GENERAL APTITUDE

PEN-Drive / G-Drive Course / VOD & Tablet Users

Workbook

CE / CH / CS / EC / EE / IN / ME / MT / PI

GATE / ESE / UGC-NET / PSUs

GATE Since 2004

GATE ACADEMY®

steps to success...

General Aptitude

PEN-Drive / G-Drive Course / VOD & Tablet Users

Workbook

CE / CH / CS / EC / EE / IN / ME / MT / PI

Edition : APTI-HPD-2021

GATE ACADEMY ®

A/114-115, Smriti Nagar, Bhilai - 490 020 (C.G.)

Phone : 0788 - 4034176, 0788 - 3224176

Help Desk No. - +91-97131-13156

For Feedback & Suggestions...

info@gateacademy.co.in

GATE Syllabus

Common to All Papers

Verbal Aptitude : Basic English grammar: tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech Basic vocabulary: words, idioms, and phrases in context Reading and comprehension Narrative sequencing

Quantitative Aptitude : Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series Mensuration and geometry Elementary statistics and probability.

Analytical Aptitude : Logic: deduction and induction Analogy, Numerical relations and reasoning.

Spatial Aptitude : Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping Paper folding, cutting, and patterns in 2 and 3 dimensions.

Table of Contents

Sr.	Chapters	Pages
1.	Number System ……	1
2.	Permutation & Combination ……	9
3.	Probability ……	14
4.	Time & Work……	20
5.	Percentage & It's Applications ……	25
6.	Time, Speed & Distance……	29
7.	Average & Ratio ……	33
8.	Geometry & Mensuration ……	38
9.	Data Interpretation ……	45
10.	Analytical Aptitude ……	55
11.	Spatial Aptitude ……	93
12.	Verbal Ability & Verbal Grammar (VA VG) ……	104

Video Lecture Information

Sr.	Lecture Name	Duration
01 Number System		
Lecture 01	Numbers Categorization	**1:16:57**
Lecture 02	Concept of Index of Greatest Power (IGP)	**0:46:50**
Lecture 03	Questions Based on IGP	**0:42:54**
Lecture 04	Number of Zeroes Concept	**0:35:58**
Lecture 05	Concept of Cyclicity Finding Unit Digit Value	**0:53:39**
Lecture 06	Questions Based on Unit Digit Value 01	**0:28:11**
Lecture 07	Questions Based on Unit Digit Value 02	**1:13:51**
Lecture 08	Finding Last Two Digits	**0:55:55**
Lecture 09	Divisibility Rule Concept	**0:41:06**
Lecture 10	Questions Based on Divisibility Rule	**0:59:34**
Lecture 11	Divisibility Rule (Question 22)	**0:18:39**
Lecture 12	Divisibility for Algebraic function	**0:29:29**
Lecture 13	Factorization	**0:58:30**
Lecture 14	Questions Based on Factorization	**0:35:00**
Lecture 15	Discussion on Coprime Numbers	**0:21:01**
Lecture 16	Concept of Remainders	**0:53:10**
Lecture 17	Remainders Theorem	**0:48:39**
Lecture 18	Questions 37-38	**0:19:08**
Lecture 19	Questions 39-43	**0:41:56**
Lecture 20	Questions 44-45	**0:22:22**
Lecture 21	Questions 46-49	**0:29:57**
Lecture 22	Sequence & Series	**1:22:48**
Lecture 23	Questions 50-52	**0:37:15**
Lecture 24	Questions 53-57	**0:32:11**
Lecture 25	Questions 58-62	**0:47:55**
Lecture 26	Questions 63-68	**0:56:39**
Lecture 27	Remainders Theorem (Question 70)	**0:44:37**
Lecture 28	CPQ 71-80	**0:58:44**
Lecture 29	CPQ 81-86	**0:55:12**
Lecture 30	CPQ 87-89	**0:27:57**
Lecture 31	LCM & HCF Concept	**0:52:33**
02 Permutation & Combination		
Lecture 01	Introduction to PnC	**1:01:36**
Lecture 02	How to use Permutation & Combination	**0:32:09**

Lecture 03	Questions 1-5 & 9	**1:09:41**
Lecture 04	Questions 6-7	**0:40:13**
Lecture 05	SPQ 1 & CPQ 8	**1:04:31**
Lecture 06	Questions 10-11	**0:36:23**
Lecture 07	Questions 12-14	**1:08:01**
Lecture 08	Questions 15 & 17	**0:47:01**
Lecture 09	Number of Arrangements Concept	**0:23:49**
Lecture 10	Number of Combination Concept with Question 21	**0:24:59**
Lecture 11	Dictionary Word Questions 22-23	**0:43:41**
Lecture 12	Question 32	**0:25:08**
Lecture 13	Straight Lines, Triangles, Chess Board	**0:37:52**
Lecture 14	Number of Squares & Rectangles	**1:09:09**
Lecture 15	Question 16	**0:22:09**
Lecture 16	CPQ 18, 20 & SPQ 8	**0:26:01**
Lecture 17	CPQ 33, 37, 38 & SPQ 2	**0:29:35**
03 Probability		
Lecture 01	Probability Basics (Part 1)	**0:46:31**
Lecture 02	Probability Basics (Part 2)	**0:30:45**
Lecture 03	Types of Events	**0:54:36**
Lecture 04	CPQ 1-2	**0:30:36**
Lecture 05	CPQ 3	**0:32:21**
Lecture 06	CPQ 5-6	**0:24:16**
Lecture 07	CPQ 4 & 10	**0:23:24**
Lecture 08	CPQ 7-8	**0:13:17**
Lecture 09	CPQ 9 & 36-37	**0:21:17**
Lecture 10	CPQ 11 & 13	**0:25:34**
Lecture 11	CPQ 14	**0:24:24**
Lecture 12	CPQ 15	**0:09:11**
Lecture 13	CPQ 16	**0:17:22**
Lecture 14	CPQ 17	**0:09:17**
Lecture 15	CPQ 18-20	**0:34:17**
Lecture 16	CPQ 21-22	**0:48:04**
Lecture 17	CPQ 23-24	**0:39:49**
Lecture 18	CPQ 25-29	**0:36:49**
Lecture 19	CPQ 30-34	**0:36:29**
Lecture 20	CPQ 12 & 39	**0:29:07**
Lecture 21	CPQ 35, 38 & SPQ 16	**0:37:04**
04 Time & Work		
Lecture 01	Introduction to Time & Work	**1:07:13**

Lecture 02	Workbook Questions 1-5	**0:43:46**
Lecture 03	Workbook Questions 6-9	**0:33:37**
Lecture 04	Workbook Questions 10-14	**0:38:27**
Lecture 05	Workbook Questions 15-16	**0:23:00**
Lecture 06	Workbook Questions 17-20	**0:33:15**
Lecture 07	Workbook Questions 21-26	**0:37:37**
05 Percentage & Its Application		
Lecture 01	Introduction to Percentage & Its Application	**0:37:10**
Lecture 02	Workbook Questions 1-5	**0:46:09**
Lecture 03	Workbook Questions 6-7	**0:18:04**
Lecture 04	Workbook Questions 8-9	**0:15:15**
Lecture 05	Workbook Questions 11-15	**0:25:20**
Lecture 06	Workbook Questions 16-20	**0:39:21**
Lecture 07	Workbook Questions 21-25	**0:23:53**
Lecture 08	Workbook Questions 26-30	**0:34:07**
Lecture 09	Workbook Questions 31-34	**0:37:19**
06 Time Speed & Distance		
Lecture 01	Introduction to Time Speed & Distance	**1:12:07**
Lecture 02	Workbook Questions 1-5	**0:34:17**
Lecture 03	Workbook Questions 6-10	**0:47:38**
Lecture 04	Workbook Questions 11-15	**0:44:13**
Lecture 05	Workbook Questions 16-20	**0:38:28**
Lecture 06	Workbook Questions 21-25	**0:43:49**
07 Average & Ratio		
Lecture 01	Introduction to Average & Ratio	**0:05:35**
Lecture 02	Workbook Questions 1-5	**0:37:45**
Lecture 03	Workbook Questions 5-8	**0:21:59**
Lecture 04	Workbook Questions 8-10	**0:33:09**
Lecture 05	Workbook Questions 11-15	**0:28:47**
Lecture 06	Workbook Questions 16-20	**0:20:30**
Lecture 07	Workbook Questions 21-25	**0:22:08**
Lecture 08	Workbook Questions 26-30	**0:22:53**
08 Geometry & Mensuration		
Lecture 01	Introduction to Geometry & Mensuration	**0:04:05**
Lecture 02	Workbook Questions 1-5	**0:38:38**
Lecture 03	Workbook Questions 6-9	**0:27:57**
Lecture 04	Workbook Questions 10-14	**0:40:27**
Lecture 05	Workbook Questions 15-16	**0:21:39**
Lecture 06	Workbook Questions 17-19	**0:24:10**

Lecture 07	Workbook Questions 21-25	**0:48:37**
Lecture 08	Workbook Questions 26-29	**0:26:51**
Lecture 09	Workbook Questions 31-35	**0:18:31**
09 Data Interpretation		
Lecture 01	Introduction to Data Interpretation	**0:07:54**
Lecture 02	Workbook Questions 1-4	**0:32:27**
Lecture 03	Workbook Questions 5-8	**0:33:17**
Lecture 04	Workbook Questions 9-11	**0:25:56**
Lecture 05	Workbook Questions 12-14	**0:17:53**
Lecture 06	Workbook Questions 16-20	**0:39:00**
Lecture 07	Workbook Questions 21-32	**0:14:50**
Lecture 08	Workbook Questions 22-24, 28	**0:11:43**
Lecture 09	Workbook Questions 25-27	**0:18:19**
Lecture 10	Workbook Questions 29-30	**0:16:56**
10 Analytical Aptitude		
Lecture 01	Direction - Basic Concepts CBQ	**0:38:35**
Lecture 02	Direction PYQ Q11-016	**0:26:59**
Lecture 03	Direction - Point - Q17-019	**0:15:35**
Lecture 04	Direction - Shadow - Q20-024	**0:30:45**
Lecture 05	Clock - Basic Concepts	**0:27:29**
Lecture 06	Clock - CBQ Q1-Q8	**0:28:05**
Lecture 07	Clock - Angle Between Hands - 29-010	**0:32:22**
Lecture 08	Clock Q11-014	**0:47:17**
Lecture 09	Clock - Error Clock - Q15-022	**0:37:56**
Lecture 10	Clock - Mirror & Water Images - 023	**0:08:30**
Lecture 11	Counting of Figure Q1-Q4	**0:28:13**
Lecture 12	Blood Relation - Basic Concepts	**0:43:56**
Lecture 13	Blood Relation Q1-Q4	**0:13:45**
Lecture 14	Blood Relation 25-010	**0:21:09**
Lecture 15	Coding Decoding - Basic Concepts	**0:30:06**
Lecture 16	Coding Decoding - Process & Pattern	**0:41:45**
Lecture 17	Coding Decoding - Letter to Number Process	**0:29:26**
Lecture 18	Coding Decoding - PYQ Q1-09	**0:24:41**
Lecture 19	Coding Decoding - Letter Series Q10-015	**0:13:28**
Lecture 20	Coding Decoding - Odd One Out Q16-020	**0:17:24**
Lecture 21	Coding Decoding - Number Series Q21-227	**0:24:14**
Lecture 22	Ranking - Basic Concepts Q1-Q7	**0:56:47**
Lecture 23	Order - Basics 08-015	**0:20:18**
Lecture 24	Venn Diagram - Basic Concepts	**0:18:22**

Lecture 25	Venn Diagram Q1-Q2	**0:34:00**
Lecture 26	Venn Diagram 03-013	**0:46:12**
Lecture 27	Contour Lines Q14-016	**0:22:28**
Lecture 28	Syllogism - Basic Concepts	**0:21:14**
Lecture 29	Syllogism - All A are B - Relationship	**0:30:57**
Lecture 30	Syllogism - Some A are B - Relationship	**0:19:22**
Lecture 31	Syllogism - No A are - Relationship	**0:09:50**
Lecture 32	Syllogism - Some A are not B - Relationship	**0:12:40**
Lecture 33	Syllogism Q1-Q12	**0:37:25**
Lecture 34	Syllogism - Practice Table 1	**0:25:18**
Lecture 35	Syllogism - Practice Table 2	**0:24:17**
Lecture 36	Analogy - Basic Concepts	**0:31:29**
Lecture 37	Analogy - Q1-Q18	**0:15:14**
Lecture 38	Seating Arrangement - Circular Q1-Q4	**0:43:55**
Lecture 39	Seating Arrangement - Linear Q5-Q11	**0:31:21**
Lecture 40	Seating Arrangement - Square Q12-Q18	**0:25:21**
Lecture 41	Logical Puzzle Q1-07	**0:48:11**
Lecture 42	Logical Puzzle 08-Q11	**0:36:17**
Lecture 43	Logical Puzzle Q12-Q16	**0:29:13**
Lecture 44	Logical - Basic Concepts	**0:27:50**
Lecture 45	Logical Q1-Q10	**0:39:08**
11 Spatial Aptitude		
Lecture 01	Mirror & Water Images	**0:36:43**
Lecture 02	Paper Cutting & Folding	**0:40:32**
Lecture 03	Figure Symmetry	**0:22:47**
12 Verbal Ability & Verbal Grammar		
Lecture 01	Introduction + Tense (Simple) Part 1	**0:57:47**
Lecture 02	Tense (Simple) Part 2	**0:25:10**
Lecture 03	Simple Tense (Past+Future)	**0:57:49**
Lecture 04	Continuous Tense	**1:07:10**
Lecture 05	Perfect Tense	**1:03:25**
Lecture 06	Perfect Continuous Tense	**0:27:07**
Lecture 07	Conditional Sentences (Part 1)	**1:07:18**
Lecture 08	Conditional Sentences (Part 2)	**0:27:07**
Lecture 09	Basics (Part 1)	**0:50:30**
Lecture 10	Basics (Part 2)	**0:41:22**
Lecture 11	Basics (Part 3)	**0:54:27**
Lecture 12	Basics (Part 4)	**0:28:48**
Lecture 13	Pronoun (Part 1)	**0:43:36**

Lecture 14	Pronoun (Part 2)	**0:38:10**
Lecture 15	Pronoun (Part 3)	**0:53:25**
Lecture 16	Pronoun (Part 4)	**0:37:31**
Lecture 17	Noun (Part 1)	**0:41:05**
Lecture 18	Noun (Part 2)	**1:11:00**
Lecture 19	Adjective (Part 1)	**0:25:36**
Lecture 20	Adjective (Part 2)	**0:50:12**
Lecture 21	Adjective (Part 3)	**0:27:07**
Lecture 22	Subject Verb Agreement (Part 1)	**0:44:43**
Lecture 23	Subject Verb Agreement (Part 2)	**0:50:17**
Lecture 24	Preposition (Part 1)	**0:53:48**
Lecture 25	Preposition (Part 2) Academic	**0:56:15**
Lecture 26	Verb (Part 1)	**0:49:58**
Lecture 27	Verb (Part 2)	**1:16:11**
Lecture 28	Adverb (Part 1)	**0:52:59**
Lecture 29	Adverb (Part 2)	**0:35:43**
Lecture 30	Conjunction	**0:33:43**
Lecture 31	Articles	**0:56:27**
Lecture 32	Voice (Part 1)	**0:49:37**
Lecture 33	Voice (Part 2)	**0:35:01**
Lecture 34	Voice (Part 3)	**1:15:07**
Lecture 35	Workbook (Part 1) Sentence Completion + Sentence Improvement	**0:47:30**
Lecture 36	Workbook (Part 2) Rest Portion	**0:53:29**

1 NUMBER SYSTEM

Class Practice Questions : (CPQ's)

1.1 Number of Trailing Zero's (0's)

Q.1 (i) Find the IGP of 7 that can divide 256!.

(ii) Find the IGP of 3 in 599!

(iii) Find the IGP of 10 that can divide 890!

(iv) Find the IGP of

(a) 12 in 50! (b) 40 in 150!

(v) Find the IGP of 2 in 31! + 32! + 33! + … + 40!.

(vi) If the IGP of 7 in n! is 10, how many values can n take?

(vii) If the IGP of 5 in n! is 40, what is the greatest power of 11 in n!?

Q.2 100!, 150!, 250!

Q.3 If N = 15 × 30 × 45 × 60 × ……..× 1500, what will be the number of zeroes at the end of N?

(A) 63 (B) 55

(C) 97 (D) 124

[GATE 2016 : IISc Bangalore (CE Set – 2)]

1.2 Unit Digit Value (UDV)

Q.4 $2^{23}, 2^{51}, 3^{59}, 4^{99}, 3^{171}, 7^{208}$

Q.5 $12^{71}, 16^{51}, 21^{99}, 39^{235}, 17^{999}, 37^{897}, 127^{200899}$

Q.6 $13^{666} \times 44^{777} \times 616^{333} \times 777^{444} \times 8898^{222} \times 999^{555}$

Q.7 $1^2 + 2^2 + 3^2 + ... + 99^2 + 100^2$

Q.8 $1^1 + 2^2 + 3^3 + ... + 9^9 + 10^{10}$

Q.9 The numeral in the units position of $211^{870} + 146^{127} \times 3^{424}$ is _____

[GATE 2016 : IISc Bangalore (EE Set - 2)]

Q.10 The last digit of $(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$ is

(A) 2 (B) 4

(C) 6 (D) 8

[GATE 2017 : IIT Roorkee (CH, CE, Set - 1)]

Q.11 Let $x = (633)^{24} - (277)^{38} + (266)^{54}$. What is the units digit of x?

(A) 8 (B) 6

(C) 4 (D) 7

Q.12 Find the unit place of

$$\frac{12^{55}}{3^{11}} + \frac{8^{48}}{16^{18}}$$

Q.13 Find the unit digit of the product of all the prime number between 1 and 99999

(A) 9 (B) 7

(C) 0 (D) N.O.T.

Q.14 Find the unit digit of the product of all the elements of the set which consists all the prime numbers greater than 2 but less than 222.

(A) 4 (B) 5

(C) 0 (D) N.O.T.

Q.15 Find the last digit of

(i) 9^{9^9} (ii) $18^{18^{18^{18}}}$

(iii) $17^{18^{19^{20}}}$ (iv) $14^{15^{16^{17}}}$

1.3 Divisbility

Q.16 If all the natural numbers starting from 1 are written side by side then find the : 25th, 50th, 100th digit of the sequence.

Q.17 In the above question find the remainder when the sequences are divided by : 2,4,8,16 , 5 , 25 , 125.

Q.18 What is the least number of digits in the number that is formed using only 2's and 5's, that is divisible by both 11 and 25?

Q.19 If the eight-digit number a456b72c is divisible by 72, what is the least value of a + b + c?

Q.20 If the number 715■423 is divisible by 3 (■ denotes the missing digit in the thousandths place), then the smallest whole number in the place of ■ is _____.

(A) 0 (B) 2

(C) 5 (D) 6

[GATE 2018 : IIT Guwahati (EC Set – 1)]

Q.21 What is the remainder when the number 523523523……100 digits is divided by 32?

Q.22 Consider the set of integers {1,2,3, ..., 5000}. The number of integers that is divisible by neither 3 nor 4 is :

(A) 1668 (B) 2084

(C) 2500 (D) 2916

[GATE 2010 :IIT Guwahati (MN)]

1.4 Factorization

Q.23 Find the number of factors, Sum of factors and Product of factors of the following :

12, 24, 288.

Q.24 For the given natural number 150,

(i) Number of distinct prime factors

(ii) Number of factors

(iii) Sum of factors

(iv) Product of factors

Q.25 What is the least natural number by which 5400 should be multiplied so that the resultant product is

(i) A perfect square?

(ii) A perfect cube?

Q.26 Find the smallest number y such that : $y \times 162$ is a perfect cube.

(A) 24 (B) 27

(C) 32 (D) 36

[GATE 2017 : IIT Roorkee (EE, CS, Set – 1)]

Q.27 If $a = (3^4)(4^9)$ and $N = a^4$, find the least natural number by which N should be divided so that the resulting number is x^5, where x is a positive integer.

1.5 Concepts of Remainders

Q.28 $\dfrac{(123 \times 1234)}{15}$

Q.29 $(1218 \times 1220 \times 1222 \times 1224) \div 9$

Q.30 $(1719 \times 1721 \times 1723 \times 1725 \times 1727) \div 18$

Q.31 The remainder when S is divided by 20 , where S = 1! + 2! + 3! + 4! + 5! + 6! + ……+ 19! + 20!

