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| **Serial No.** | **Questions** | **CO** | **Bloom’s Taxonomy Level** | **Difficulty Level** | **Competitive Exam Question Y/N** | **Area** | **Topic** | **Unit** | **Marks** |
| **1** | Define sum rule with an example. | CO2 | K1 | Low | N |  |  | 2 | 2 |
| **2** | Define product rule with an example. | CO2 | K1 | Low | N |  |  | 2 | 2 |
| **3** | Define permutation of n objects taking r objects at a time. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **4** | Define combination of n objects taking r objects at a time. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **5** | Define relation between permutation and combination of n objects taking r at a time. | CO2 | K1 | Medium | N |  |  | 2 | 2 |
| **6** | Find permutation of the letters of the word BANANA. | CO2 | K2 | Low | N |  |  | 2 | 2 |
| **7** | Find the formula for circular permutation. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **8** | Define Inclusion and exclusion principle. | CO2 | K1 | Low | N |  |  | 2 | 2 |
| **9** | Define Pigeon-hole principle. | CO2 | K2 | Low | N |  |  | 2 | 2 |
| **10** | Define Generalized Pigeon-hole principle. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **11** | Find the number *m* of permutations of six objects, say, *A*, *B*, *C*, *D*, *E*, *F*, taken three at a time. | CO2 | K2 | Low | N |  |  | 2 | 2 |
| **12** | Find the number *m* of seven-letter words that can be formed using the letters of the word  “*BENZENE*.” | CO2 | K1 | Medium | N |  |  | 2 | 2 |
| **13** | Three cards are chosen one after the other from a 52-card deck. Find the number *m* of ways this can be done: (a) with replacement; (b) without replacement. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **14** | Find the number of combinations of 4 objects, *A*, *B*, *C*, *D*, taken 3 at a time. | CO2 | K2 | High | N |  |  | 2 | 2 |
| **15** | 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 *m* of choices that the farmer has. | CO2 | K2 | High | N |  |  | 2 | 2 |
| **16** | 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. | CO2 | K2 | Medium | Y |  |  | 2 | 2 |
| **17** | Find the minimum number of students in a class to be sure that three of them are born in the same month. | CO2 | K2 | Medium | Y |  |  | 2 | 2 |
| **18** | Find the number *m* of ways that 7 people can arrange themselves:  (*a*) In a row of chairs;  (*b*) Around a circular table. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **19** | 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. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **20** | Find the number *m* of committees of 5 with a given chairperson that can be selected from 12 people. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **21** | A history class contains 8 male students and 6 female students. Find the number *n* of ways that the class  can elect: (*a*) 1 class representative; (*b*) 2 class representatives, 1 male and 1 female;  (*c*) 1 president and 1 vice president. | CO2 | K2 | Medium | N |  |  | 2 | 2 |
| **22** | There are 22 female students and 18 male students in a classroom. Find the total number *t* of students. | CO2 | K3 | High | Y |  |  | 2 | 2 |
| **23** | Suppose a bookcase shelf has 5 History texts, 3 Sociology texts, 6 Anthropology texts, and 4 Psychology texts. Find the number *n* of ways a student can choose:  (*a*) one of the texts; (*b*) one of each type of text. | CO2 | K3 | Medium | Y |  |  | 2 | 2 |
| **24** | There are 12 students in a class. Find the number *n* of ways that the 12 students can take 3 tests if 4 students are to take each test. | CO2 | K3 | Medium | Y |  |  | 2 | 2 |
| **25** | Let *A*, *B*, *C*, *D* denote, respectively, art, biology, chemistry, and drama courses. Find the number *N* of students in a dormitory given the data:  12 take *A,* 5 take *A* and *B,* 4 take *B* and *D,*  2 take *B,* C*, D,*  20 take *B,* 7 take *A* and *C,* 3 take *C* and *D,* 3 take *A, C, D,*  20 take *C,* 4 take *A* and *D,* 3 take *A, B,C,* 2 take all four*,*  8 take *D,* 16 take *B* and *C,* 2 take *A, B, D,* 71 take none*.* | CO2 | K3 | Medium | Y |  |  | 2 | 6 |
| **26** | 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. | CO2 | K3 | Medium | Y |  |  | 2 | 6 |
| **27** | Let *L* be a list (not necessarily in alphabetical order) of the 26 letters in the English alphabet (which consists of 5 vowels, *A*, *E*, *I*, *O*, *U*, and 21 consonants).  (*a*) Show that *L* has a sublist consisting of four or more consecutive consonants.  (*b*) Assuming *L* begins with a vowel, say *A*, show that *L* has a sublist consisting of five or more consecutive consonants. | CO2 | K2 | Medium | Y |  |  | 2 | 6 |
| **28** | 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. | CO2 | K2 | Medium | Y |  |  | 2 | 6 |
| **29** | Astudent must take five classes from three areas of study. Numerous classes are offered in each discipline, but the student cannot take more than two classes in any given area.  (*a*) Using the pigeonhole principle, show that the student will take at least two classes in one area.  (*b*) Using the Inclusion–Exclusion Principle, show that the student will have to take at least one class in  each area. | CO2 | K2 | Medium | N |  |  | 2 | 6 |
