sim (\sim p \Rightarrow \sim q)$.

(vi) Prove that :

$(p \wedge q) \wedge \square (p \vee q)$ is a fallacy; where p and q are statements.