Q.32 The rightmost non- zero digit of the number 30^{2720}.

Q.33 Find the remainder when

(i) 7^{77} is divided by 4.

(ii) 11^{88} is divided by 7.

(iii) 5^{123} is divided by 7.

(iv) 7^{84} is divided by 342.

(v) 21^{117} is divided by 17.

(vi) 2^{333} is divided by 21.

(vii) 126^{456} is divided by 41.

(viii) $1201^{12} - 1201$ is divided by 48.

1.6 Last Two Digits

Q.34 $21^{23}, 31^{53}, 51^{93}$

Q.35 $3^{23}, 7^{53}, 9^{93}$

Q.36 $2^{53}, 4^{83}, 8^{93}$

1.7 Miscellaneous

Q.37 If a and b are integers and $a - b$ is even, which of the following must always be even?

(A) ab (B) $a^2 + b^2 + 1$

(C) $a^2 + b + 1$ (D) $ab - b$

[GATE 2017 : IIT Roorkee (ME Set – 2)]

Q.38 Given that a and b are integers and $a + a^2b^3$ is odd then, which one of the following statements is correct?

(A) a and b are both odd

(B) a and b are both even

(C) a is even and b is odd

(D) a is odd and b is even

[GATE 2018 : IIT Guwahati (ME Set – 1)]

Q.39 A number consists of two digits, the sum of digits is 9. If 45 is subtracted from the number, its digits are interchanged. What is the number?

(A) 63 (B) 72

(C) 81 (D) 90

[GATE 2018 : IIT Guwahati (ME Set – 1)]

Q.40 The sum of the digits of a two-digit number is 12. If the new number formed by reversing the digits is greater than the original number by 54, find the original number.

(A) 39 (B) 57

(C) 66 (D) 93

[GATE 2016 : IISc Bangalore (CE Set - 2)]

Q.41 When the digits of a three-digit number are reversed, the number decreases by 594. The difference between the digits in the first two places of the number equals the difference between the digits in the last two places. If none of the digits of the number is zero, the number of possible values of the number is _____.

Q.42 If 198 is subtracted from a three-digit number (T), the resulting number is the three-digit number formed by reversing the digits of T. The middle digit of T equals the sum of its other two digits. T is at least _____.

Q.43 A number is as much greater than 75 as it is smaller than 117. The number is:

(A) 91 (B) 93

(C) 89 (D) 96

[GATE 2013 : IIT Bombay (CE)]

Q.44 The sum of eight consecutive odd numbers is 656. The average of four consecutive even numbers is 87. What is the sum of the smallest odd number and second largest even number?

[GATE 2014 : IIT Kharagpur (EC Set – 2, ME Set - 2)]

Q.45 In a sequence of 12 consecutive odd numbers, the sum of the first 5 numbers is 425. What is the sum of the last 5 numbers in the sequence?

[GATE 2014 : IIT Kharagpur (EC Set - 4, ME Set - 4)]

Direction (46 – 48) : Given, m = 1! + 2! + 3! + 4! +..... + 99! + 100!

Q.46 Find the unit digit of "m"

Q.47 Find the last two digits of 'm'

Q.48 Find the remainder, when 'm' is divided by 168.

Q.49 Which among $2^{1/2}$, $3^{1/3}$, $4^{1/4}$, $6^{1/6}$ and $12^{1/12}$ is the largest?

(A) $2^{1/2}$ (B) $3^{1/3}$

(C $4^{1/4}$ (D) $6^{1/6}$

1.8 Sequence & Series

Q.50 (i) Find the value of $1+2x+3x^2+4x^3+....\infty$ where $x=\frac{1}{2}$.

(ii) Find the value of $1+3x+6x^2+10x^3+15x^4+...\infty$ where $x=\frac{2}{3}$.

Q.51 The sum of the first n terms in the sequence 8, 88, 888, 8888, ….. is _____.

(A) $\frac{81}{80}(10^n-1)+\frac{9}{8}n$

(B) $\frac{81}{80}(10^n-1)-\frac{9}{8}n$

(C) $\frac{80}{81}(10^n-1)+\frac{8}{9}n$

(D) $\frac{80}{81}(10^n-1)-\frac{8}{9}n$

[GATE 2020 : IIT Delhi (IN, ME-1, MT, PE, PH)]

Q.52 The sum of n terms of the series 4 + 44 + 444 + …. is

(A) $\left(\frac{4}{81}\right)\left[10^{n+1}-9n-1\right]$

(B) $\left(\frac{4}{81}\right)\left[10^{n-1}-9n-1\right]$

(C) $\left(\frac{4}{81}\right)\left[10^{n+1}-9n-10\right]$

(D) $\left(\frac{4}{81}\right)\left[10^{n}-9n-10\right]$

[GATE 2011 : IIT Madras (AG, CY, EC, EE, IN, MA, MT, XE, XL)]

Q.53 Find the sum of $(1 + 2 + 3 + \ldots n) + (2 + 3 + \ldots n) + (3 + 4 + \ldots n) + \ldots + (n)$.

Q.54 If $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+....\infty=s$,

Find $\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\frac{1}{5^2}-\frac{1}{6^2}....\infty$.

Q.55 Consider the series

$\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{8}+\frac{1}{9}-\frac{1}{16}+\frac{1}{32}+\frac{1}{27}-\frac{1}{64}+.....$

The sum of the infinite series above is :

(A) ∞ (B) $\frac{5}{6}$

(C) $\frac{1}{2}$ (D) 0

[GATE 2010 : IIT Guwahati (TF)]

Q.56 What is the value of $1+\frac{1}{4}+\frac{1}{16}+\frac{1}{64}+\frac{1}{256}+....?$

(A) 2 (B) $\frac{7}{4}$

(C) $\frac{3}{2}$ (D) $\frac{4}{3}$

[GATE 2018 : IIT Guwahati (EC)]

Q.57 Find the value of 1+4/6 + 9/36 + 16/216 + 25/1296 + …… ∞ .

Q.58 $\frac{1}{5\times7}+\frac{1}{7\times9}+\frac{1}{9\times11}.....\infty =$ _____.

Q.59 $\frac{1}{1+1^2+1^4}+\frac{2}{1+2^2+2^4}+\frac{3}{1+3^2+3^4}+....$

$+\frac{10}{1+10^2+10^4}=$ _____.

Q.60 Find the sum to *n* terms of the series 10 + 84 + 734 + ….

(A) $\frac{9(9^n+1)}{10}+1$ (B) $\frac{9(9^n-1)}{8}+1$

(C) $\frac{9(9^n-1)}{8}+n$ (D) $\frac{9(9^n-1)}{8}+n^2$

[GATE 2013 : IIT Bombay (EC, EE, IN)]

Q.61 What will be the maximum sum of 44, 42, 40, …….?

(A) 502 (B) 504

(C) 506 (D) 500

[GATE 2013 : IIT Bombay (CS, ME, PI)]

Q.62 Consider a sequence of numbers a_1, a_2, a_3, ….. a_n where $a_n=\frac{1}{n}-\frac{1}{n+2}$, for each integer $(n>0)$.

What is the sum of the first 50 terms?

(A) $\left(1+\frac{1}{2}\right)-\frac{1}{50}$

(B) $\left(1+\frac{1}{2}\right)+\frac{1}{50}$

(C) $\left(1+\frac{1}{2}\right)-\left(\frac{1}{51}+\frac{1}{52}\right)$

(D) $1-\left(\frac{1}{51}+\frac{1}{52}\right)$

[GATE 2018 : IIT Guwahati (CE-1)]

Q.63 Find the sum of the expression

$$\frac{1}{\sqrt{1}+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+....\frac{1}{\sqrt{80}+\sqrt{81}}$$

(A) 7 (B) 8

(C) 9 (D) 10

[GATE 2013 : IIT Bombay (CS, ME, PI)]

Q.64 The value of $\sqrt{12+\sqrt{12+\sqrt{12+....}}}$ is

(A) 3.464 (B) 3.932

(C) 4.000 (D) 4.444

[GATE 2014 : IIT Kharagpur (CS-2, EE-2)]

Q.65 Insert seven numbers between 2 and 34, such that the resulting sequence including 2 and 34 is an arithmetic progression. The sum of these inserted seven numbers is _____.

(A) 130 (B) 120

(C) 124 (D) 126

[GATE 2020 (CE-1)]

Q.66 The sum of all the natural numbers between 1 and 101 which are divisible by 5 is :

(A) 1000 (B) 1050

(C) 1500 (D) 2550

Q.67 Given two sets *X* = {1, 2, 3} and *T* = {2, 3, 4}, we construct a set Z of all possible fractions where the numerators belong to set X and the denominators belong to set Y. The product of elements having minimum and maximum values in the set Z is _____.

(A) 1/8 (B) 3/8

(C) 1/12 (D) 1/6

[GATE 2019 : IIT Madras (EE)]

Q.68 How many integers are there between 100 and 1000 all of whose digits are even?

(A) 90 (B) 100

(C) 80 (D) 60

[GATE 2019 : IIT Madras (EE)]

Q.69 Which one of the following numbers is exactly divisible by $(11^{13}+1)$?

(A) $11^{26}+1$ (B) $11^{52}-1$

(C) $11^{39}-1$ (D) $11^{33}+1$

[GATE 2021 : IIT Bombay (AG, EE, EY, GG)]

Q.70 What would be the smallest natural number which when divided either by 20 or by 42 or by 76 leaves a remainder of 7 in each case?

(A) 3047 (B) 6047
(C) 7987 (D) 63847

[GATE 2018 : IIT Guwahati (CS, MN)]

Q.71 If a prime number on division by 4 gives a remainder of 1, then that number can be expressed as
(A) Sum of square of two natural numbers
(B) Sum of cubes of two natural numbers
(C) Sum of square roots of two natural numbers
(D) Sum of cube roots of two naturals numbers

[GATE 2012 : IIT Delhi (AE, AG,MN)]

Q.72 X is a 30 digits number starting with the digit 4 followed by the digit 7. Then the number X^3 will have,
(A) 90 digits (B) 91 digits
(C) 92 digits (D) 93 digits

[GATE 2017 : IIT Roorkee (CS-2, EE-2)]

Q.73 If $pqr \neq 0$ and $p^{-x} = \frac{1}{q}, q^{-y} = \frac{1}{r}, r^{-z} = \frac{1}{p}$, what is the value of the product xyz?
(A) –1 (B) $\frac{1}{pqr}$
(C) 1 (D) pqr

[GATE 2018 : IIT Guwahati (CS, MN)]

Q.74 In appreciation of the social improvements completed in a town, a wealthy philanthropist decided to gift Rs 750 to each male senior citizen in the town and Rs 1000 to each female senior citizen. Altogether, there were 300 senior citizens eligible for this gift. However, only 8/9th of the eligible men and 2/3rd of the eligible women claimed the gift. How much money (in rupees) did the philanthropist give away in total?
(A) 1,50,000 (B) 2,00,000
(C) 1,75,000 (D) 1,51,000

[GATE 2018 : IIT Guwahati (CS, MN)]

Q.75 In four-digits integer numbers from the 1001 to 9999, the digits group "37" (in the same sequence) appears_____ times.
(A) 270 (B) 299
(C) 279 (D) 280

[GATE 2020 : IIT Delhi (EE, EY,TF)]

Q.76 The difference between the sum of the first 2n naturals numbers and the sum of the first n odd numbers is
(A) $2^n - n$ (B) $n^2 - n$
(C) $2^n + n$ (D) $n^2 + n$

[GATE 2020 : IIT Delhi (AR,BM,BT,CH,MA,MN,ST,XE,XL)]

Q.77 If $\left(x-\frac{1}{2}\right)^2 - \left(x-\frac{3}{2}\right)^2 = x+2$ then the value of x is
(A) 6 (B) 4
(C) 8 (D) 2

[GATE 2021 : IIT Bombay(CS-2,XE,XL)]

Q.78 If $\left(z+\frac{1}{z}\right)^2 = 98$, compute $\left(z^2+\frac{1}{z^2}\right)$.

[GATE 2014 : IIT Kharagpur (CS-1 ,EE-1)]

Q.79 What is the average of all multiples of 10 from the 2 to 198?
(A) 90 (B) 100
(C) 110 (D) 120

[GATE 2014 : IIT Kharagpur (CS-2 ,EE-2)]

Q.80 For what values of K given below is $\frac{(k+2)^2}{k-3}$ an integer?
(A) 4, 8, 18 (B) 4, 10, 16,
(C) 4, 8, 28 (D) 8, 26, 28

[GATE 2018 : IIT Guwahati (EE)]

1.9 LCM & HCF

Q.81 (i) Find the LCM and HCF of 60, 96 and 144.
(ii) Find the LCM and HCF of 2/5, 12/18, 8/9 and 6/7.

Q.82 The LCM and HCF of two numbers are 360 and 18 respectively.
(i) If one of them is 90, what is the other?
(ii) If one of them is 180, what is the other?

Q.83 The LCM and HCF of 36,60 and x is 1260 and their HCF is 12. What is the difference between the least and the greatest possible value of x?

Q.84 Four lights flash together at 10 am and after that, they flash after every 15, 20, 24 and 36 seconds. How many times do they flash together from 10 am to 11:45 am?

Q.85 In a singing competition, 30 participants from Andhra Pradesh, 48 from the Karnataka and 60 from Tamilnadu participate. Find the minimum

numbers of rooms required to conduct the competition, if, in each room the same numbers of participants belonging to the same state are to be allotted.

Q.86 Patnaik had some books with him. If he distributes them equally among either 30 or 36 or 45 students, he would be left with 15 books. If he distributes them equally among 25 students, he would be left with no books. Find the minimum of number of books he had.

Q.87 The unit digit of $(12345k)^{72}$ is 6. The value of k is:

(A) 8 (B) 6

(C) 2 (D) 9

[MSQ]

Q.88 Sum of the series $2^2+4^2+6^2+.....+20^2$ is

(A) 1040 (B) 1540

(C) 2540 (D) 3080

[ESE-2021 Prelims]

Q.89 The value of $\sum_{1}^{n}\frac{1}{(x+3)(x+4)}$ is

(A) $\frac{n}{n+2}$ (B) $\frac{2n}{n+1}$

(C) $\frac{n}{4(n+4)}$ (D) $\frac{n}{2(n+2)}$

[ESE-2021 Prelims]

Self Practice Questions (SPQ's)

Q.1 Which of the following is not a factor of $6^{12}-1$?

(A) 7 (B) 35

(C) 215 (D) 127

Q.2 If $x=\left(19^3+21^3+23^3+25^3+27^3+29^3+31^3\right)$, what is the remainder when x is divided by 50?

Q.3 How many of the following are not divisible by 63?

(A) 8^8-1 (B) 27^3+36^3

(C) $146\times147\times148$ (D) $117\times188\times119$

Q.4 The digits of a two-digit number differ by 6. The sum of the number and number formed by reversing its digits is 132. Find the number(s).

Q.5 $4^{11}+4^{12}+4^{13}+4^{14}+4^{15}$ is divided by which of the following ?

(A) 11 (B) 31

(C) 341 (D) All of the above

Q.6 Find the difference between the remainders when 7^{84} is divided by 342 & 344.

(A) 0 (B) 1

(C) 3 (D) 5

Q.7 What will be the value of x for $\frac{(100^{17}-1)+(10^{34}+x)}{9}$; the remainder = 0

(A) 3 (B) 6

(C) 9 (D) 8

Q.8 Let the sum of the squares of successive integers 0,1,2,…., n-1, n be denoted by S. Let the sum of the cubes of the same integers be denoted by C. It is desirable that $\frac{2}{315}$, as n increases in steps of unity from zero, is given by the series : $\frac{0}{1},\frac{3}{3},\frac{9}{5},\frac{18}{7},\frac{30}{9},....$ (for $n=0,1,2,3,4.....$). What will be this ratio be for n = 8?

(A) $\frac{108}{17}$ (B) $\frac{103}{17}$

(C) $\frac{103}{15}$ (D) $\frac{100}{15}$

Q.9 Find th HCF and LCM of the following :

(i) 2,4,8

(ii) 24,60,120

(iii) 2/3 , 4/5 , 7/9

(iv) 99! , 999! , 9999!

Q.10 HCF of 3240, 3600 and a third number is 36 and their LCM is $2^4\times3^5\times5^2\times7^2$ -

Q.11 The sum of the two numbers is 216 and their HCF is 27. The number are –

Q.12 The sum of the two numbers is 528 and their HCF is 33. The number of pairs of n umbers satisfying the above conditions is –

Q.13 The least number of five digits which is exactly divisible by 12, 15 and 18 is :

Q.14 The LCM of two numbers is 48. The numbers are in the ratio in the ratio 2 : 3. The sum of the numbers is –

Q.15 The product of two numbers is 1320 and their HCF is 6. The LCM of the numbers is –

Q.16 The product of two numbers is 7168 and their HCF is 16. How many pairs of numbers are possible such that the above conditions are satisfied?

(A) 2 (B) 3

(C) 4 (D) 6

Q.17 Find the number of positive integers co-prime to 480 and less than it. Also find the sum of all those numbers

Q.18 How many natural numbers between 100 and 300 have three factors?

Q.19 What are the prime factors of 207090?

(A) 2, 3, 5 and 11

(B) 2, 3, 5, 7 and 13

(C) 2, 7, 11 and 13

(D) 2, 3, 5, 7 and 11

Q.20 The eight-digits number 78p456q3 is divisible by 9 and q - p = 2. Find (p, q)

(A) (6, 8) (B) (4, 6)

(C) (5, 7) (D) (7, 9)

A Answer Keys

Class Practice Questions (CPQ's)									
1.1 Number of Trailing Zero's (0's)									
1.	**(i) 41, (ii) 296, (iii) 221, (iv) 22, 37 (v) 26, (vi) 7, (vii) 16**	**2.**	**24, 37, 62**	**3.**	**(C)**				
1.2 Unit Digit Value (UDV)									
4.	**8, 8, 7, 4, 7, 1**	**5.**	**8, 6, 1, 9, 3, 7, 3**	**6.**	**6**	**7.**	**0**	**8.**	**7**
9.	**7**	**10.**	**(B)**	**11.**	**(A)**	**12.**	**0**	**13.**	**(C)**
14.	**(B)**	**15.**	**(i) 9, (ii) 6, (iii) 1, (iv) 4**						
1.3 Divisibility									
16.	**7, 3, 5**	**17.**	**(a) 1, 1, 1, 1, 2, 17, 117, 0, 0 (b) 1, 1, 5, 5, 3, 18, 43, 0, 6 (c) 1, 1, 1, 9, 0, 20, 45, 3, 5**	**18.**	**5225**	**19.**	**3**	**20.**	**(B)**
21.	**3**	**22.**	**(C)**						

1.4 Factorization									
23.	(a) 6, 28, 1728 (b) 8, 60, 24^4 (c) 18, 819, 288^9	24.	(i) 3, (ii) 12, (iii) 372 (iv) $(150)^6$	25.	(i) 6, (ii) 5	26.	(D)	27.	12

1.5 Concepts of Remainders									
28.	12	29.	0	30.	9	31.	13	32.	1
33.	(i) 3, (ii) 3, (iii) 6, (iv) 1, (v) 4, (vi) 8, (vii) 1, (viii) 0								

1.6 Last Two Digits									
34.	61, 91, 51	35.	27, 07, 29	36.	92, 64, 88				

1.7 Miscellaneous									
37.	(D)	38.	(D)	39.	(B)	40.	(A)	41.	3
42.	341	43.	(D)	44.	163	45.	495	46.	3
47.	13	48.	33	49.	(B)				

1.8 Sequence & Series									
50.	(i) 4, (ii) 27	51.	(D)	52.	(C)	53.	$\frac{n(n+1)(2n+1)}{6}$	54.	$\frac{s}{2}$
55.	(B)	56.	(D)	57.	$\frac{252}{125}$	58.	$\frac{1}{10}$	59.	$\frac{55}{111}$
60.	(D)	61.	(C)	62.	(C)	63.	(B)	64.	(C)
65.	(D)	66.	(B)	67.	(B)	68.	(B)	69.	(B)
70.	(C)	71.	(A)	72.	(A)	73.	(C)	74.	(B)
75.	(D)	76.	(D)	77.	(B)	78.	96	79.	(B)
80.	(C)								

1.9 LCM & HCF									
81.	(i) 1440,12 (ii) 24, $\frac{2}{315}$	82.	(i) 72 (ii) Data inconsistent	83.	1176	84.	18	85.	23
86.	375	87.	(A), (B), (C)	88.	(B)	89.	(C)		

Self Practice Questions (SPQ's)

1.	(D)	2.	25	3.	(C)	4.	93.39	5.	(D)
6.	(A)	7.	(D)	8.	(A)	9.	(i) HCF – 2, LCM – 8 (ii) HCF – 12, LCM – 120 (iii) HCF – 1/45, LCM – 28 (iv) HCF – 99!, LCM – 9999!	10.	$2^2 \times 3^5 \times 7^2$
11.	(3,5) (1,7)	12.	4 Pairs	13.	10080	14.	40	15.	220
16.	(A)	17.	128,30720	18.	3	19.	(D)	20.	(C)

❖❖❖❖

2 PERMUTATION & COMBINATION

Class Practice Questions : (CPQ's)

2.1 Numbers Arrangement

Q.1 (i) How many five digit numbers with distinct digits can be formed using the digit 1, 2, 3, 4, 5?

(ii) How many three digit numbers can be formed using the digits 1, 2, 3, 4, 5 without repetition of digits?

(iii) How many three-digit odd numbers can be formed using the digits 1, 2, 3, 4, 5, when each digit occurs at most once in any of the numbers?

Q.2 Using the digits : 0,1,2,3,4 and 5 how many three digit numbers can be formed :

(i) Repetition allowed.

(ii) Repetition not allowed.

Q.3 How many four digit numbers can be formed with the 10 digits 0, 1, 2, ... 9 if no number can start with 0 and if repetitions are not allowed?

[GATE 2015 : IIT Kanpur (CE Set - 2)]

Q.4 How many numbers between 0 and 1 million can be formed using 0, 7 and 8?

(A) 486 (B) 1086

(C) 728 (D) 900

[GATE 2014 : IIT Kharagpur]

Q.5 How many 3 digit no. are there from100 – 1000

(i) All three digits prime and distinct.

(ii) All 3 digits odd.

Q.6 Using the digits : 0,1,2,3,4 and 5 how many three digit numbers can be formed , such that it must have :

(i) Exactly one 5

(ii) Exactly two 5

(iii) At least one 5

Q.7 Using the digits : (1) 1,2,3,4,5,6,7,8 and 9 (2) 0, 1,2,3,4,5,6,7,8 and 9 how many three digit numbers can be formed , such that it must have :

(i) Exactly one 7

(ii) Exactly two 7

(iii) At least one 7

Q.8 Using the digits : (1) 1,2,3,4,5,6,7,8 and 9 (2) 0, 1,2,3,4,5,6,7,8 and 9 how many three digit numbers can be formed , such that :

(i) The ten's place is greater than the unit's place digit.

(ii) The ten's place is greater than the unit's place digit and less the hundred's place digit.

Q.9 There are 4 digits : 2, 3, 5, 8.

(i) How many 4 digit numbers can be formed without repetition of digits?

(ii) Of these, how many are even?

(iii) Of these even numbers, how many are not divisible by 4?

(iv) In how many numbers are 2 and 8 together?

(v) How many 4 digit numbers are possible (with repetition)?

Q.10 What is the sum of all 4 digit numbers which can be formed using the digits 1,2,3 and 4 without repetition?

Q.11 A five digit number is formed using the digits 1,3,5,7 and 9 without repeating any of them. What is the sum of all such possible five digit numbers?

(A) 6666660 (B) 6666600
(C) 6666666 (D) 6666606

[GATE 2014 : IIT Kharagpur (EC Set – 4, ME Set - 4)]

2.2 Letters Arrangement

Q.12 (i) Find the number of words that can be formed using all the letters of the word BHUPATI.
(ii) How many of the words that can be formed using all the letters of the word BHUPATI begin with B but don't end with I?

Q.13 (i) How many words can be formed using all the letters of the word TUSEDAY such that all the vowels are together?
(ii) The number of words that can be formed using all the letters of the word TUESDAY such that on two vowels are together is_____.

Q.14 (i) The number of words that can be formed using all the letters of the word SUCCESS is_____.
(ii) In the above problem, the number of words in which all the S's are together is_____.

Q.15 How many different words can be formed from the letters of the word GANESHPURI when:
(i) All the letters are taken.
(ii) The letter G always occupies the first place.
(iii) The letters P and E respectively occupy the first and last places.
(iv) All the vowels are always together.
(v) How many words of 5 letters each can be formed each containing 3 consonants and 2 vowels?
(vi) All the vowels are never together.
(vii) No 2 vowels are together.
(viii) All vowels always occupy even places?

Q.16 There are 4 women *P*, *Q*, *R*, *S* and 5 men *V*, *W*, *X*, *Y*, *Z* in a group. We are required to form pairs each consisting of one woman and one man. P is not to be paired with *Z*, and *Y* must necessarily be paired with someone. In how many ways can 4 such pairs be formed?

(A) 74 (B) 76
(C) 78 (D) 80

[GATE 2017 : IIT Roorkee (ME Set – 2)]

Q.17 A three-member committee has to be formed a group of 9 people. How many such distinct committees can be formed?

(A) 27 (B) 72
(C) 81 (D) 84

[GATE 2018 : IIT Guwahati (CE Set – 2)]

Q.18 An e-mail password must contain three characters. The password has to contain one numeral from 0 to 9, one upper and one lower case character from the English alphabet. How many distinct passwords are possible?

(A) 6,760 (B) 13,520
(C) 40,560 (D) 1,05,456

[GATE 2018 : IIT Guwahati (EE Set – 1)]

Q.19 A 9-letter password is formed using the letters A, E, G, I, N, R, S, T and U. If repetition of letters is allowed, how many of these passwords are palindromes?

Q.20 Arun, Gulab, Neel and Sweta must choose one shirt each from a pile of four shirts coloured red, pink, blue and white respectively. Arun dislikes the colour red and Sweta dislikes the colour white. Gulab and Neel like all the colours. In how many different ways can they choose the shirts so that no one has a shirt with a colour he or she dislikes?

(A) 21 (B) 18
(C) 16 (D) 14

[GATE 2017 : IIT Roorkee (EE, CS, Set – 1)]

Q.21 There are 3 Indians and 3 Chinese in a group of 6 people. How many subgroups of this group can we choose so that every subgroup has at least one Indian?

(A) 56 (B) 52
(C) 48 (D) 44

[GATE 2017 : IIT Roorkee (EC, BT, PI Set – 1)]

2.3 Dictionary Word

Q.22 If all the words, not necessarily meaningful, that can be formed by using all the letters of ALERT are arranged as in a dictionary, the 25th word is _____.

Q.23 If all the letters of the word 'AGAIN' be arranged as per English dictionary, what is the 50th word.

2.4 Agenda : Straight Lines, Triangles, Chess Board, Handshake & Gift Exchange

Q.24 Of 20 points on a plane, 6 are collinear. Except for the triplets formed from among these 6 points, no other triplet of points is collinear. By joining these 20 points
(i) how many straight lines can be formed?
(ii) how many triangles can be formed?

Q.25 The number of diagonals in a regular polygon of 10 vertices is____,

Q.26 (i) On a 8×8 chess board, the number of squares of all sizes is_____.
(ii) In the above problem the number of rectangles is _____.

Q.27 How many diagonals are there in an n side polygon.

Q.28 Find the number of :
(i) Straight Lines
(ii) Diagonals
(iii) Triangles formed in a decagon.

Q.29 Out of 18 points in a plane, no three are in the same straight line except five points which are collinear. How many
(i) Straight lines
(ii) Triangles can be formed by joining them?

Q.30 A 2 × 4 rectangle grid shown below, each cell is a rectangle. How many rectangles can be observed in the grid?

(A) 21 (B) 27
(C) 30 (D) 36

[GATE 2016 : IISc Bangalore (EE Set - 1, CSE Set - 1)]

Q.31 A set of 4 parallel lines intersect with another set of 5 parallel lines. How many parallelograms are formed?
(A) 20 (B) 48
(C) 60 (D) 72

[GATE 2018 : IIT Guwahati (IN Set – 1)]

2.5 Miscellaneous

Q.32 How many word can be formed by taking 4 letters at a time out of the letters of the word MATHEMATICS?

Q.33 In how many ways 3 scholarships can be awarded to 4 applicants, when each applicant can receive any number of scholarships?
(A) 4 (B) 12
(C) 64 (D) 81

[GATE 2011 : IIT Madras (AE, MN)]

Q.34 Ten teams participate in a tournament. Every team plays each of the other teams twice. The total number of matches to be played is
(A) 20 (B) 45
(C) 60 (D) 90

[GATE 2012 : IIT Delhi (AR, GG, TF)]

Q.35 Five teams have to compete in a league, with every team playing every other team exactly once, before going to the next round. How many matches will have to be held to complete the league round of matches?
(A) 20 (B) 10
(C) 8 (D) 5

[GATE 2015 : IIT Kanpur (AE, GG, IN, MA, ME-3, MN, MT, PH, PI, TE)]

Q.36 930 Deepawali greeting cards are exchanged amongst the students of a class. If every student sends a card to every other student then what is the number of students in the class?

Q.37 Five different books (P, Q, R, S, T) are to be arranged on a shelf. The books R and S are to be arranged first and second respectively from right side of the shelf. The number of different orders in which P, Q and T may be arranged is _____.
(A) 6 (B) 2
(C) 12 (D) 120

[GATE 2019 : IIT Madras (EC)]

Q.38 Given digits 2, 2, 3, 3, 3, 4, 4, 4, 4. How many distinct 4 digit numbers greater than 3000 can be formed?
(A) 50 (B) 51
(C) 52 (D) 54

[GATE 2010 : IIT Guwahati (All branches)]

Self Practice Questions : (SPQ's)

Q.1 Using the digits : (1) 1,2,3,4 and 5 (2) 0, 1,2,3,4 and 5 how many three digit numbers can be formed , such that :

(i) The ten's place is greater than the unit's place digit.

(ii) The ten's place is greater than the unit's place digit and less the hundred's place digit.

Q.2 How many numbers between 2000 and 3000 can be formed with the digits 0, 1, 2, 3, 4, 5, 6, 7 (repetition of digits not allowed)?

(A) 42 (B) 210

(C) 336 (D) 440

Q.3 Five person A, B, C, D and E occupy seats in a row such that A and B sit next to each other. In how many possible ways can these five people sit?

(A) 24 (B) 48

(C) 72 (D) None of these

Q.4 A polygon has 44 diagonals, then the numbers of its side are

(A) 11 (B) 9

(C) 7 (D) 5

Q.5 In an examinations paper there are two groups, each containing 4 questions. A candidates is required to attempt 5 questions but not more than 3 questions from any group. In how many ways can 5 questions be selected?

(A) 24 (B) 48

(C) 96 (D) None of these

Q.6 A cricket team of 11 players is to be formed from 20 players including 6 bowlers and 3 wicket keepers. The numbers of ways in which a team can be formed having exactly 4 bowlers and 2 wicket keepers is

(A) 20790 (B) 6930

(C) 10790 (D) 360

Q.7 In a hockey championship, there were 153 matches played. Every two teams played one match with each other. The numbers of teams participating in the championship is

(A) 18 (B) 19

(C) 17 (D) 16

Q.8 A code word is to consist of two distinct English alphabets followed by two distinct numbers between 1 and 9. For examples, CA23 is a code word. How many such words are there?

(A) 615800 (B) 46800

(C) 719500 (D) 410800

Q.9 It is required to seat 5 men and 4 women in a row so that the women occupy the even places. How many such arrangements are possible?

(A) 2880 (B) 2480

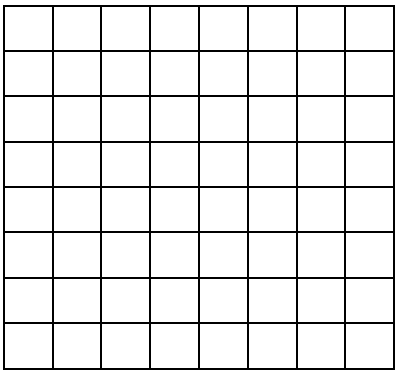
(C) 3680 (D) 3280

Q.10 Four books, one each in Chemistry, Physics, Biology, and Mathematics are to be arranged in a shelf. In how many ways can this be done?

(A) 12 (C) 36

(C) 24 (D) 48

Directions Q.11 to Q.13 : Below is a square grid of 8 × 8.



Q.11 What is total No. of squares in the grid?

(A) 204 (B) 285

(C) 140 (D) None of these

Q.12 What is total number of rectangles in the grid?

(A) 36×36 (B) 35×35

(C) 34×34 (D) 32×32

Q.13 How many rectangle of different dimensions are there?

(A) 34 (B) 35

(C) 36 (D) 33

Directions :

(Q.14 to Q.15) : There are 10 points in a plane and out of which 4 are collinear.

Q.14 How different triangles can be mode using these 10 points?

(A) $^{10}C_3 - {}^{3}C_3$ (B) $^{9}C_3 - {}^{2}C_2$

(C) $^{10}C_3 - {}^{4}C_3$ (B) $^{10}C_3 - {}^{5}C_3$

Q.15 How many different lines can be drawn ?

(A) $^{10}C_2 - {}^{4}C_2$ (B) $^{10}C_2 - {}^{4}C_2 + 1$

(A) $^{10}C_3 - {}^{4}C_3 + 1$ (B) None of these

A Answer Keys

2.1 Number Arrangement									
1.	(i) 120 (ii) 60 (iii) 36	2.	(i) 180 (ii) 100	3.	4536	4.	(C)	5.	(i) 24 (ii) 60
6.	(i) 65 (ii) 14 (iii) 80	7.	(i) 192, 225 (ii) 24, 26 (iii) 217, 252	8.	(i) 324, 405 (ii) 841, 120	9.	(i) 24 (ii) 12 (iii) 6 (iv) 12 (v) 256	10.	66660
11.	(B)								
2.2 Letters Arrangement									
12.	(i) 5040 (ii) 720	13.	(i) 720 (ii) 1440	14.	(i) 420 (ii) 60	15.	(i) 10! (ii) 9! (iii) 8! (iv) 120960 (v) 14400 (vi) 3507840 (vii) 604800 (viii) 86400	16.	(C)
17.	(D)	18.	(C)	19	9^5	20.	(D)	21.	(A)
2.3 Dictionary Word									
22.	EALRT	23	NAIIG						
2.4 Agenda : Straight Lines, Triangles, Chess Board, Handshake and Gift Exchange									
24.	(i) 176 (ii) $20_{C_3} - 6_{C_3}$	25.	35	26.	(i) 204 (ii) 1296	27.	$n_{C_2} - n$	28.	(i) 45 (ii) 35 (iii) 120
29.	(i) 144 (ii) 806	30.	(C)	31.	(C)				
2.5 Miscellaneous									
32.	2454	33.	(C)	34.	(D)	35.	(B)	36.	31
37.	(A)	38.	(B)						

Self Practice Questions [SPQ's]									
1.	(i) 50, 75 (ii) 10, 20	2.	(B)	3.	(B)	4.	(A)	5.	(B)
6.	(A)	7.	(A)	8.	(B)	9.	(A)	10.	(C)
11.	(A)	12.	(A)	13.	(C)	14.	(C)	15.	(B)

3 PROBABILITY

Class Practice Questions :

Q.1 An unbiased die is thrown. What is the probability of getting -
(i) An even number
(ii) A multiple of 3.
(iii) An even number or a multiple of 3
(iv) An even number and a multiple of 3.

Q.2 2 Dice are thrown are simultaneously. Find the probability of getting:
(i) An even no. as the sum.
(ii) The sum as a prime no.
(iii) A total of at least 10.
(iv) A multiple of 2 on 1 dice and multiple of 3 on the other.

Q.3 3 dice are thrown together. Find the probability of getting sum of :
(i) At least 6
(ii) At most 6
(iii) Exactly 6

Q.4 Find the probability that a leap year selected at random, will have:
(i) 53 Sun
(ii) 53 Sun & 53 Mon
(iii) 52 Sun
(iv) 52 Sun & 53 Mon
(v) 52 Sun & 52 Mon
(vi) 52 Sun & 53 Tue
(vii) 52 Sun & 52 Tue.

Q.5 What is the probability that a no. selected from the nos. 1-100 (both inclusive) is :
(i) A Prime no.
(ii) Is a composite no.
(iii) A perfect square
(iv) A perfect Integer
(v) Multiple of 2
(vi) Multiple of 4
(vii) Multiple of 3

Q.6 Out of all the 2-digit integers between 1 and 100, a 2-digit number has to be selected at random. What is the probability that the selected number is not divisible by 7?
(A) 13/90 (B) 12/90
(C) 78/90 (D) 77/90
[GATE 2013 : IIT Bombay (CSE, ME)]

Q.7 Two dice are thrown simultaneously. The probability that the product of the numbers appearing on the top faces of the dice is a perfect square is
(A) $\frac{1}{9}$ (B) $\frac{2}{9}$
(C) $\frac{1}{3}$ (D) $\frac{4}{9}$
[GATE 2017 : IIT Roorkee (IN, CE Set – 2)]

Q.8 Given set A = {2, 3, 4, 5} and Set B = {11, 12, 13, 14, 15}, two numbers are randomly selected, one from each set. What is probability that the sum of the two numbers equals 16?
(A) 0.20 (B) 0.25
(C) 0.30 (D) 0.33
[GATE 2015 : IIT Kanpur (EE Set - 1, CSE Set - 1)]

Q.9 A couple has 2 children. The probability that both children are boys if the older one is a boy is
(A) $\frac{1}{4}$ (B) $\frac{1}{3}$
(C) $\frac{1}{2}$ (D) 1
[GATE 2017 : IIT Roorkee (ME Set – 2)]

Q.10 What is the chance that a leap year, selected at random, will contain 53 Saturdays?

(A) 2/7 (B) 3/7

(C) 1/7 (D) 5/7

[GATE 2013 : IIT Bombay (EC, EE, IN)]

Q.11 One card is drawn from a pack of 52 cards, each of the 52 cards are equally likely to be drawn. Find the probability that the card drawn is :

(i) An Ace

(ii) Red

(iii) Either Ace or Red

(iv) Ace & Red

Q.12 4 persons are to be chosen at random from a group of 3 men, 4 women and 4 children. Find the probability of selecting:

(i) 1 man, 1 woman and 2 children.

(ii) 2 Women.

(iii) At least 2 women.

(iv) At most 2 women.

Q.13 The letters of the word 'SOCIETY' are placed at random in a row. What is the probability that:

(i) All the vowels are together.

(ii) All the vowels are never together.

(iii) No 2 vowels are together.

(iv) "SOIT" are always together.

Q.14 A fair coin is tossed in times. The probability that the difference between the number of heads and tails is (n-3) is,

(A) 2^{-n} (B) 0

(C) $n_{C_{n-3}}\,2^{-n}$ (D) 2^{-n+3}

Q.15 Let X_1 , X_2 , X_3 and X_4 be independent normal random variable with zero mean and unit variance. The probability that X_4 is the smallest amoung the four is_____?

Q.16 Two persons A & B through a dice alternatively till one of them gets a six and wins the game, the probability of winning of B. Assume that person A starts the game

(a) 6/11 (b) 5/11

(c) 4/11 (d) 3/11

Q.17 Consider a dice with the property that the probability of a face with in dots showing up is proportional to n, the probability of the face with three dots showing up is____?

Q.18 Two dice are thrown simultaneously. The probability that at least one of them will have 6 facing up is_____?

Q.19 Suppose a fair six sided die is rolled once. If the value on the die is 1, 2, or 3 then die is rolled a second time. What is the probability that the sum of the total values that turn up is at least 6?

(a) 10/21 (b) 5/12

(c) 2/3 (d) 1/6

Q.20 Four fair six-sided dice are rolled. The probability that the sum of the results being 22 is $\frac{x}{1296}$. The value of x is _____?

Q.21 Suppose we uniformly and randomly select a permutation from the 20! Permutation of 1, 2, 3, 4, - - - - -20. What is the probability that 2 appears at an earlier position that any other even number in the selected permutations?

(A) 1/2 (B) 1/10

(C) 9!/20! (D) None of these

Q.22 A man walks only one step forward or one step backward when he walks. The probability of the man taking a step forward is 1/3 and the probability of the man taking a step backward is 2/3.

(i) What is the probability that after 11 steps, he is 1 step away from the starting point?

(ii) What is the probability that after 10 steps, he is 1 step away from the starting point?

Q.23 A bag has 12 bolls, of which 7 are red and the remaining are black. Find the probability of each of the following events?

(i) If 2 balls are selected simultaneously. The will be of different colours?

(ii) If 2 balls are selected successively (without replacement) they will be of different colours?

(iii) If 2 balls are selected successively (with replacement) they will be of different colours?

Q.24 There are two bags. One has 5 red and 6 black balls, while the other has 4 red and 8 black balls.

(i) A balls is selected randomly from one of the bags. What is the probability that it is red?

(ii) A boll is picked from the 1st bag and put in the 2nd bag. Then a ball is picked from the 2nd bag. What is the probability that it is red?

Q.25 A bag contains 6 white, 5 red and 4 black balls. If two balls are drawn at random, what is the probability that none is white?

(A) $\frac{1}{3}$ (B) $\frac{3}{5}$

(C) $\frac{12}{35}$ (D) $\frac{13}{16}$

Q.26 A bag contains 4 white and 2 black balls and another bag contains 3 of each colour. A bag is selected at random and a ball is drawn at random from the bag chosen. The probability of the white ball drawn is :

(A) $\frac{1}{3}$ (B) $\frac{1}{4}$

(C) $\frac{5}{12}$ (D) $\frac{7}{12}$

[ESE : 2020]

Q.27 There are 3 red socks, 4 green socks and 3 blue socks. You choose 2 socks. The probability that they are of the same colour is

(A) $\frac{1}{5}$ (B) $\frac{7}{30}$

(C) $\frac{1}{4}$ (D) $\frac{4}{15}$

Q.28 A box contains 15 blue balls and 45 black balls. If 2 balls are selected randomly, without replacement, the probability of an outcome in which the first selected is a blue ball and the second selected is a black ball, is_____?

(A) 3/16 (B) 45/236

(C) 3/4 (D) 1/4

[ME-2, MT GATE- 2021 IIT - BUMBAY]

Q.29 There are five bags each containing identical sets of ten distinct chocolates. One chocolate is picked from each bag. The probability that atleast two chocolates are identical is_____.

(A) 0.8125 (B) 0.6976

(C) 0.3024 (D) 0.4235

[BT, CH, CS-1, MA TF GATE- 2021 IIT - BUMBAY]

Q.30 A problem in statistics is given to three students A, B and C whose chances of solving it are 1/2, 1/3 and 1/4 respectively. The probability that the problem will be solved is

(A) $\frac{3}{4}$ (B) $\frac{1}{24}$

(C) $\frac{1}{4}$ (D) $\frac{1}{2}$

Q.31 An unbiased coin is tossed six times in a row and four different such trials are conduced. One trial implies six tosses of the coin. If H stands for head and T stands for tail, the following are the observations from the four trials :

(1) HTHTHT (2) TTHHHT

(3) HTTHHT (4) HHHT_ _

Which statement describing the last two coin tosses of the fourth trial has the higher probability of being correct?

(A) Two T will occur

(B) One H and one T will occur

(C) Two H will occur

(D) One H will be followed by one T.

[GATE 2018 : IIT Guwahati (ME Set – 2)]

Q.32 Ram and Ramesh appeared in an interview for two vacancies in the same department. The probability of Ram's selection is 1/6 and that of Ramesh is 1/8. What is the probability that only one of them will be selected?

(A) $\frac{47}{48}$ (B) $\frac{1}{4}$

(C) $\frac{13}{48}$ (D) $\frac{35}{48}$

[GATE 2015 : IIT Kanpur (EC Set - 2, ME Set - 1)]

Q.33 The probabilities of the three doctors A, B and C getting success in an operation are 0.5, 0.2 and 0.3 respectively. Find the probability that the operation is not successful.

(A) 0.78 (B) 0.64

(C) 0.56 (D) 0.28

Q.34 A class of twelve children has two more boys than girls. A group of three children are randomly picked from this class to accompany the teacher on a field trip. What is the probability that the group accompanying the teacher contains more girls than boys?

(A) 0 (B) $\frac{325}{864}$

(C) $\frac{525}{864}$ (D) $\frac{5}{12}$

[GATE 2018 : IIT Guwahati (EE) (MTA)]

Q.35 10% of the population in a town is HIV+. A new diagnostic kit for HIV detection is available this kit correctly identifies HIV+ individuals 95% of the time, and HIV– individuals 89% of the time. A particular patient is tested using this kit and is found to be positive. The probability that the individual is actually positive is_____.

[GATE 2014 : IIT Kharagpur (CE Set - 2, IN)]

Q.36 Two dice are rolled one after the other. The probability that the number on the first is smaller than the number on second

(A) $\frac{1}{2}$ (B) $\frac{7}{18}$

(C) $\frac{3}{4}$ (D) $\frac{2}{12}$

Q.37 A die is rolled three times. The probability of getting a larger number than the previous number each time is

(A) 7/54 (B) 5/54

(C) 11/54 (D) 6/54

Q.38 2 integers are selected at random from integers 1-11. If the sum is even, find the probability that :

(i) Both the integers are odd.

(ii) Both the integers are even.

Q.39 Four person are chosen at random from a group of 3 men, 2 women and 4 childern. The chance that exactly 2 of them are childern,is

(A) $\frac{2}{9}$ (B) $\frac{4}{5}$

(C) $\frac{7}{12}$ (D) $\frac{10}{21}$

Self Practice Questions :

Q.1 From a pack of 52 playing cards, three cards are drawn at random. Find the probability of drawing a king, A queen and a jack.

(A) $\frac{16}{5525}$ (B) $\frac{1}{13^3}$

(C) $\frac{1}{14^3}$ (D) $\frac{1}{15^3}$

Directions for (Q.2 to Q.5): A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selections is 1/7 and that of wife's is 1/5.

Q.2 What is the probability that only one of them will be selected?

(A) $\frac{2}{7}$ (B) $\frac{1}{35}$

(C) $\frac{24}{25}$ (D) $\frac{11}{35}$

Q.3 What is the probability that both of them will be selected?

(A) $\frac{2}{7}$ (B) $\frac{1}{35}$

(C) $\frac{24}{25}$ (D) $\frac{11}{35}$

Q.4 What is the probability that none of them will be selected?

(A) $\frac{2}{7}$ (B) $\frac{1}{35}$

(C) $\frac{24}{25}$ (D) $\frac{11}{35}$

Q.5 What is the probability that at least one of them will be selected?

(A) $\frac{2}{7}$ (B) $\frac{1}{35}$

(C) $\frac{24}{25}$ (D) $\frac{11}{35}$

Q.6 A man speaks truth in 80% of the cases and another in 90% of the cases. While stating the same fact what is the probability that they contradict?

(A) $\frac{37}{50}$ (B) $\frac{13}{50}$

(C) $\frac{16}{50}$ (D) None of these

Q.7 A can solve 90% of the problems given in a books and B solve 70%. What is the probability that atleast one of them will solve a problem selected at random from the book?

(A) $\frac{3}{100}$ (B) $\frac{97}{100}$

(C) $\frac{83}{100}$ (D) $\frac{17}{100}$

Q.8 Find the probability that in a random arrangement of the letters of the world DAUGHTER, the letter D occupies the first place.

(A) $\frac{1}{8}$ (B) $\frac{1}{4}$

(C) $\frac{3}{8}$ (D) $\frac{1}{2}$

Q.9 A bag contains 3 green and 7 white balls. Two balls are drawn from the bag in succession without replacement. What is the probability that both are white?

(A) $\frac{1}{7}$ (B) $\frac{5}{11}$

(C) $\frac{7}{11}$ (D) $\frac{7}{15}$

Q.10 In a simultaneous throw of two dice, find P (A or B), if A denotes the event 'a total of 11 and B denotes the event' 'an odd number on each die'.

(A) $\frac{11}{36}$ (B) $\frac{1}{4}$

(C) $\frac{5}{18}$ (D) $\frac{1}{6}$

Q.11 The probabilities that a student will receive an A, B, C or D grade are $0.30, 0.38, 0.22$ and 0.01, respectively. What is the probability that the student will receive at least B grade?

(A) 0.38 (B) 0.42

(C) 0.68 (D) None of these

Q.12 A problem in statistics is given to four students A, B, C and D. Their chances of solving it are $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ and $\frac{1}{6}$, respectively. What is the probability that the problem will be solved?

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$

(C) $\frac{4}{5}$ (D) None of these

Q.13 If A and B are two independent events such that $P(\bar{A}) = 0.65$, $P(A \cup B) = 0.65$ and $P(B) = p$, find the value of p

(A) $\frac{7}{13}$ (B) $\frac{6}{13}$

(C) $\frac{37}{65}$ (D) None of theses

Q.14 The probability of raining on day 1 is 0.2 and on day 2 is 0.3. What is the probability of raining on both the days?

(A) 0.2 (B) 0.1

(C) 0.06 (D) 0.25

Q.15 A bag contains 5 red balls and 8 blue balls. It also contains 4 green and 7 black balls. If a ball is drawn at random, then find the probability that is not green.

(A) $\frac{5}{6}$ (B) $\frac{1}{4}$

(C) $\frac{1}{6}$ (D) $\frac{7}{4}$

Q.16 The probability that a student is a not a swimmer is 1/5. Then the probability that out of the five students, exactly four are swimmers, is

(A) ${}^5C_4\left(\frac{4}{5}\right)^2\left(\frac{1}{5}\right)$ (B) $\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$

(C) ${}^5C_1\left(\frac{1}{5}\right)\left(\frac{4}{5}\right)^4$ (D) None of these

Q.17 Four different objects 1,2,3,4 are distributed at random in four places marked 1,2,3,4. What is the probability that none of the objects occupy the place corresponding to its number?

(A) $\frac{17}{24}$ (B) $\frac{3}{8}$

(C) $\frac{1}{2}$ (D) $\frac{5}{8}$

Q.18 A number is chosen at random among the first 120 natural numbers. The probability of the number chosen being a multiple of 5 or 15 is

(A) $\frac{1}{5}$ (B) $\frac{1}{6}$

(C) $\frac{1}{7}$ (D) $\frac{1}{9}$

❖❖❖❖

A Answer Keys

Class Practice Questions (CPQ's)									
1.	(i) 1/2 (ii) 1/3 (iii) 2/3 (iv) 1/6	2.	(i) 1/2 (ii) 5/12 (iii) 1/6 (iv) 1/6	3.	(i) 103/108 (ii) 5/54 (iii) 5/108	4.	(i) 2/7 (ii) 3/7 (iii) 5/7 (iv) 1/7 (v) 4/7 (vi) 2/7 (vii) 3/7	5.	(i) 1/4 (ii) 74/100 (iii) 1/10 (iv) 1/50 (v) 1/2 (vi) 1/4 (vii) 33/100
6.	(D)	7.	(B)	8.	(A)	9.	(C)	10.	(A)
11.	(i) 1/13 (ii) 1/2 (iii) 7/13 (iv) 1/26	12.	(i) 72 (ii) 126 (iii) 155 (iv) 301	13.	(i) 720 (ii) 4320 (iii) 1440 (iv) 576	14.	(B)	15.	0.25
16.	(B)	17.	0.142	18.	11/36	19.	(B)	20.	10
21.	(D)	22.	(i) 0.25 (ii) 0	23.	(i) 35/66 (ii) 35/66 (iii) 35/72	24.	(i) 13/33 (ii) 49/143	25.	(C)
26.	(D)	27.	(D)	28.	(B)	29.	(B)	30.	(A)
31.	(B)	32.	(B)	33.	(D)	34.	4/11 (MTA)	35.	0.475
36.	(D)	37.	(B)	38.	(i) 3/5 (ii) 2/5	39.	(D)		

Self Practice Questions (SPQ's)									
1.	(A)	2.	(A)	3.	(B)	4.	(C)	5.	(D)
6.	(B)	7.	(B)	8.	(A)	9.	(D)	10.	(A)
11.	(C)	12.	(B)	13.	(B)	14.	(C)	15.	(A)
16.	(C)	17.	(C)	18.	(A)				

❖❖❖❖

4 TIME & WORK

Class Practice Questions :

Q.1 A can do a piece of work in 12 days while B alone can do it in 15 days. In how many days can A and B working together complete it?

Q.2 It takes two hours for a person X to mow the lawn. Y can mow the same lawn in four hours. How long (in minutes) will it take X and Y, if they work together to mow the lawn?

(A) 60 (B) 80

(C) 90 (D) 120

[GATE 2019: IIT Madras (EE)]

Q.3 Two design consultants, P and Q, started working from 8 AM for a client. The client budgeted a total of USD 3000 for the consultants. P stopped working when hour hand moved by 210 degrees on the clock.

Q stopped working when the hour hand moved by 240 degrees. P took tea breaks of 15 minutes each during her shift, but took no lunch break. Q took only one lunch break for 20 minutes, but no tea breaks. The market rate for consultants is USD 200 per hour and breaks are not paid. After paying the consultants, the client shall have USD ____ remaining in the budget.

(A) 000.00 (B) 300.00

(C) 166.67 (D) 433.33

[GATE 2019 : IIT Madras (EC)]

Q.4 A can complete a piece of work in 30 days. With the help of B work can be complete in work in 20 days. In how days B can complete the work alone.

(A) 30 days (B) 40 days

(C) 45 days (D) 60 days

Q.4 A can complete a piece of work in 10 days, B can complete in 15 days and C can complete it in 20 days A, B and C started the work, starting from A then B and then C. In how many days work will be completed.

(A) $13\frac{1}{2}$ days (B) $13\frac{3}{4}$ days

(C) $13\frac{5}{6}$ days (D) $13\frac{6}{7}$ days

Q.6 A can do a piece of work in 25 days and B can do it in 20 days. They work together for 5 days and then A goes away. How many more days will B require to finish the work?

Q.7 A can do a piece of work in 10 days, B in 12 days and C in 15 days. They all start the work together, but A leaves the work after 2 days and B leaves 3 days before the work is completed. How many days did the work last?

Q8. A can complete a piece of work in 15 days B in 20 days and C can complete in 30 days alone. A starts the work and work for 2 days then B joined him and they both work for 1 more days. How many days they all will take to complete the remaining work.

(A) 4 days (B) 5 days

(C) 8 days (D) 10 days

Q.9 A certain number of men can finish a piece of work in 60 days. If they were 8 men more, the work clould be finished in 10 days less. Find the original number of men.

Q.10 12 men can build a wall 100 metres long, 3 metres high and 0.5-metre-thick in 25 days. In how many days' will 20 men build a wall 60 metres long, 4 metres high and 0.25 metre thick?

Q.11 3 men or 5 women can do a job in 12 days. How long will 6 men and 5 women take to finish the job?

Q.12 If 12 pumps can raise 1218 tons of water in 11 days of 9 hours each, then how many pumps will raise 2030 tons of water in 12 days of 11 hours each?

(A) 12 pumps (B) 15 pumps
(C) 18 pumps (D) 14 pumps

Q.13 Seven machines take 7 minutes to make 7 identical toys. At the same time rate how many minutes would it take for 100 machines to make 100 toys?

(A) 1 (B) 7
(C) 100 (D) 700

[GATE 2018 : IIT Guwahati (ME Set – 1)]

Q.14 Ananth takes 6 hours and Bharath takes 4 hours to read a book. Both started reading copies of the book at the same time. After how many hours is the number of pages to be rad by Ananth, twice that to be read by Bharath? Assume Ananth and Bharath read all the pages with constant pace.

(A) 1 (B) 2
(C) 3 (D) 42

[GATE 2016 : IISC Banglore (CE Set - 2)

Q.15 1200 men and 500 women can build a bridge in 2 weeks. 900 men and 250 women will take 3 weeks to build the same bridge. How many men will be needed to build the bridge in one week

(A) 3000 (B) 3300
(C) 3600 (D) 3900

[GATE 2017 : IIT Roorkee (EC Set – 2)]

Q.16 P, Q, R and S are working on a project. Q can finish the task in 25 days, working alone for 12 hours a day. R can finish the task in 50 days, working alone for 12 hours per day. Q worked 12 hours a day but took sick leave in the beginning for two days. R worked 18 hours a day on all days. What is the ratio of work one by Q and R after 7 days from the start of the project?

(A) 10 : 11 (B) 11:10
(C) 20 : 21 (D) 21 : 20

[GATE 2016 : IISC Banglore (EC Set – 1, ME Set-1)]

Q.17 5 skilled workers on build a wall in 20 days; 8 semi-skilled workers can build a wall in 25 days; 10 unskilled workers can build a wall in 30 days. If a team has 2 skilled. 6 semi-skilled and 5 unskilled workers, how long will it take to build the wall?

(A) 20 days (B) 18 days
(C) 16 days (D) 15 days

[GATE 2010 : IIT Guwahati (EC, EE CE, ME, CSE, IN)]

Q.18 Five men can paint a building in 20 days, 8 Women can paint the same building in 25 days and 10 Boys can paint it in 30 days. If a team has 2 men, 6 Women and 5 Boys, how long will it take to paint the building?

(A) 12 days (B) 13 days
(C) 14 days (D) 15 days

[ESE 2017]

Q.19 A group of workers estimate to finish a work in 10 days, but 5 workers could not join the work, if the rest of them finished the work in 12 days, the number of members present in the team originally is

(A) 50 (B) 45
(C) 35 (D) 30

[ESE 2017]

Q.20 If m students require a total of m pages of stationery in m days, then 100 students will require 100 pages of stationery in

(A) 100 days (B) m/100 days
(C) 100/m days (D) m days

[GATE 2019 : IIT Madras GG, TF]

Q.21 Two persons A and B can complete a work in 10 and 15 days respectively, working separately. In how many days will the work be completed, if they both work together. If they received Rs. 300 as payment, then what are their respective shares?

Q.22 A can do a piece of work in 15 days and B in 20 days. They finished the work with the assistance of C in 5 days and got Rs. 45 as their wages. The share of each in wages (in Rs.) is

(A) 22.5, 12, 10.5 (B) 10.5, 12, 22.5
(C) 15, 11.25, 18.75 (D) 12.5, 13 19.5

Q.23 pipes can fill a reservoir in 15, 20, 30 and 60 hours respectively. The first was opened at 6 am, second at 7 am third at 8 am and fourth at 9 am. When will the reservoir be full?

(A) 12.30 pm (B) 1.30 pm
(C) 1.00 pm (D) 12.50 pm

Q.24 A and B can fill a cistern in 4 and 5 hours respectively and C can empty it in 2 hours. If three pipes be opened at 1, 2 and 3 am, when will the cistern be empty?

(A) 5 am (B) 2 pm
(C) 5 pm (D) 4 pm

Q.25 A cistern has 3 pipes, A to supply and B and C to drain. A can fill it in 10 hours while B and C can empty it in 15 and 20 hours respectively. If the cistern is 7/10 full when they are all opened at once, in what time will it be empty?

(A) 36 hours (B) 42 hours
(C) 48 hours (D) 52 hours

Q.26 Two pipes P and Q can fill the tank in 6 hours and 9 hours while 3rd pipe R can empty the tank in 12 hours. Initially P and R open for 4 hours then P is closed and Q is open. After 6 hours R is closed then find the total time to fill the tank (in hours).

[GATE 2019 : IIT Madras (ME)]

Q.27 It takes 30 minutes to empty a half-full tank by draining it at a constant rate. It is decided to simultaneously pump water into the half-full tank while draining it. What is the rate at which water has to be pumped in so that it gets fully filled in 10 minutes?

(A) 4 times the draining rate
(B) 3 times the draining rate
(C) 2.5 times the draining rate
(D) 2 times the draining rate

[GATE 2014 : IIT Kharagpur (EC Set – 2, ME Set – 2)]

Q.28 Two machines M1 and M2 are able to execute any of four jobs P, Q, R and S. The machines can perform one job on one object at a time. Jobs P, Q, R and S take 30 minutes, 20 minutes, 60 minutes and 15 minutes each respectively.

There are 10 objects each requiring exactly 1 job, Job P is to be performed on 2 objects, Job Q on 3 objects, Job R on 1 object and Job S on 4 objects. What is the minimum time needed to complete all the jobs?

(A) 2 hours (B) 2.5 hours
(C) 3 hours (D) 3.5 hours

[GATE 2017 : IIT Roorkee (CE, CH Set – 1)]

Self Practice Questions :

Q.1 9 Men can complete a piece of work in 35 days. In how many days 7 men will complete that same piece of work

(A) 28 days (B) 40 days
(C) 42 days (D) 45 days

Q.2 7 Men can complete a piece of work in 33 days. In how many days 11 men will complete that same piece of work?

(A) 18 days (B) 21 days
(C) 24 days (D) 27 days

Q.3 5 Men can complete a piece of work in 39 days. In how many days 13 men will complete the same piece of work?

(A) 10 days (B) 15 days
(C) 20 days (D) 25 days

Q.4 A can do a piece of work in 12 days while B alone can do it in 15 days. In how many days the work gets completed if, A and B work together, but alternately:

Q.5 A can complete a piece of work in 40 days with the help of B work can be complete 8 days. In how many days B can be complete it alone.

(A) 10 days (B) 12 days
(C) 15 days (D) 20 days

Q.6 A can complete a piece of work in 10 days. B can complete the same work in 15 days, with the help of C they together complete the work in 3 days. In how many days C can complete it alone.

(A) 4 days (B) 6 days
(C) 8 days (D) 10 days

Q.7 A can complete a piece of work in 10 days. B can complete the same work in 15 days and C can complete it in 20 days. A, B, & C starts the work together for 2 days then C leave the group, A & B work for 2 days more then A leave the group. In how many days B will complete the remaining work.

(A) $\frac{5}{2}$ days (B) $\frac{7}{2}$ days

(C) $\frac{9}{2}$ days (D) $\frac{11}{2}$ days

Q.8 A can do a piece of work in 10 days, B in 10 days and C in 15 days. They all start the work together, but A leaves the work after 2 days and B leaves 3 days before the work is completed. How many days did the work last?

Q9. A and B can complete a piece of work in 10 days. Working together B and C can complete in 15 days, A and C can complete in 20 days working together. In how many days they A, B & C complete the same piece of work working together.

(A) $9\frac{3}{13}$ days (B) $11\ \frac{3}{13}$ days

(C) $7\frac{3}{13}$ days (D) $10\frac{3}{13}$ days

Q.10 A man can finish a work in 6 days, a woman in 10 days and a child in 12 days. The man starts the work and works for 1/3rd of a day, then the woman works for 1/3rd of a day and finally the boy works for remaining 1/3rd of a day. This cycle is repeated till the work finishing. Who was working when the work finished?

(A) Man (B) Woman

(C) Child (D) None of these

Q11. A and B have efficiency 3:4. A can complete a piece of work in 12 days, in how many days B will complete the same piece of work.

(A) 8 days (B) 9 days

(C) 10 days (D) 15 days

Q12. A and B can have efficiency 7:3 B can complete a piece of work in 35 days, in how many days they A will complete the same piece of work.

(A) 12 days (B) 15 days

(C) 20 days (D) 21 days

Q13. A has efficiency 40% more then B, A can complete a piece of work in 60 days. In how many days A and B will complete the same piece of work, working together.

(A) 30 days (B) 35 days

(C) 40 days (D) 45 days

Q14. 9 Men can finish a piece of work in 21 days working 8 hrs daily than find the number of women to finish the same piece of work working 7 days and 8 hrs. daily. If the efficiency of man is thrice of women.

(A) 72 (B) 81

(C) 90 (D) 99

Q15. A certain number of person can finish a piece of work in 100 days. If there 10 men less, they would have taken 10 days more. find the initial number of person in the group.

(A) 90 (B) 100

(C) 110 (D) 120

Q16. There is a sufficient food for 150 men for 15 days. After 10 days, 75 men leave the place. For how many days will the rest of the food lasts for the rest of the men.

(A) 5 days (B) 10 days

(C) 15 days (D) 20 days

Q17. 30 men can make 480 chairs in 15 days. Find the number of chairs made by 10 men in 6 days.

(A) 48 (B) 56

(C) 64 (D) 72

Q18. 23 Men can dig a trench which is 40 m long 20m broad and 10 m high in 15 days. Then find the height of trench which is dig by 69 men in 10 days and the trench is 20 m long and 10 m broad.

(A) 60 m. (B) 70 m.

(C) 80 m. (D) 100 m.

Q.19 Tap A can fill a tank in 36 minutes and tap B can fill a tank in 45 minutes. In how many minutes will be filled when the pipes will be opened simultaneously?

(A) 28 minutes (B)18 minutes

(C) 20 minutes (D) 24 minutes

Q.20 Tap A can fill a tank in 10 minutes and tap B in 15 minutes. In how many minutes will be filled when the both pipes open simultaneously where as there is one more pipe C which is working as outlet pipe and can empty the tank in 60 min.

Q.21 Tap A can fill a tank in 20 min. but due to a leak it is filled in 60 min. If leak has to empty a full fill tank, how many minutes required.

(A) 20 minutes (B) 30 minutes

(C) 40 minutes (D) 60 minutes

Q.22 Tap A can fill a tank in 10 min. tap B in 15 min. but due to a leak tap filled in 30 min. If leak can draw 5 litres water per minute then find the volume of the tank.

(A) 28 liters (B) 32.5 liters

(C) 35 liters (D) 37.5 liters

Q.23 Two pipes P and Q would fill a cistern in 12 and 16 minutes respectively. Both pipe being opened, find when the first pipe must be off so that the cistern may be just filled in 8 minutes.

(A) 4 minutes (B) 6 minutes

(C) 8 minutes (D) 10 Minutes

Q.24 Two pipes A and B can fill a tank in 36 min. & 48 min. respectively. If both the pipes are opened simultaneously, after how much time should B be closed so that the tank is full in 27 minutes.

(A) 8 minutes (B) 10 minutes

(C) 12 minutes (D) 15 minutes

Q.25 There is a leak in the bottom of a cistern. When the cistern was thoroughly repaired it would be filled in 12 min. It now takes 18 min. longer. If the cistern is full, how long would the leak take to empty the cistern.

(A) 15 minutes (B) 20 minutes

(C) 24 minutes (D) 30 minutes

A Answer Keys

Class Practice Questions [CPQ's]									
1.	$6\frac{2}{3}$ days	2.	B	3.	C	4.	D	5.	B
6.	11 days	7.	9 days	8.	B	9.	40 men	10.	6 days
11.	4 days	12.	B	13.	B	14.	C	15.	C
16.	C	17.	D	18.	D	19.	D	20.	D
21.	Rs. 180, Rs.120	22.	C	23.	C	24.	C	25.	B
26.	14.5 hours	27.	A	28.	A				

Self Practice Questions [SPQ's]									
1.	D	2.	B	3.	B	4.	13/4 days, 675 days	5.	A
6.	B	7.	B	8.	*	9.	A	10.	B
11.	B	12.	B	13.	B	14.	B	15.	C
16.	B	17.	C	18.	C	19.	C	20.	7.5 min
21.	D	22.	D	23.	B	24.	C	25	B

5 PERCENTAGE & IT'S APPLICATIONS

Class Practice Questions :

Q.1 In a basket of fruits, 60% are mangoes and remaining 40% are apples. 25% of the apples are green and the rest 75% are red. Of the mangoes, 80% are red and the rest of the mangoes are green. What percentage of the green fruits are mangoes?

Q.2 In a huge pile of apples and oranges, both ripe and unripe mixed together, 15% are unripe fruits. Of the unripe fruits, 45% are apples. Of the ripe ones, 66% are oranges. If the pile contains a total of 5692000 fruits, how many of them are apples?

(A) 2029198 (B) 2467482

(C) 2789080 (D) 3577422

[GATE 2016 : IISc Bangalore (EC Set – 1, ME Set -1)]

Q.3 In an exam, a student scored 50% of the maximum marks and yet failed by 12 marks. If he had scored 10% more than what he scored, he would have just managed to get the pass percentage. What are the maximum marks of the paper?

Q.4 (x% of y) + (y% of x) is equivalent to _____

(A) 2% of xy (B) 2% of $\left(\frac{xy}{100}\right)$

(C) xy % of 100 (D) 100% of xy

[GATE 2016 : IISc Bangalore (CE Set - 2]

Q.5 There are two candidates P and Q in an election. During the campaign, 40% of the voters promised to vote for P, and rest for Q. However, on the day of election 15% of the voters went back on their promise to vote for Q and instead voted for P. Suppose, P lost by 2 votes, then what was the total number of voters?

(A) 100 (B) 110

(C) 90 (D) 95

[GATE 2011 : IIT Madras (EC, EE)]

Q.6 Three friends, R, S and T shared toffee from a bowl. R took 1/3rd of the toffees, but returned four to the bowl. S took 1/4th of what was left but returned three toffees to the bowl. T took half of the remainder but returned two back into the bowl. If the bowl had 17 toffees left, how many toffees-were originally there in the bowl?

(A) 38 (B) 31

(C) 48 (D) 41

[GATE 2011 : IIT Madras (EC, EE)]

Q.7 The cost function for a product in a firm is given by $5q^2$,where q is the amount of production. The firm can sell the product at a market price of Rs.50 per unit. The number of units to be produced by the firm such that the profit is maximized is

(A) 5 (B) 10

(C) 15 0x (D) 25

[GATE 2012 : IIT Delhi (ME, CE, CSE)]

Q.8 In the summer of 2012, in New Delhi, the mean temperature of Monday to Wednesday was 41^0C and of Tuesday to Thursday was 43^0C . If the temperature on Thursday was 15% higher than that of Monday, then the temperature in ^{0}C on Thursday was

(A) 40 (B) 43

(C) 46 (D) 49

[GATE 2013 : IIT Bombay (EC, EE, IN)]

Q.9 A firm is selling it product at Rs. 60 per unit. The total cost of production is Rs. 100 and firm is earning total profit of Rs. 500. Later, the total cost increased by 30%. By what percentage the price should be increased to maintain the same profit level

(A) 5 (B) 15

(C) 10 (D) 30

[GATE 2013 : IIT Bombay (CE)]

Q.10 If prices decrease by 25%, by what percentage can consumption increase without affecting the expenditure?

Q.11 If the area of the circle is increased by 21% then what is the percentage increased in the circumference of the circle?

Q.12 In the summer, water consumption is known to decrease overall by 25%. A Water Board official states that in the summer household consumption decreases by 20%, while other consumption increases by 70%.

Which of the following statements is correct?

(A) The ratio of household to other consumption is 8/17

(B) The ratio of household to other consumption is 1/17

(C) The ratio of household to other consumption is 17/8

(D) There are errors in the official's statement.

[GATE 2017 : IIT Roorkee EC, BT, PI Set - 1]

Q.13 If the price of petrol increases successively by 20% and then by 10%, what is the net change in percentage terms?

Q.14 The length of a rectangle is increased by 10%. What will be the percentage decreased in its breadth so as to have the same area?

Q.15 A bought a cycle for Rs. 1080 and then sold it to B for a loss of 20%. B spent Rs. 36 on improving the condition of the cycle and then sold it to C for a 20% profit. What amount did C pay for the cycle?

Q.16 A man sells an article at a profit of 25%. If he had bought it at 20% less and sold it for Rs. 10.50 less, he would have gained 30%. Find the C.P. of the article.

Q.17 A fruit seller sold a basket of fruits at 12.5% loss. Had he sold it for Rs.108 more, he would have made a 10% gain. What is the loss in Rupees incurred by the fruit seller?

(A) 48 (B) 52

(C) 60 (D) 108

[GATE 2018 : IIT Guwahati (CE Set – 1)]

Q.18 The price of a wire made of a super alloy material is proportional to the square of its length. The price of 10 m length of wire is Rs. 1600. What would be the total price (in Rs.) of two wires of lengths 4 m and 6 m?

(A) 768 (B) 832

(C) 1440 (D) 1600

[GATE 2018 : IIT Guwahati (CE Set – 1)]

Q.19 The ratio of the number of boys and girls who participated in an examination is 4:3. The total percentage of candidates who passed the examination is 80 and the percentage of girls who passed is 90. The percentage of boys who passed is _____. **[GATE 2019 : IIT Madras]**

(A) 90.00 (B) 80.50

(C) 55.50 (D) 72.50

Q.20 If the radius of a right circular cone is increased by 50%, its volume increases by

(A) 75% (B) 100%

(C) 125% (D) 237.5%

[GATE 2017 : IIT Roorkee (EC, BT, PI Set – 1)]

Q.21 Fiscal deficit was 4% of GDP in 2015 and increased to 5% in 2016. If GDP increased by 10% from 2015 to 2016. Then % increase in actual Fiscal deficit?

[GATE 2019: IIT Madras]

Q.22 If R = 10%, n = 4 years, what is the simple interest charged on a loan of Rs. 2,000?

Q.23 In the above problem, if the case was one of compound interest, what is the CI?

Q.24 If an amount is kept at SI, it earns an interest of Rs. 600 in first two years but when kept at CI, it earns an interest of Rs. 660 in the same period. Find the rate of interest and the Principal.

Q.25 At what simple rate of interest shall a sum of money double itself in 4 years?

Q.26 For how many years should Rs. 600 be invested at 10% p.a. in S.I., in order to earn the same interest as earned by investing Rs. 800 at 12% p.a. for 5 years in S.I.?

Q.27 Find the C.I on Rs. 5,000 at 8% p.a. for 2 years, compounding being done annually.

Q.28 Find amount for Rs. 80,000 at 20% per annum, compounded semi – annually for 2 years.

Q.29 Find C.I. on Rs. 10,000 at 10% for 9 months compounded quarterly

Q.30 Industrial consumption of power doubled from 2000-2001 to 2010-2011. Find the annual rate of increase in percent assuming it to be uniform over the years.

(A) 5.6 (B) 7.2
(C) 10.0 (D) 12.2

[GATE 2014 : IIT Kharagpur (EC Set – 4, ME Set - 4)]

Q.31 The population of a new city is 5 million and is growing at 20% annually. How many years would it take to double at this growth rate?

(A) 3-4 years (B) 4-5 years
(C) 5-6 years (D) 6-7 years

[GATE 2014 : IIT Kharagpur (CE Set - 2 IN)]

Q.32 Round–trip tickets to a tourist destination are eligible for a discount of 10% on the total fare.

In addition, groups of 4 or more get a discount of 5% on the total fare. If the one way single person fare is Rs 100, a group of 5 tourists purchasing round–trip tickets will be charged Rs_____

[GATE 2014 : IIT Kharagpur (EE Set – 1, CSE Set - 1)]

Q.33 The Gross Domestic Product (GDP) in Rupees grew at 7% during 2012-2013. For international comparison, the GDP is compared in US Dollars (USD) after conversion based on the market exchange rate. During the period 2012-2013 the exchange rate for the USD increased from Rs. 50 per USD to Rs. 60 per USD. India's GDP in USD during the period 2012- 2013

(A) Increased by 5 %
(B) Decreased by 13%
(C) Decreased by 20%
(D) Decreased by 11%

[GATE 2014 : IIT Kharagpur (EE Set - 3, CSE Set - 3)]

Q.34 Leila aspires to buy a car worth Rs. 10,00,000 after 5 years. What is the minimum amount in Rupees that she should deposit now in a bank which offers 10% annual rate of interest, if the interest was compounded annually?

(A) 5,00,000 (B) 6,21,000
(C) 6,66,667 (D) 7,50,000

[GATE 2018 : IIT Guwahati (EC Set – 1)]

Self Practice Questions :

Q.1 A's income is 70% of B's. B's income is 50%of C's. If C's income is Rs. 1,00,000, what is A's income?

Q.2 What is 20% of 30% of 40?

Q.3 If A is 37.5% more than B, by what percent is B less than A?

Q.4 Since prices of mangoes decreased by 25%, I can purchase 4 mangoes more for Rs. 60. What is the original price of one mango?

Q.5 The length and the breadth of a rectangle are 10 cm and 5 cm respectively. The length is increased by 10% and the breadth is increased by 5%. What is the new area of the rectangle?

Q.6 The radius of a circle has increased by 20%. By what percentage does

A. The circumference increase?
B. The area increase?

Q.7 If the side of a square is increased by 25%, then its area is increased by how many percent?

Q.8 Anirudh bought 8 lemons for a rupee, but sells only 6 lemons for a rupee. Find his profit percentage.

Q.9 Aditya purchases toffees at Rs. 10 per dozen and sells them at Rs. 12 for every 10 toffees. Find the gain or loss percentage.

Q.10 A boy buys eggs at 10 for Rs. 1.80 and sells them at 11 for Rs. 2 What is his profit or loss percent?

Q.11 A single discount equivalent to a series discount of 20%, 10% and 5% is ….. .

Q.12 Paresh sells 40 pencils and gains the selling price of 10 pencils. What is his profit percentage?

Q.13 Inspite of giving a discount of 10%, a shopkeeper manages to make a profit of 8%. By what percentage does the shopkeeper mark – up his goods?

Q.14 If a commission of 10% is given on the marked price of an article, the gain is 25%. Find the gain percentage, if the commission is increased to 20%.

Q.15 The price of a Maruti car rises by 30% while the sale of the car comes down by 20%. What is the percentage change in the total revenue?

(A) - 4% (B) - 2%

(C) + 4% (D) + 2%

Q.16 What shall be the simple interest to be paid on a principal of Rs. 14,000 borrowed at a rate of 15% for a period of 3 years and 6 months?

Q.17 If a certain sum amounts to Rs. 108 in 2 years Rs. 112 in 3 years, find rate of interest (simple).

Q.18 Prabhat took a certain amount as a loan from a bank at the rate of 8% p.a. S.I. and gave the same amount to Ashish as a loan at the rate of 12% p.a. If at the end of 12 years, he made a profit 12% p.a. If at the end of 12 years, he made a profit of Rs. 320 in the deal, what was the original amount?

Q.19 If a sum of money at simple interest doubles in 6 years, it will become 4 times in

Q.20 The rate of interest on a sum of money is 4% p.a. for the first 2 years, 6% p.a. for the next 3 years and 8% p.a. for the period. beyond 5 years. If the simple interest accrued by the sum for a total period of 8 years is Rs. 1,280 then what is the sum?

Q.21 Vinod Kumar invested Rs. 1,600 for3 years and Rs. 1,100 for 4 years at the same rate of simple interest. If the total interest from these investments is Rs. 506, find the rate of interest.

Q.22 A man invests an amout of Rs. 15,860 in the names of his three sons A, B, and C in such a way that they getthe same interest after 2, 3 and 4 years respectively at SI. If the rate of interest is 5%, then the ratio of amounts invested in the name of A, B and C is

Q.23 Mr Kuber bought a flat in Swarg Lok Apartments for $1,000. What would the future value of the flat be after 2 years if the value is compounded semi – annually at 22% per annum?

Q.24 What shall be the amount for a sum of Rs. 1,000 at 10% for 3 years compounded annually?

❖❖❖❖

A Answer Keys

Class Practice Questions [CPQ's]									
1.	54.54%	2.	A	3.	240	4.	A	5.	A
6.	C	7.	A	8.	C	9.	A	10.	33.33%
11.	10%	12.	D	13.	32%	14.	9.09%	15.	Rs.1080
16.	Rs.55	17.	C	18.	B	19.	D	20.	C
21.	37.5%	22.	Rs.800	23.	Rs.928.2	24.	Rs.1500	25.	25%
26.	8 years	27.	Rs. 832	28.	Rs.11712.8	29.	Rs. 769	30.	B
31.	A	32.	Rs. 850	33.	D	34	B		

Self Practice Questions [SPQ's]									
1.	Rs. 35000	2.	2.4	3.	27.27%	4.	51%	5.	57.75cm
6.	A. 20% B. 40%	7.	56.25%	8.	33.33%	9.	44%	10.	1.01%
11.	31.6%	12.	33.33%	13.	20%	14.	11.1%	15.	C
16.	Rs.7350	17.	4%	18.	Rs.666.7	19.	18 years	20.	2.60
21.	5.5%	22.	6 : 4 : 3	23.	1518.07	24.	1331		

6 TIME, SPEED & DISTANCE

Class Practice Questions : (CPQ's)

Q.1 A train runs at the rate of 45 km per hour. What is its speed in metres per second?

Q.2 A motor car takes 50 seconds to travel 500 metres. What is its speed in km per hour?

Q.3 A car travels 8 km in the first quarter of an hour, 6 km in the second quarter and 16 km in the third quarter. The average speed of the car in km per hour over the entire journey is

(A) 30 (B) 36

(C) 40 (D) 24

[GATE 2013 : IIT Bombay (EC, EE, IN)]

Q.4 A tourist covers half of his journey by train at 60 km/h, half of the remainder by bus at 30 km/h and the rest by cycle at 10 km/h. The average speed of the tourist in km/h during his entire journey is

(A) 36 (B) 30

(C) 24 (D) 18

[GATE 2013 : IIT Bombay (ME, CSE)]

Q.5 An automobile travels from city A to city B and returns to city A by the same route. The speed of the vehicle during the onward and return journeys were constant at 60 km/h and 90 km/h respectively. What is the average speed in km/h for the entire journey?