| **30** | Find the number of ways a coin can be tossed:  (a) 6 times so that there is exactly 3 heads and no two heads occur in a row.  (b) 2*n* times so that there is exactly *n* heads and no two heads occur in a row. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **31** | Find the number of permutations that can be formed from all the letters of each word: (a) QUEUE;  (b) COMMITTEE; (c) PROPOSITION;  (d) BASEBALL. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **32** | 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. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **33** | A box contains 12 lightbulbs. Find the number *n* of ordered samples of size 3:  (a) with replacement; (b) without replacement. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **34** | class contains l0 students. Find the number *n* of ordered samples of size 4:  (a) with replacement; (b) without replacement. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **35** | 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. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **36** | 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. | CO2 | K3 | High | N |  |  | 2 | 6 |
| **37** | A woman has 11 close friends. Find the number of ways she can invite 5 of them to dinner where:  (a) There are no restrictions.  (b) Two of the friends are married to each other and will not attend separately.  (c) Two of the friends are not speaking with each other and will not attend together. | CO2 | K3 | Medium | Y |  |  | 2 | 6 |
| **38** | Aclass contains 8 men and 6 women and there is one married couple in the class. Find the number *m* of ways a teacher can select a committee of 4 from the class where the husband or wife but not both can be on the committee. | CO2 | K3 | Medium | N |  |  | 2 | 6 |
| **39** | 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. | CO2 | K3 | Medium | N |  |  | 2 | 6 |
| **40** | A box has 6 blue socks and 4 white socks. Find the number of ways two socks can be drawn from the box where:  (a) There are no restrictions. (b) They are different colors. (c) They are the same color. | CO2 | K3 | Low | N |  |  | 2 | 9 |
| **41** | A women student is to answer 10 out of 13 questions. Find the number of her choices where she must answer:  (a) the first two questions;  (b) the first or second question but not both;  (c) exactly 3 out of the first 5 questions;  (d) at least 3 of the first 5 questions. | CO2 | K3 | Medium | N |  |  | 2 | 9 |
| **42** | 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. | CO2 | K3 | Medium | N |  |  | 2 | 9 |
| **43** | In a class of 30 students, 10 got *A* on the first test, 9 got *A* on a second test, and 15 did not get an *A* on either test.  Find: the number of students who got:  (a) an *A* on both tests;  (b) an *A* on the first test but not the second;  (c) an *A* on the second test but not the first. | CO2 | K3 | High | N |  |  | 2 | 9 |
| **44** | 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; 2. (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. | CO2 | K3 | High | N |  |  | 2 | 9 |
| **45** | 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. | CO2 | K3 | High | N |  |  | 2 | 9 |
| **46** | Find the number *m* of elements in the union of sets *A*, *B*, *C*, *D* where:  (i) *A*, *B*, *C*, *D* have 50, 60, 70, 80 elements, respectively.  (ii) Each pair of sets has 20 elements in common.  (iii) Each three of the sets has 10 elements in common.  (iv) All four of the sets have 5 elements in common. | CO2 | K3 | High | Y |  |  | 2 | 9 |
| **47** | Assuming a cell can be empty, find the number *n* of ways that a set with 3 elements can be partitioned into:  (a) 3 ordered cells; (b) 3 unordered cells. | CO2 | K3 | High | N |  |  | 2 | 9 |
| **48** | Assuming a cell can be empty, find the number *n* of ways that a set with 4 elements can be partitioned into:  (a) 3 ordered cells; (b) 3 unordered cells. | CO2 | K3 | Medium | N |  |  | 2 | 9 |
| **49** | 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*. | CO2 | K3 | Medium | Y |  |  | 2 | 9 |
| **50** | Teams *A* and *B* play in theWorld Series of baseball, where the team that first wins four games wins the series. Suppose *A* wins the first game, and that the team that wins the second game also wins the fourth game.  (a) Find and list the number *n* of ways the series can occur.  (b) Find the number of ways that *B* wins the series.  (c) Find the number of ways the series lasts seven games. | CO2 | K3 | High | N |  |  | 2 | 9 |

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC:

Appendix II :

Bloom’s Taxonomy Levels Distribution of Questions in Question Bank

School of SBAS

Course Name : Linear Algerba and differential Equations Course Code : MATH1006

|  |  |  |
| --- | --- | --- |
| Serial No. | Bloom’s Taxonomy Level | Percentage Distribution |
| 1 | Knowledge | 10% |
| 2 | Understand | 30% |
| 3 | Apply | 60% |

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC:

Appendix III :

Bloom’s Taxonomy Levels Distribution of Questions in Question Bank

School of SBAS

Course Name : Linear Algerba and differential Equations Course Code : MATH1006

|  |  |  |
| --- | --- | --- |
| Serial No. | Difficulty Level | Percentage Distribution |
| 1 | Low | 20% |
| 2 | Medium | 60% |
| 3 | High | 20% |

Signature of Course co-ordinator:

Signature of PC:

Signature of Dean:

IQAC: