**BBS01T1009, Question Bank-Unit 2**

**(Counting Techniques)**

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| **Sr. No.** | **Questions** | **Bloom’s Taxonomy Level** | **Difficulty Level** | **Marks** |
| **1** | Define sum rule with an example. | K1 | Low | 2 |
| **2** | Define product rule with an example. | K1 | Low | 2 |
| **3** | Define permutation of n objects taking r objects at a time. | K2 | Medium | 2 |
| **4** | Define combination of n objects taking r objects at a time. | K2 | Medium | 2 |
| **5** | Define relation between permutation and combination of n objects taking r at a time | K1 | Medium | 2 |
| **6** | Find permutation of the letters of the word BANANA. | K2 | Low | 2 |
| **7** | Define Inclusion and exclusion principle. | K1 | Low | 2 |
| **8** | Define Pigeon-hole principle. | K2 | Low | 2 |
| **9** | Find the number *m* of permutations of six objects, say, *A*, *B*, *C*, *D*, *E*, *F*, taken three at a time. | K2 | Low | 2 |
| **10** | Find the numberof seven-letter words that can be formed using the letters of the word  “*BENZENE*.” | K1 | Medium | 2 |
| **11** | Three cards are chosen one after the other from a 52-card deck. Find the numberof ways this can be done: (a) with replacement; (b) without replacement. | K2 | Medium | 2 |
| **12** | Find the number of combinations of 4 objects, *A*, *B*, *C*, *D*, taken 3 at a time. | K2 | High | 2 |
| **13** | A farmer buys 3 cows, 2 pigs, and 4 hens from a man who has 6 cows, 5 pigs, and 8 hens. Find the number of choices that the farmer has. | K2 | High | 2 |
| **14** | Find the minimum number of elements that one needs to take from the set  *S* = {1*,* 2*,* 3*, . . . ,* 9} to be sure that two of the numbers add up to 10. | K2 | Medium | 2 |
| **15** | Find the minimum number of students in a class to be sure that three of them are born in the same month. | K2 | Medium | 2 |
| **16** | A box contains 8 blue socks and 6 red socks. Find the number of ways two socks can be drawn from the  box if:  (*a*) They can be any color. (*b*) They must be the same color. | K2 | Medium | 2 |
| **17** | Find the number of Mathematics students at a college taking at least one of the languages  French, German, and Russian, given the following data:  65 study French, 20 study French and German, 45 study German, 25 study French and Russian, 42 study Russian, 15 study German and Russian,8 study all three languages. | K3 | Medium | 6 |
| **18** | Suppose among 32 people who save paper or bottles (or both) for recycling, there are 30 who save paper and 14 who save bottles. Find the number *m* of people who:  (*a*) save both; (*b*) save only paper; (*c*) save only bottles. | K2 | Medium | 6 |
| **19** | Find the number of permutations that can be formed from all the letters of each word: (a) QUEUE;  (b) COMMITTEE; (c) PROPOSITION;  (d) BASEBALL. | K3 | High | 6 |
| **20** | Suppose we are given 4 identical red flags, 2 identical blue flags, and 3 identical green flags. Find the number *m* of different signals that can be formed by hanging the 9 flags in a vertical line. | K3 | High | 6 |
| **21** | A restaurant has 6 different desserts. Find the number of ways a customer can choose:  (a) 1 dessert; (b) 2 of the desserts; (c) 3 of the desserts. | K3 | High | 6 |
| **22** | A class contains 9 men and 3 women. Find the number of ways a teacher can select a committee of 4 from the class where there is: (a) no restrictions; (b) 2 men and 2 women; (c) exactly one woman; (d) at least one woman. | K3 | High | 6 |
| **23** | Consider all integers from 1 up to and including 100. Find the number of them that are:  (a) odd or the square of an integer; (b) even or the cube of an integer. | K3 | Medium | 6 |
| **24** | A survey of 80 car owners shows that 24 own a foreign-made car and 60 own a domestic-made car. Find the number of them who own:  (a) both a foreign made car and a domestic made car;  (b) only a foreign made car;  (c) only a domestic made car. | K3 | Medium | 9 |
| **25** | Consider all integers from 1 up to and including 300. Find the number of them that are divisible by:   1. at least one of 3, 5, 7;   (b) 3 and 5 but not by 7;  (c) by 5, but by neither 3 nor 7;  (d) by none of the numbers 3, 5, 7. | K3 | High | 9 |
| **26** | In a certain school, French (*F*), Spanish (*S*), and German (*G*) are the only foreign languages taught. Among 80 students:  (i) 20 study *F*, 25 study *S*, 15 study *G*.  (ii) 8 study *F* and *S*, 6 study *S* and *G*, 5 study *F* and *G*.  (iii) 2 study all three languages.  Find the number of the 80 students who are studying:  (a) none of the languages;  (b) only French;  (c) only one language;  (d) only Spanish and German;  (e) exactly two of the languages. | K3 | High | 9 |
| **27** | The English alphabet has 26 letters of which 5 are vowels. Consider only 5-letter “words” consisting of 3 different consonants and 2 different vowels. Find the number of such words which:   1. have no restrictions;   (b) contain the letter *B*;  (c) contain the letters *B* and *C*;  (d) begin with *B* and contain the letter *C*. | K3 | Medium | 9 |