(A) 72 (B) 73

(C) 74 (D) 75

[GATE 2018 : IIT Guwahati (IN Set – 1)]

Q.6 If Arun rides his scooter at a speed of 20 kmph, then he reaches his office 5 minutes late. If he rides at 30kmph then he reaches 5 minutes early. Find the distance between his home and office.

Q.7 Walking at $5/7^{th}$ of his usual rate, a man reaches the, market 16 minutes late. Find his usual time taken to reach the market.

Q.8 Walking at $12/11^{th}$ of his usual rate, a man takes 5 minutes less to reach his office. Find his usual time taken to reach the office.

Q.9 A train running between two towns arrives at its destination 10 minutes late when it goes at 60 km per hour and 16 minutes. late when it goes at 40 km per hour. Determine the distance between the two towns.

Q.10 A man travelled a distance of 61 km in 9 hours partly on foot at the rate of 4 km per hour and partly on bicycle at the rate of 9 km per hour. Find the distance travelled on foot.

Q.11 A train, 140 metres long, moves at the rate of 36kmph. How long will it take to pass a certain telegraph pole? (The height of the pole is 2 m).

Q.12 It takes 10 s and 15 s, respectively, for two trains travelling at different constant speeds to completely pass a telegraph post. The length of the first train is 120 m and that of the second train is 150 m. The magnitude of the difference in the speeds of the two trains (in m/s) is _____.

(A) 2.0 (B) 10.0

(C) 12.0 (D) 22.0

[GATE 2016 : IISC Banglore (IN)]

Q.13 A train that is 280 metres long, travelling at a uniform speed, crosses a platform in 60 seconds

and passes a man standing on the platform in 20 seconds. What is the length of the platform in metres?

[GATE 2014 : IIT Kharagpur (EC Set - 1, ME Set - 1)]

Q.14 From the time the front of a trains enters a platform, it takes 25 sec for the back of the train to leave the platform, while train travelling at a constant speed of 54 km/h. At the same speed, it takes 14 sec to pass a man running at 9 km/h in the same direction as the train. What is the length of the train and that of the platform in meters respectively?

(A) 210 & 140 (B) 162.5 & 187.5

(C) 245 & 130 (D) 175 & 200

[GATE 2018 : IIT Guwahati (ME Set – 1)]

[GATE 2016 : IISC Banglore (EC Set - 1)]

Q.15 A train has 320 km to run. After going 1/5th of the distance, the engine breaks down and it can only run the remaining part of the journey at 3/4th of the original speed. If it arrives 2hrs 40minlate, what was its original speed?

(A) 24 km/hr (B) 32 km/hr

(C) 48 km/hr (D) 64 km/hr

Q.16 A tiger is 50 leaps of its own behind a deer. The tiger takes 5 leaps per minute to the deer's 4. If the tiger and the deer cover 8 meter and 5 meter per leap respectively, what distance in meters will the tiger have a run before it catches the deer?

[GATE 2015 : IIT Kanpur (EC Set – 2, ME SET - 1)]

Q.17 If a man cycles at 10 km/h, then he arrives at a certain place at 1:00 pm. If he cycles at 15 km/h, he arrives at the same place at 11:00 am. At what speed must he cycle to get there at noon?

(A) 11 km/h (B) 12 km/h

(C) 13 km/h (D) 14 km/h

Q.18 Tower *A* is 90 m tall and tower *B* is 140 m tall. They are 100 m apart. A horizontal skywalk connects the floors at 70 m in both the towers. If a taut rope connects the top of tower *A* to the bottom of tower *B*, at what distance (in meters) from tower *A* will the rope intersect the skywalk?

[GATE 2018 : IIT Guwahati (CE Set – 1)]

Q.19 Two trains start at the same time from Aligarh and Delhi and proceed towards each other at the rate of 16 km/hr and 21 km/hr respectively. When they meet , it is found that one train has travelled 60 km more than the other. The distance between the two stations is

(A) 445 km (B) 444 km

(C) 440 km (D) 450 km

Q.20 Trucks (10 m long) and cars (5 m long) go on a single lane bridge. There must be a gap of at least 20 m after each truck and a gap of at least 15 m after each car. Trucks and cars travel at a speed of 36 km/h. If cars and trucks go alternately, what is the maximum number of vehicles that can use the bridge in one hour?

(A) 1440 (B)200

(C) 720 (D) 600

[GATE 2017 : IIT Roorkee (EC, BT, PI Set – 1)]

Q.21 Budhan covers a distance of 19 km in 2 hours by cycling one fourth of the time and walking the rest. The next day he cycles (at the same speed as before) for half the time and walks the rest (at the same speed as before) and covers 26 km in 2 hours. The speed in km/h at which Budhan walks is

(A) 1 (B) 4

(C) 5 (D) 6

[GATE 2017 : IIT Roorkee (IN, CE Set – 2)

Q.22 A boat covers a certain distance downstream in 1 hour, while it comes back in $1\frac{1}{2}$ hours. If the speed of the stream be 3 kmph, what is the speed of the boat in still water?

(A) 12 kmph (B) 13 kmph

(C) 15 kmph (D) None of these

Q.23 A motorboat, whose speed is 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. The speed of the stream (in km/hr) is:

(A) 4 (B) 5

(C) 6 (D) 10

Q.24 The speed of a boat in still water is 10 km/hr. If it can travel 26 km downstream and 14 km upstream in the same time, the speed of the stream is:

(A) 2 km/hr (B) 2.5 km/hr
(C) 3 km/hr (D) 4 km/hr

Q.25 A man can row at 8 km per hour in still water. If it takes him thrice as long to row upstream, as to row downstream, then find the stream velocity in km per hour.

[GATE 2014 : IIT Kharagpur
(EC Set – 3, ME Set – 3)]

Self Practice Questions : (SPQ's)

Q.1 A bird flying 400 km covers the first 100km at the rate of 100km/hr, the second 100km at 200km/hr, the third100km at the rate of 300km/hr and the last 100 km at the rate of 400km/hr. Determine the average speed of the bird.

Q.2 If Tushar goes from Delhi to Noida at a speed of 30 km per hour and comes back at a speed of 70 km per hour, then what is his average speed during the entire journey?

Q.3 Michael lives 10 km away from where I live. Ahmed lives 5 km away and Susan lives 7 km away from where I live. Arun is farther away then Ahmed but closer than Susan from where I live. From the information provided here, what is one possible distance (in km) at which I live from Arun's place?

(A) 3.00 (B) 4.99
(C) 6.02 (D) 7.01

Q.4 A carriage driving in a fog passed a man who was walking at the rate of 3 kmph in the same direction, if he could see the carriage for 4 minutes and if it was visible to him up to a distance of 100 m then what was the speed of the carriage?

(A) 3.6 kmph (B) 4.5 kmph
(C) 3.5 kmph (D) None of these

Q.5 The distance between two cities A and B is 80km. A motorcycle rider starts from A towards B at 7am at a speed of 10 km/hr. Another motorcyclist starts from B towards A at 8am at a speed of 25km/hr. At what time will they cross each other?

Q.6 Two trains start at the same time from two stations and proceed towards each other at the rate of 20 km/hr and 25km/hr respectively. When they meet, it is found that one train has travelled 80km more than the other. Find the distance between the two stations.

Q.7 Distance between A and B is 72 km. Two men started walking from A and B at the same time towards each other. The person who started from A travelled uniformly with average speed 4 km/h. While the other man travelled with varying speed as follows: In first hour, his speed was 2 km/h, in the second hour, it was 2.5 km/h. in the third hour, it was 3 km/h, and so on. When will they meet each other?

(A) 7h
(B) 10 h
(C) 35 km from A
(D) Midway between A & B

Read the data given below and answer the questions that follow.

Two trains start from the opposite stations A and B, 100 m apart at the same time. A bird flies from the faster train towards the slower one starting at the same time. The velocities of the two trains and the bird are in G.P. the bird being the fastest. The bird reaches the second train in 10 sec and then immediately flies back towards the faster train. It continues this till the two trains meet after 50/3 sec.

Q.8 What is the velocity of the slower train?

(A 1 m/sec (B) 2 m/sec
(C) 3 m/sec (D) 4 m/sec

Q.9 What is the velocity of the bird?

(A) 6m/sec (B) 7 m/sec
(C) 8 m/sec (D) 9 m/sec

Q.10 After how many seconds from where the bird first started flying does the bird again reach the faster train?

(A) 20/3 sec (B) 10 sec
(C) 40/3 sec (D) 50/3 sec

Q.11 What will be the total distance travelled by the bird till the two trains meet?

(A) 200/3 m (B) 100 m
(C) 400/3 m (D) 500/3 m

Q.12 In nuts & bolts factory, one machine produces only nuts at the rate of 100 nuts per minute & needs to be cleaned for 5 min after production of every 1000 nuts. Another machine produces only bolts at the rate of 75 bolts per minute & needs to be cleaned for 10 min after production of every 1500 bolts. If both the machines start production at the same time, what is the minimum duration required for producing 9000 pairs of nuts & bolts?

(A) 130 min (B) 135 min

(C) 170 min (D) 180 min

Q.13 Shyam went from Delhi to Shimla via Chandigarh by car. The distance from Delhi to Chandigarh is ¾ times the distance from Chandigarh to Shimla. The average speed from Delhi to Chandigarh was half as much more as that from Chandigarh to Shimla. If the average speed for entire journey was 49 km/hr, then what was the average speed from Chandigarh to Shimla?

(A) 39.2 km/hr (B) 63 km/hr

(C) 42 km/hr (D) None of these.

Q.14 A man rows to a place 48 km distant and back in 14 hours. He finds that he can row 4 km with the stream in the same time as 3 km against the stream. The rate of the stream is:

(A) 1 km/hr (B) 1.5 km/hr

(C) 1.8 km/hr (D) 3.5 km/hr

A Answer Keys

Class Practice Questions [CPQ's]									
1.	12.5m/sec	2.	36 kmph	3.	C	4.	C	5.	A
6.	10 km	7.	40 min	8.	55 min	9.	12 km	10.	16 km
11.	14 sec	12.	A	13.	560 m	14.	D	15.	B
16.	800 m	17.	B	18.	22.22 m	19.	D	20.	A
21.	D	22.	C	23.	B	24.	C	25.	4 kmph

Self Practice Questions [SPQ's]									
1.	192 kmph	2.	42 kmph	3.	C	4.	B	5.	10 am
6.	72 km	7.	D	8.	B	9.	C	10.	C
11.	C	12.	C	13.	C	14.	A		

7 AVERAGE & RATIO

Class Practice Questions :

Q.1 The avg. weight of 4 students is 64 kg. When Tom joins the group, avg. weight of group increases by 2 kg. Find Tom's weight.

(A) 68 kg. (B) 70 kg.
(C) 72 kg. (D) 74 kg.

Q.2 6 friends has an average weight of 62 kg. One of the student left the group having weight 52 kg. Find new avg. weight.

(A) 62 kg. (B) 64 kg.
(C) 66 kg. (D) 68 kg.

Q.3 The avg. wt. of 5 students in a class is 65 kg. 2 friends with an avg. wt. of 70 kg. Left the group. Find the new avg. weight.

(A) 61 kg. (B) 61.67 kg.
(C) 62 kg. (D) 64 kg.

Q.4 The avg. wt. of 10 students is 80 kg. 3 students with an avg. wt. of 73 kg left the group. Find the new avg. wt. of class.

(A) 81 kg. (B) 82 kg.
(C) 83 kg. (D) 84 kg.

Q.5 The avg. weight of 8 students in a class is found to be 53 kg. If one of the student need to be replace by other student. Such that avg. weight of the class may increase by 2 kg. It the wt. of new student is 80 kg. Find the wt. of new student.

(A) 62 kg. (B) 64 kg.
(C) 66 kg. (D) 68 kg

Q.6 The avg. height of 48 students in a class is found to be 152 cm. later it was discovered that the height of one of the student in a class is 126 cm. whereas his actual height is 150 cm. find the new avg. height.

(A) 150 cm. (B) 152 cm.
(C) 152.5 cm. (D) 154 cm.

Q.7 The avg. wt. of 20 students in a class is 70 kg. Later it was discovered that weight of one of the student is 88 kg, it is wrongly spelt as 40 kg. Weight of another student is 40 kg. it is wrongly spell as 68 kg. Find the new avg. weight.

(A) 68 kg. (B) 69 kg.
(C) 70 kg. (D) 71 kg.

Q.8 The avg. temp of a town in a week is 30^0C and the temp from Monday to Thursday is 30^0C and Thursday to Sunday is 40^0C. find temp on Thursday (in degree Celsius).

(A) 25 (B) 27
(C) 30 (D) 32

Q.9 If A : B = 2 : 3, B : C = 4 : 5 and C : D = 6 : 7 then A : B : C : D is.

(A) 16 : 22 : 30 : 35 (B) 16 : 24 : 15 : 35
(C) 16 : 24 : 30 : 35 (D) 18 : 24 : 30 : 35

Q.10 Rs.1210 were divided among A, B, C so that A: B = 5:4 and B : C = 9:10. then C gets

(A) Rs.340 (B) Rs.400
(C) Rs.450 (D) Rs.475

Q.11 The ratio of the number of boys and girls in a college is 7:8. If the percentage increase in the number of boys and girls be 20% and 10% respectively. What will be the new ratio

(A) 8 : 9
(B) 17 : 18

(C) 21 : 22
(D) Cannot be determined

Q.12 Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water

(A) 1 : 1 (B) 2 : 3
(C) 1 : 2 (D) 3 : 2

Q.13 85 kg of a mixture contains milk and water in the ratio 27 : 7. How much more water is to be added to get a new mixture containing milk and water in the ratio 3 : 1?

(A) 5 lit. (B) 6.5 lit.
(C) 7.25 lit. (D) 8 lit.

Q.14 The electricity bill of a certain establishment is partly fixed and partly varies as the number of units of electricity consumed. When in a certain month 540 units are consumed, the bill is Rs.1800. In another month 620 units are consumed and the bill is Rs. 2040. In year another month 500 units are consumed. The bill for that month would be :

(A) Rs.1560 (B) Rs.1680
(C) Rs.1840 (D) Rs.1950

Q.15 Zinc and copper are melted together in the ratio 9:11. What is the weight of melted mixture, if 28.8 kg of zinc has been consumed in it?

(A) 58 kg (B) 60 kg
(C) 64 kg (D) 70 kg

Q.16 What is the ratio whose terms differ by 40 and the measure of which is $\frac{2}{7}$?

(A) 16 : 56 (B) 14 : 56
(C) 15 : 56 (D) 16 : 72

Q.17 In what ratio must rice at Rs. 9.30 per kg be mixed with rice at Rs. 10.80 per kg so that the mixture be worth Rs. 10 per kg?

Q.18 In what ratio must tea at Rs. 62 per kg be mixed with tea at Rs. 72 per kg so that the mixture must be worth Rs. 64.50 per kg?

(A) 3 : 1 (B) 3 : 2
(C) 4 : 3 (D) 5 : 3

Q.19 A merchant has 1000 kg of sugar, part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. The quantity sold at 18% profit is:

(A) 400 kg (B) 560 kg
(C) 600 kg (D) 640 kg

Q.20 Tea worth Rs. 126 per kg and Rs. 135 per kg are mixed with a third variety in the ratio 1 : 1 : 2. If the mixture is worth Rs. 153 per kg, the price of the third variety per kg will be:

(A) Rs. 169.50 (B) Rs. 170
(C) Rs. 175.50 (D) Rs.180

Q.21 The price of a wire made of a super alloy material is proportional to the square of its length. The price of 10 m length of wire is Rs. 1600. What would be the total price (in Rs.) of two wires of lengths 4 m and 6 m?

(A) 768 (B) 832
(C) 1440 (D) 1600

[GATE 2018 : IIT Guwahati (CE Set-1, EC Set-1)]

Q.22 In what ratio must water be mixed with milk to gain 20% by selling the mixture at cost price?

Q.23 The milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing half milk and half water?

Q.24 Two vessels A and B contain milk and water mixed in the ratio 8 : 5 and 5 : 2 respectively. Find the ratio in which these mixture be mixed to get a new mixture containing $69\frac{3}{13}$ % milk, is:

(A) 2 : 7 (B) 3 : 5
(C) 5 : 2 (D) 5 : 7

Q.25 A container contains 40 litres of milk From this containers 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

(A) 26.34 litres (B) 27.36 litres
(C) 28 litres (D) 29.16 litres

[GATE 2012 : IIT Delhi]

Q.26 8 litres are drawn from a cask full of wine and is then filled with water. This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of the water is 16 : 65. How much wine did the cask hold originally?

(A) 18 litres (B) 24 litres
(C) 32 litres (D) 42 litres

Q.27 A and B start a business with capital of Rs. 20,000 and Rs. 10,000 respectively. They get the profit after one year in ratio?
(A) 2 : 1 (B) 3 : 2
(C) 4 : 3 (D) 1 : 1

Q.28 A start a business with Rs. 25,000. After 6 months B Joins A with 15,000. Find their profit sharing ratio after 1 year.
(A) 7 : 3 (B) 5 : 3
(C) 10 : 3 (D) 10 : 6

Q.29 A, B and C start a business. A invests 3 times as much as B invest. B invest 2/3rd of what C invests. At the end of the year, they get Rs. 6600 as a profit. Find B's share in the profit.
(A) 800 (B) 1000
(C) 1200 (D) 1500

Q.30 The ratio of age of two students is 3 : 2. One is older to the other by 5 years. What is the age of the Younger Student?
(A) 2 years (B) 10 years
(C) $2\frac{1}{2}$ years (D) 15 years

Q.31 The ratio between Sumits and Prakash's age at present is 2 : 3. Sumit is 6 years younger than Prakash. The ratio of Sumit's age to Prakash's age afters 6 years will be
(A) 2 : 3 (B) 1 : 2
(C) 4 : 3 (D) 3 : 4

Q.32 The ratio of the ages of two persons is 4 : 7 and the age of one of then is greater than that of the other by 30 years. The sum of their ages (in years) is
(A) 110 (B) 100
(C) 70 (D) 40

Q.33 Four years ago the ratio of the age of A & B was 2 : 3 and afters four years it will become 5 : 7. Find their present age.
(A) 36 yrs & 40 yrs
(B) 32 yrs & 48 yrs
(C) 40 yrs & 56 yrs
(D) 36 yrs & 52 yrs

Self Practice Questions :

Q.1 The wt. of 4 students in a class is 48 kg, 52 kg, 60 kg, and 40 kg. Find the avg. weight of class.
(A) 45 kg. (B) 50 kg.
(C) 55 kg. (D) 60 kg.

Q.2 The avg. wt. of 37 students in a class is 42 kg. When their teachers join the group, average wt. increases by 1 kg. Find the wt. of teacher.
(A) 70 kg. (B) 74 kg.
(C) 76 kg. (D) 80 kg.

Q.3 The avg. wt. of 47 students in a class is 52 kg. When their friend join the group, the avg. wt. increase by half kg.
(A) 72 kg. (B) 74 kg.
(C) 76 kg. (D) 80 kg.

Q.4 The avg. wt. of 5 students in a class is 62 kg. One of the student need to be replaced by other student. So that the avg. wt. of the class will increase by 2 kg. If the wt. of replaced student is 60 kg. Then, Find the wt. of new student.
(A) 62 kg. (B) 65 kg.
(C) 68 kg. (D) 70 kg.

Q.5 The avg. height of 39 girls in a class is found to be 158 cm. it was later discover that the height of one of the girl is wrongly spelt as 151 cm. whereas her actual height is 112 cm. Find the new avg. height of the class after correction.
(A) 156 cm. (B) 157 cm.
(C) 157.5 cm. (D) 162 cm.

Q.6 The avg. temp of a city is 20^0C on Monday, Thue Wed, Thu and is 30^0C on Thu, Fri, Sat & Sun. the avg. temp of the city of the Whole Week is 25^0C. find the temp of the city on Thursday (in degree Celsius).
(A) 25 (B) 27
(C) 30 (D) 32

Q.7 Two numbers are in the ratio 1 : 2. if 7 is added to both, their ratio changes to 3 : 5. the greatest number is :
(A) 24 (B) 26
(C) 28 (D) 32

Q.8 Rs.366 are divided amongst A, B and C so that A may get $\frac{1}{2}$ as much as B and C together, B may get $\frac{2}{3}$ as much as A and C together, then the share of A is

(A) Rs.122 (B) Rs.129.60

(C) Rs.146.60 (D) Rs.183

Q.9 An amount of Rs.735 was divided between A, B and C. If each of them had received Rs.25 less, their shares would have been in the ratio of 1: 3:2. The money received by C was :

(A) Rs.195 (B) Rs.200

(C) Rs.225 (D) Rs.245

Q.10 In a college, the ratio of the number of boys to girls is 8: 5. If there are 160 girls, the total number of students in the college is :

(A) 100 (B) 250

(C) 260 (D) 416

Q.11 The least whole number which when subtracted from both the terms of the ratio 6 : 7 gives a ratio less than 16 : 21 is :

(A) 2 (B) 3

(C) 4 (D) 6

Q.12 Avg. of 11 observations was 20. It the avg. of 1st six of them is 20. And that of last six is 15. Find the 6th observation (in degree Celsius).

(A) 10 (B) 15

(C) 20 (D) 25

Q.13 A and B together have Rs.1210. If $\frac{4}{15}$ of A amount is equal to $\frac{2}{5}$ of B's amount. How much amount does B have?

(A) Rs.460 (B) Rs.484

(C) Rs.550 (D) Rs.664

Q.14 The cost of Type 1 rice is Rs. 15 per kg and Type 2 rice is Rs. 20 per kg. if both Type 1 and Type 2 mixed in the ratio of 2 : 3, then the prices per kg of the mixed variety of rice is:

(A) Rs. 18 (B) Rs. 18.50

(C) Rs. 19 (D) Rs. 19.50

Q.15 In what ratio must water be mixed with milk costing Rs. 12 per litre to obtain a mixture worth of Rs. 8 per litre?

(A) 1 : 2 (B) 2 : 1

(C) 2 : 3 (D) 3 : 2

Q.16 Two alloys *A* and *B* contain gold and copper in the ratios of 2:3 and 3:7 by mass, respectively. Equal masses of alloys *A* and *B* are melted to make an alloy *C*. The ratio of gold to copper in alloy *C* is,

(A) 5 : 10 (B) 7 : 13

(C) 6 : 11 (D) 9 : 13

Q.17 A container originally contains 10 litres of pure spirit. From this container 1 litre of spirit is replaced with 1 litre of water. Subsequently, 1 litre of the mixture is again replaced with 1 litre of water and this process is repeated one more time. How much spirit is now left in the container?

(A) 7.58 litres (B) 7.84 litres

(C) 7 litres (D) 7.29 litres

Q.18 The ratio of the number of boys and girls who participated in an examination is 4:3. The total percentage of candidates who passed the examination is 80 and the percentage of girls who passed is 90. The percentage of boys who passed is _____.

(A) 90.00 (B) 80.50

(C) 55.50 (D) 72.50

[GATE 2019 : IIT Madras]

Q.19 A and B start a business with capital of Rs. 2,00,000 and Rs. 1,00,000 respectively. They get Rs. 60,000 as a profit in the end of the year. Find the difference of A's & B's project.

(A) 10,000 (B) 15,000

(C) 20,000 (D) 25,000

Q.20 A and B start a business with Rs. 30,000 & Rs. 20,000 respectively. After 4 month C joins them with the capital of Rs. 10,000 & again after 4 months A takes away half of his capital. Find their profit sharing ration at the end of the year.

(A) 12 : 8 : 5 (B) 15 : 10 : 8

(C) 15 : 12 : 4 (D) 8 : 6 : 3

Q.21 The ratio of A's, B,s & C,s capital is 3 : 5 : 2. It the ratio of their time is 1 : 2 : 3, then find their profit sharing ratio.

(A) 3 : 10 : 6 (B) 3 : 8 : 6

(C) 2 : 5 : 8 (D) 3 : 5 : 2

Q.22 The ratio of the age of Ram & Rahim 10 years ago was 1 : 3. The ratio of their age five years hence will be 2 : 3. Then ratio of their present age is

(A) 1 : 2 (B) 3 : 5

(C) 3 : 4 (D) 2 : 5

Q.23 A invest $\frac{1}{6}$th of the capital for $\frac{1}{6}$th of the times B invest $\frac{1}{3}$rd of the capital for $\frac{1}{3}$rd of the times and C invest rest of the capital for whole the time. Find profit sharing ratio.

(A) 1 : 4 : 8 (B) 3 : 6 : 14

(C) 1 : 4 : 18 (D) 1 : 6 : 14

Q.24 Three containers have their volumes in the ratio 3 : 4 : 5. They are full of mixtures of milk and water. The mixtures contains milk and water in the ratio of (4 : 1), (3 : 1) and (5 : 2) respectively. The contents of all these three containers are poured into a fourth container. The ratio of milk and water in the fourth container is:

(A) 4 : 1 (B) 151 : 48

(C) 157 : 53 (D) 5 : 2

Q.25 At present, the ratio of the age of Maya and chhaya is 6 : 5 and fifteen years from now, the ratio will get changed to 9 : 8. Maya's present age is

(A) 21 years (B) 24 years

(C) 30 years (D) 40 years

Q.26 The ratio of the present age of Puneet and Appu is 2 : 3. After 3 years the ratio of their age will be 3 : 4. The present age of Puneet is

(A) 3 years (B) 6 years

(C) 9 years (D) 4 years

A Answer Keys

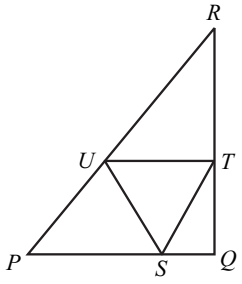
Class Practice Questions [CPQ's]									
1.	D	2.	B	3.	B	4.	C	5.	B
6.	C	7.	D	8.	C	9.	C	10.	B
11.	C	12.	D	13.	A	14.	A	15.	C
16.	A	17.	8 : 7	18.	A	19.	C	20.	C
21.	B	22.	1 : 5	23.	7 : 5	24.	A	25.	D
26.	B	27.	A	28.	C	29.	C	30.	B
31.	D	32.	A	33.	D				

Self Practice Questions [SPQ's]									
1.	B	2.	D	3.	C	4.	D	5.	B
6.	A	7.	C	8.	A	9.	D	10.	D
11.	B	12.	A	13.	B	14.	A	15.	A
16.	B	17.	D	18.	D	19.	C	20.	C
21.	A	22.	B	23.	C	24.	C	25.	C
26.	B								

8 GEOMETRY & MENSURATION

Class Practice Questions :

Q.1 In the given figure angle Q is a right angle, $PS : QS = 3 : 1$, $RT : QT = 5 : 2$ and $PU : UR = 1 : 1$. If area of triangle QTS is 20 cm^2, then the area of triangle PQR in cm^2 is _____.



[GATE 2014 : IIT Kharagpur (IN, ME-3, MT, PI)]

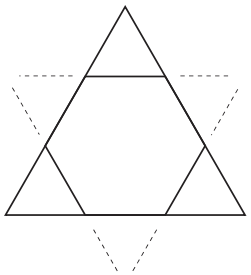
Q.2 The area of an equilateral triangle is $\sqrt{3}$. What is the perimeter of the triangle?

(A) 2 (B) 4

(C) 6 (D) 8

[GATE 2018 : IIT Guwahati (CH, IN, MT)]

Q.3



Corners are cut from an equilateral triangle to produce a regular convex hexagon as shown in the figure above.

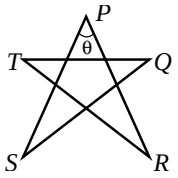
The ratio of the area of the regular convex hexagon to the area of original equilateral triangle is

(A) 5 : 6 (B) 3 : 4

(C) 4 : 5 (D) 2 : 3

[GATE 2021 : IIT Bombay (EC)]

Q.4 Following shape has equal length segments PR, PS, QS, TR and TQ are of equal length, what will be the angle θ?



(A) 36 (B) 108

(C) 72 (D) 45

[GATE 2021 : IIT Bombay (IN, CE-1)]

Q.5 A window is made up of a square portion and an equilateral triangle portion above it. The base of the triangular portion coincides with the upper side of the square. If the perimeter of the window is 6 m, the area of the window in m^2 is _____.

(A) 1.43 (B) 2.06

(C) 2.68 (D) 2.88

[GATE 2016 : IISc Bangalore (CH, ME-2)]

Q.6 The smallest angle of a triangle is equal to two thirds of the smallest angle of a quadrilateral. The ratio between the angles of the quadrilateral is 3:4:5:6. The largest angle of the triangle is twice its smallest angle. What is the sum, in degrees, of the second largest angle of the triangle and the largest angle of the quadrilateral?

[GATE 2014 : IIT Kharagpur (CE-1, CH, MT)]

Q.7 A square has sides 5 cm smaller than the sides of a second square. The area of the larger square is four times the area of the smaller square. The side of the larger square is _____ cm.

(A) 15.10 (B) 8.50
(C) 18.50 (D) 10.00

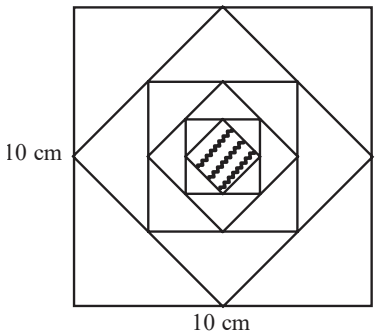
[GATE 2019 : IIT Madras (CE-1)]

Q.8 Consider a square sheet of side 1 unit. In the first step, it is cut along the main diagonal to get two triangles. In the next step, one of the cut triangle is revolved about its short edge to form solid cone. The volume of a resulting cone, in a cube units is _____.

(A) $\frac{2\pi}{3}$ (B) 3π
(C) $\frac{\pi}{3}$ (D) $\frac{3\pi}{2}$

[GATE 2021 : IIT Bombay (EC)]

Q.9 In the figure shown above, each inside square is formed by joining the mid points of the sides of the next larger square. The area of the smallest square (shaded has shown in cm^2) is



(A) 6.25 (B) 3.125
(C) 12.50 (D)1.5625

[GATE 2021 : IIT Bombay EE]

Q.10 We have 2 rectangular sheets of paper, M and N, of Dimension $6\text{ cm} \times 1\text{cm}$ each. Sheet M is rolled to form an open cylinder by bringing short edges of the sheet together. Sheet N is cut into equal square patches and assembled to form largest possible closed cube. Assuming the ends of the cylinder are closed, ratio of the volume of the cylinder to that of the cube is _____.

(A) $\frac{9}{\pi}$ (B) 3π
(C) $\frac{\pi}{2}$ (D) $\frac{3}{\pi}$

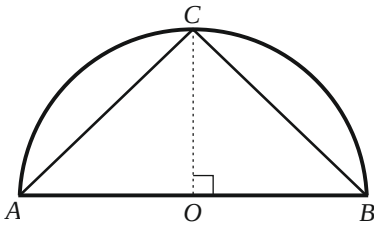
[GATE 2021 : IIT Bombay (CS-1)]

Q.11 A retaining wall with measurements $30\text{m} \times 12\text{m} \times 6\text{m}$ was constructed with bricks of dimensions $8\text{cm} \times 6\text{cm} \times 6\text{cm}$. If 60% of the wall consists of bricks, the number of bricks used for the construction is _____ lakhs.

(A) 30 (B) 40
(C) 75 (D) 45

[GATE 2019 : IIT Madras (CE-2)]

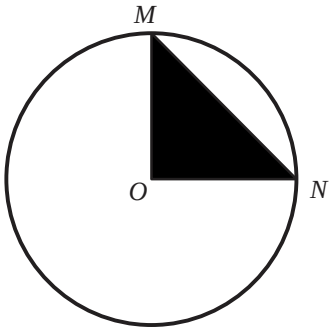
Q.12 Given a semicircle with O as the centre, as shown in the figure, the ratio $\frac{\overline{AC}+\overline{CB}}{\overline{AB}}$ is _____. where $\overline{AC}$, $\overline{CB}$ and $\overline{AB}$ are chords.



(A) $\sqrt{3}$ (B) 3
(C) 2 (D) $\sqrt{2}$

[GATE 2020 : IIT Delhi (EE)]

Q.13



In the above figure, O is the center of the circle and, M and N lie on the circle. The area of the right triangle MON is 50 cm^2. What is the area of the circle in cm^2?

(A) 2π (B) 50π
(C) 100π (D) 75π

[GATE 2021 : IIT Bombay (ME-1)]

Q.14

The ratio of the area of the inscribed circle to the area of the circumscribed circle of an equilateral triangle is _____.

(A) 1/6 (B) 1/8
(C) 1/2 (D) 1/4

[GATE 2021 : IIT Bombay (ME-2)]

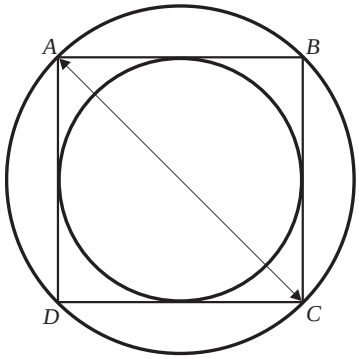
Q.15 Circle A is 4 cm in diameter, circle B is 5 cm in diameter. Circle C has its circumference equal to the sum of the circumferences of both A and B together. What will be the ratio of the area of circle C, with respect to the area of circle A and circle B respectively?

[ESE 2018]

(A) 5.0625 and 1.84
(B) 3.875 and 1.84
(C) 5.0625 and 3.24
(D) 3.875 and 3.24

Q.16 Consider following diagram : AC is a diameter of the large circle and $AB = BC$.

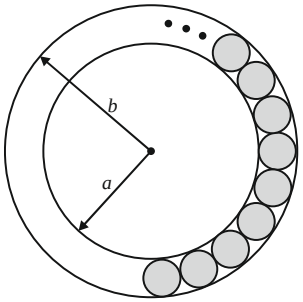
[ESE 2019]



The ratio of areas of the large circle to the small circle of a square is

(A) 4 : 1 (B) 1 : 4
(C) 2 : 1 (D) 1 : 2

Q.17 The figure below shows an annular right with outer and inner radii as b and a, respectively. The annular space has been painted in the form of blue colour circles touching the outer and inner periphery of annular space. If maximum n number of circles can be painted, then the unpainted area available in annular space is _____.



(A) $\pi\left[(b^2-a^2)-n(b-a)^2\right]$
(B) $\pi\left[(b^2-a^2)+n(b-a)^2\right]$
(C) $\pi\left[(b^2-a^2)-\frac{n}{4}(b-a)^2\right]$
(D) $\pi\left[(b^2-a^2)+\frac{n}{4}(b-a)^2\right]$

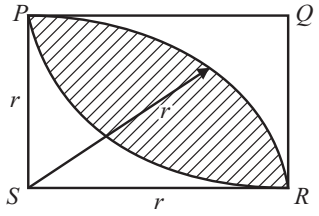
[GATE 2020 : IIT Delhi (CS, IT)]

Q.18 A square pyramid has a base perimeter x and the slant height is half of the perimeter. What is the lateral surface area of the pyramid?

(A) x^2 (B) $0.75x^2$
(C) $0.50x^2$ (D) $0.25x^2$

[GATE 2016 : IISc Bangalore (CE-2, MT, PI)]

Q.19 In the figure $PQRS$ is a square. the shaded portion is formed by intersection of sectors of circle with radius equal to the side of square and center at S and Q.



The probability that any point picked randomly within square falls in shaded area is

(A) $\frac{1}{2}$ (B) $4-\frac{\pi}{2}$
(C) $\frac{\pi}{2}-1$ (D) $\frac{\pi}{4}$

[GATE 2021 : IIT Bombay (CE-2)]

Q.20 For a regular polygon having 10 sides, the interior angle between the sides of the polygon, in degree is

(A) 324 (B) 216
(C) 144 (D) 396

[GATE 2021 : IIT Bombay (EE)]

Q.21 Arrange the following three-dimensional objects in the descending order of their volumes :

(i) a cuboid with dimensions 10 cm, 8 cm and 6 cm.
(ii) a cube of side 8 cm.
(iii) a cylinder with base radius 7 cm and height 7 cm.
(iv) a sphere of radius 7 cm.

(A) (i), (ii), (iii), (iv)
(B) (ii), (i), (iv), (iii)
(C) (iii), (ii), (i), (iv)
(D) (iv), (iii), (ii), (i)

[GATE 2018 : IIT Guwahati (CH, IN, MT)]

Q.22 A rectangle becomes a square when its length and breadth are reduced by 10m and 5 m respectively. During this process, the rectangle losses 650 m^2 of area. What is the area of the original rectangle in square meters?

(A) 1125 (B) 2250
(C) 2924 (D) 4500

[GATE 2018 : IIT Guwahati (ME-1)]

Q.23 The perimeters of a circle, a square and an equilateral triangle are equal. Which one of the following statement is true?

(A) The circle has the largest area.
(B) The square has the largest area.
(C) The equilateral triangle has the largest area
(D) All the three shapes have the same area

[GATE 2018 : IIT Guwahati (ME-2, PI)]

Q.24 A wire would enclose an area of 1936 m^2, if it is bent into a square. The wire is cut into two pieces. The longer piece is thrice as long as the shorter piece. The long and the short pieces are bent into a square and a circle, respectively. Which of the following choices is closest to the sum of the areas enclosed by the two pieces in square meters?

(A) 1096 (B) 1111
(C) 1243 (D) 2486

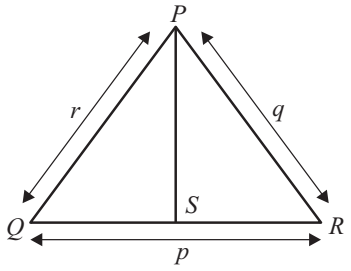
[GATE 2018 : IIT Guwahati (ME-2, PI)]

Q.25 Suresh wanted to lay a new carpet in his new mansion with an area of 70×55 sq.mts. However an area of 550 sq.mts., had to be left out for flower pots. If the cost of carpet is Rs.50 per sq.mts., how much money (in Rs.) will be spent by Suresh for the carpet now?

(A) Rs.1,65,000 (B) Rs.2,75,000 (C) Rs.1,92,500 (D) Rs.1,27,500

[GATE 2019 : IIT Madras (CE-2)]

Q.26 In a triangle PQR, PS is the angle bisector of $\angle QPR$ and $\angle QPS = 60^0$. What is the length of PS?



(A) $\frac{(q+r)}{qr}$ (B) $\frac{qr}{(q+r)}$
(C) $\sqrt{(q^2+r^2)}$ (C) $\frac{(q+r)^2}{qr}$

[GATE 2015 : Kanpur (CS-2, EE-2)]

Q.27 Consider two rectangular sheets, M and N of identical dimensions of 6×4 cm each

Folding operation (i) : The sheet is folded into half by joining the short edges of the current shape.
Folding operation (ii) : The sheet is folded into half by joining the long edges of the current shape.
Folding operation (i) is carried out on sheet M 3 times.
Folding operation (ii) is carried out on sheet N 3 times.
The ratio of perimeters of the final folded shape of sheet N to the final folded shape of sheet M is.

(A) 3 : 2 (B) 7 : 5
(C) 13 : 7 (D) 5 : 13

[GATE 2021 : IIT Bombay (IN, CE-1)]

Q.28 In an equilateral triangle PQR, side PQ is divided in 4 equal parts, side QR is divided into 6 equal parts and PR is divided into 8 equal parts. The length of each sub-divided part in cm is an integer. The minimum area of triangle PQR possible, in cm^2, is

(A) 18 (B) $144\sqrt{3}$
(C) $48\sqrt{3}$ (D) 24

[GATE 2021 : IIT Bombay (CE-2)]

Q.29 Consider a square sheet of side 1 unit. The sheet is first folded along the main diagonal. This is followed by a fold along its line of symmetry. The resulting folded shape is again folded along its line of symmetry. The area of each face of the final folded shape, in square units, equal to _____

(A) 1/8 (B) 1/16
(C) 1/4 (D) 1/3

[GATE 2021 : IIT Bombay (ME-2)]

Q.30 A polygon is convex if, for every pair of points P and Q belonging to the polygon, the line segment PQ lies completely inside or on the polygon.
Which one of the following is NOT a convex polygon?

(A)  (B) 

(C)  (D) 

[GATE 2021 : IIT Bombay (CS-1)]

Q.31 If θ is the angle, in degree, between the longest diagonal of the cube and any one of the edges of the cube, then $\cos\theta$ =

(A) $\frac{1}{\sqrt{3}}$ (B) $\frac{1}{\sqrt{2}}$

(C) $\frac{1}{2}$ (D) $\frac{\sqrt{3}}{2}$

[GATE 2021 : IIT Bombay (CS-2)]

Q.32 A wall, rectangular in shape, has a perimeter of 72 m. If the length of its diagonal is 18 m, what is the area of the wall? **[ESE 2018]**

(A) 224 m^2 (B) 486 m^2

(C) 572 m^2 (D) 606 m^2

Q.33 Consider the length of a room is 15 m and width is 10 m. If the sum of the areas of the floor and ceiling is equal to the sum of the areas of the four walls, then volume of the room is **[ESE 2018]**

(A) 900 m^3 (B) 1000 m^3

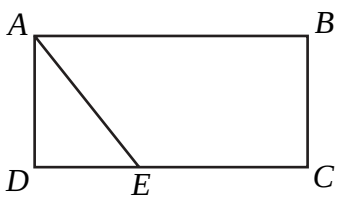
(C) 1200 m^3 (D) 1500 m^3

Q.34 In two concentric circles, a chord length 80 cm of larger circle becomes a tangent to the smaller circle whose radius is 9 cm. The radius of the larger circle will be **[ESE 2019]**

(A) 13 cm (B) 41 cm

(C) 52 cm (D) 75 cm

Q.35 Consider the rectangle $ABCD$ with $DE = \frac{1}{3}DC$ in the figure : **[ESE 2020]**



When the area of the triangle ADE is 20 cm^2, the area of the rectangle $ABCD$ will be

(A) 60 cm^2 (B) 80 cm^2

(C) 100 cm^2 (D) 120 cm^2

Self Practice Questions :

Q.1 If the length of the diagonal AC of a square ABCD is 5.2 cm, then the area of the square is :

(A) 15.12 sq.cm (B) 13.52 sq.cm

(C) 12.62 sq.cm (D) 10.00 sq.cm.

Q.2 The length of the diagonal of a square is 'a' cm. Which of the following represents the area of the square (in sq. cm.) ?

(A) 2a (B) $\frac{a}{\sqrt{2}}$

(C) $a^2/2$ (D) $a^2/4$

Q.3 The diagonal of a square is $4\sqrt{2}$ cm. The diagonal of another square whose area is double that of the first square is :

(A) $8\sqrt{2}$ cm (B) 16 cm

(C) $\sqrt{32}$ cm (D) 8 cm

Q.4 The diagonal of a square A is (a+b). The diagonal of a square whose area is twice the area of square A, is

(A) 2 (a+b) (B) 2 $(a+b)^2$

(C) $\sqrt{2}$ (a+b) (D) $\sqrt{2}$ (a-b)

Q.5 The difference of the areas of two squares drawn on two line segments of different lengths is 32 sq.cm. Find the length of the greater line segment if one is longer than the other by 2 cm.

(A) 7 cm (B) 9 cm

(C) 11 cm (D) 16 cm

Q.6 If the diagonals of two squares are in the ratio of 2 : 5, their area will be in the ratio of

(A) $\sqrt{2} : \sqrt{5}$ (B) 2 : 5

(C) 4 : 25 (D) 4 : 5

Q.7 The perimeter of five squares are 24 cm, 32 cm, 40 cm, 76 cm and 80 cm respectively. The perimeter of another square equal in area to sum of the areas of these squares is:

(A) 31 cm (B) 62 cm

(C) 124 cm (D) 961 cm

Q.8 The ratio of the area of a square to that of the square drawn on its diagonal is :
(A) 1 : 1 (B) 1 : 2
(C) 1 : 3 (D) 1 : 4

Q.9 From four corners of a square sheet of side 4 cm, four pieces, each in the shape of arc of a circle with radius 2 cm, are cut out. The area of the remaining portion is :
(A) (8– π) sq.cm. (B) (16–4π) sq.cm.
(C) (16–8 π) sq.cm. (D) (4–2 π)sq.cm.

Q.10 The length of diagonal of a square is $15\sqrt{2}$ cm. Its area is
(A) 112.5 cm² (B) 450 cm²
(C) $\frac{225\sqrt{2}}{2}$ cm² (D) 225 cm²

Q.11 A kite in the shape of a square with a diagonal 32 cm attached to an equilateral triangle of the base 8 cm. Approximately how much paper has been used tomake it? (Use $\sqrt{3}$ = 1.732)
(A) 539.712 cm² (B) 538.721 cm²
(C) 540.712 cm² (D) 539.217 cm²

Q.12 The breadth of a rectangular hall is three-fourth of its length. If the area of the floor is 768 sq. m., then the difference between the length and breadth of the hall is:
(A) 8 metres (B) 12 metres
(C) 24 metres (D) 32 metres

Q.13 The length of a plot is five times its breadth. A playground measuring 245 square metres occupies half of the total area of the plot. What is the length of the plot?
(A) $35\sqrt{2}$ metres (B) $175\sqrt{2}$ metres
(C) 490 metres (D) $5\sqrt{2}$ metres

Q.14 The length of a rectangular garden is 12 metres and its breadth is 5 metres. Find the length of the diagonal of a square garden having the same area as that of the rectangular garden :
(A) $2\sqrt{30}$ m (B) 13 m
(C) 13 m (D) $8\sqrt{15}$ m

Q.15 A circular wire of diameter 42 cm is folded in the shape of a rectangle whose sides are in the ratio 6 : 5 . Find the area enclosed by the rectangle. (Take $\pi = \frac{22}{7}$)
(A) 540 cm² (B) 1080 cm²
(C) 2160 cm² (D) 4320 cm²

Q.16 A took 15 sec. to cross a rectangular field diagonally walking at the rate of 52 m/min. and B took the same time to cross the same field along its sides walking at the rate of 68 m/min. The area of the field is :
(A) 30 m² (B) 40 m²
(C) 50 m² (D) 60 m²

Q.17 The difference between the length and breadth of a rectangle is 23 m. If its perimeter is 206 m, then its area is
(A) 1520 m² (B) 2420 m²
(C) 2480 m² (D) 2520 m²

Q.18 There is a rectangular tank of length 180 m and breadth 120 m in a circular field. If the area of the land portion of the field is 40000 m², what is the radius of the field ? (Take $\pi = \frac{22}{7}$)
(A) 130 m (B) 135 m
(C) 140 m (D) 145 m

Q.19 The length of a rectangular hall is 5m more than its breadth. The area of the hall is 750m². The length of the hall is :
(A) 15 m (B) 22.5 m
(C) 25 m (D) 30 m

Q.20 If the length and breadth of a rectangle are in the ratio 3 : 2 and its perimeter is 20 cm, then the area of the rectangle (in cm²) is :
(A) 24 (B) 48
(C) 72 (D) 96

❖❖❖❖

A Answer Keys

Class Practice Questions [CPQ's]									
1.	280	2.	C	3.	D	4.	A	5.	B
6.	180	7.	D	8.	C	9.	B	10.	A
11.	D	12.	D	13.	C	14.	D	15.	C
16.	C	17.	C	18.	D	19.	C	20.	C
21.	D	22.	B	23.	A	24.	C	25.	A
26.	B	27.	C	28.	B	29.	A	30.	C
31.	A	32.	B	33.	A	34.	B	35.	D

Self Practice Questions [SPQ's]									
1.	B	2.	C	3.	D	4.	C	5.	B
6.	C	7.	C	8.	B	9.	B	10.	D
11.	A	12.	A	13.	A	14.	A	15.	B
16.	D	17.	D	18.	C	19.	D	20.	A

9 DATA INTERPRETATION

Class Practice Questions :

Q.1 Mola taxi offers 3 rides pool, mini, prime. Table given for number of rides for past 4 months mola platform earns 1 $ per ride. %share of revenue contributed by prime to total revenue of mola for entire duration is **[GATE 2019 : IIT Madras]**

Type	Months			
	Jan	Feb	Mar	Apr
Pool	**170**	**320**	**215**	**190**
Mini	**110**	**220**	**180**	**70**
Prime	**75**	**180**	**120**	**90**

(A) 16.24 (B) 23.97

(C) 38.74 (D) 25.86

Q.2 Following table provides figures (in rupees) on annual expenditure of a firm for two years – 2010 and 2011.

Category	2010	2011
Raw material	5200	6240
Power & fuel	7000	9450
Salary & wages	9000	12600
Plant & machinery	20000	25000
Advertising	50000	19500
Research & development	22000	26400

In 2011, which of the following two categories have registered increase by same percentage?

(A) Raw material and Salary & wages

(B) Salary & wages and Advertising

(C) Power & fuel and Advertising

(D) Raw material and Research & Development

[GATE 2013 : IIT Bombay (CE)]

Q.3 Following table gives data on tourists from different countries visiting India in the year 2011.

Country	Number of Tourists
USA	2000
England	3500
Germany	1200
Italy	1100
Japan	2400
Australia	2300
France	1000

Which two countries contributed to the one third of the total number of tourists who visited India in 2011? **[GATE 2013 : IIT Bombay (CH)]**

(A) USA and Japan

(B) USA and Australia

(C) England and France

(D) Japan and Australia

Q.4 An electric bus has onboard instruments that report the total electricity consumed since the start of the trip as well as the total distance covered. During a single day of operation, the bus travels on stretches M, N, O and P, in that order. The cumulative distance travelled and the corresponding electricity consumption are shown in the Table below :

Stretch	Cumulative distance (km)	Electricity used (kWh)
M	20	12
N	45	25
O	75	45
P	100	57

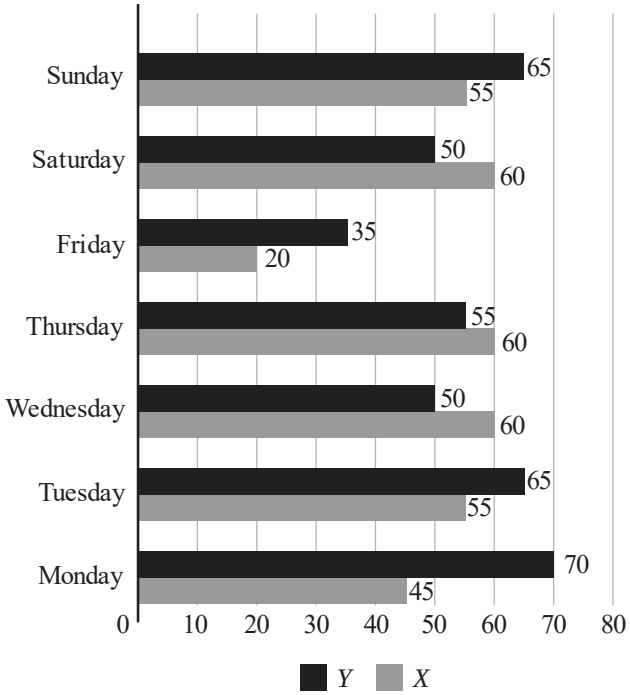
The stretch where the electricity consumption per km is minimum is

[GATE 2014 : IIT Kharagpur, (EC-2, ME-2)]

(A) *M* (B) *N*

(C) *O* (D) *P*

Q.5



The number of minutes spent by two Students, *X* and *Y*, exercising every day in a given week are shown in the bar chart above.

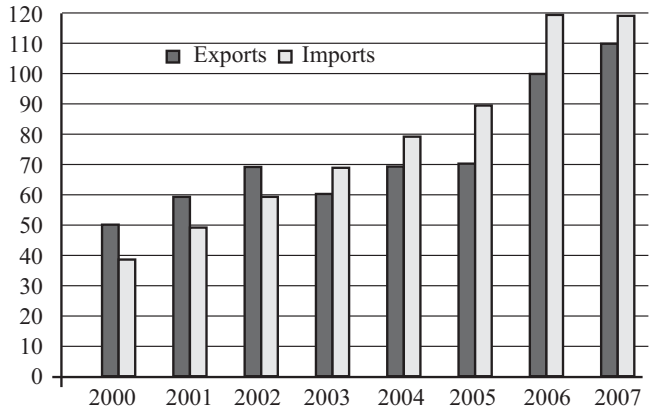
The number of days in a given week in which one of the student spent a minimum of 10% more than the other student, on a given day, is

[GATE 2021 : IIT Bombay (EC)]

(A) 5 (B) 4

(C) 7 (D) 6

Q.6 The exports and imports (in crores of Rs.) of a country from 2000 to 2007 are given in the following bar chart. If the trade deficit is defined as excess of imports over exports, in which year is the trade deficit 1/5th of the exports?

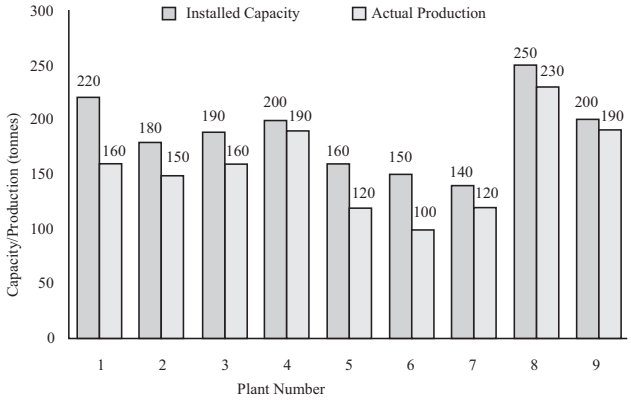


(A) 2005 (B) 2004

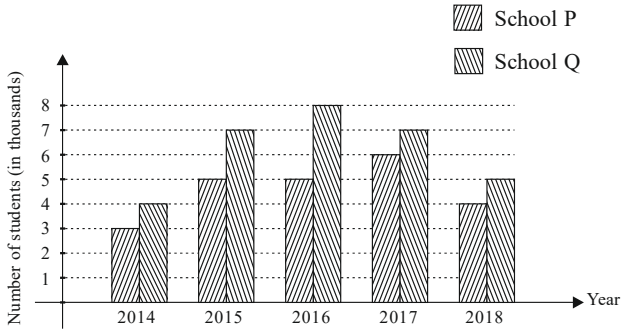
(C) 2007 (D) 2006

[GATE 2014 : IIT Kharagpur (EC Set-1, ME Set-1)]

Q.7 The following graph represents the installed capacity for cement production (in tonnes) and the actual production (in tonnes) of nine cement plants of a cement company. Capacity utilization of a plant is defined as ratio of actual production of cement to installed capacity. A plant with installed capacity of at least 200 tonnes is called a large plant and a plant with lesser capacity is called a small plant. The difference between total production of large plants and small plants, in tonnes is _____. **[GATE 2016 : IISc Bangalore EE - 2]**



Q.8 The following figure shows the data of students enrolled in 5 years (2014 to 2018) for two schools P and Q. During this period, the ratio of the average number of the students enrolled in school P to the average of the difference of the number of students enrolled in schools P and Q is **[GATE 2020 : IIT Delhi (EC)]**

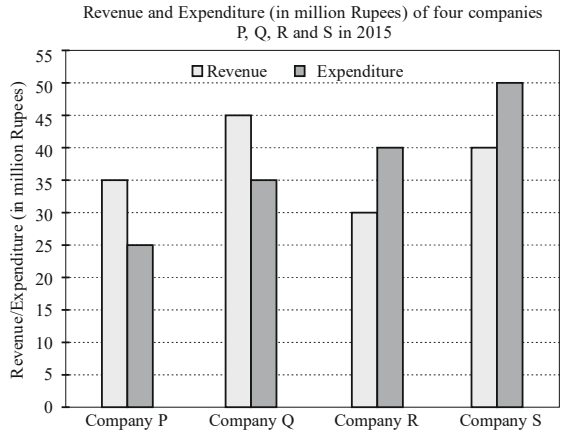


(A) 31 : 23 (B) 23 : 8

(C) 23 : 31 (D) 8 : 23

Q.9 The revenue and expenditure of four different companies P. Q, R and S in 2015 are shown in the figure. If the revenue of company Q in 2015 was

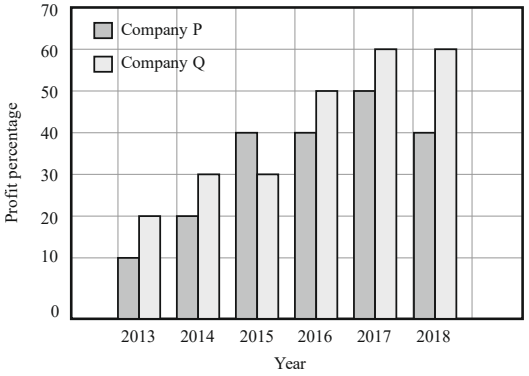
20% more than that in 2014 and company Q had earned a profit of 10% on expenditure in 2014, then its expenditure (in million rupees) in 2014 was _____. **[GATE 2020 : IIT Delhi (EE)]**



(A) 34.1 (B) 35.1
(C) 33.7 (D) 32.7

Q.10 The profit shares of two companies P and Q are shown in the figure. If the two companies have invested a fixed and equal amount every year, then the ratio of the total revenue of company P to the total revenue of company Q, during 2013 – 2018 is _____.

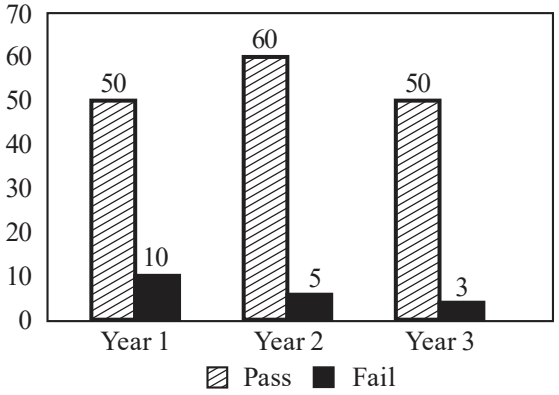
[GATE 2020 : IIT Delhi (CH, BT)]



(A) 15 : 17 (B) 16 : 17
(C) 17 : 15 (D) 17 : 16

Q.11 The number of student passing or failing in an exam for a particular subject is presented in the bar chart above. Students who pass the in exam cannot appear for the exam again. Students who fails the exam in the first attempt must appear for the exam in the following year. Students always pass the exam in their second attempt. The number of students who took the exam for the first time in the year 2nd and the year 3rd respectively are _____.

[GATE 2021 : IIT Bombay (EE)]



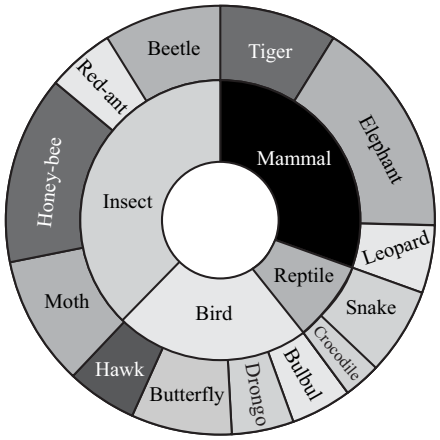
(A) 53 and 48 (B) 55 and 53
(C) 55 and 48 (D) 60 and 50

Q.12 40% of deaths on city roads may be attributed to drunken driving. The number of degrees needed to represent this as a slice of a pie chart is

(A) 120 (B) 144
(C) 160 (D) 212

[GATE 2017 : IIT Roorkee (EC, BT, PI Set – 1)]

Q.13 The multi-level hierarchical pie chart shows the population of animals in a reserve forest.



The correct conclusions from this information are

(i) Butterflies are birds.
(ii) There are more tigers in this forest than red ants.
(iii) All reptiles in this forest are either snakes or crocodiles.
(iv) Elephants are the largest mammals in this forest.

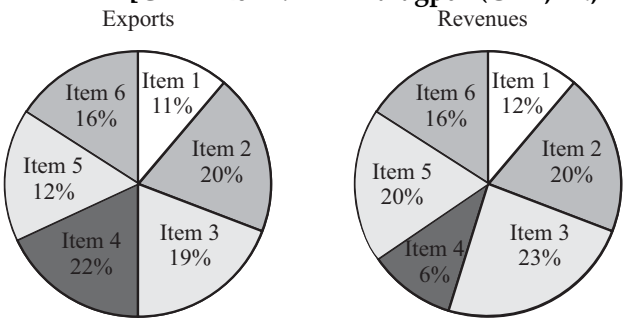
[GATE 2014 : IIT Kharagpur (EC-3, ME-3)]

(A) (i) and (ii) only
(B) (i), (ii), (iii) and (iv)

(C) (i), (iii) and (iv) only
(D) (i), (ii) and (iii) only

Q.14 The total exports and revenues from the exports of a country are given in the pie charts below. The pie chart for exports shows the quantity of each item as a percentage of the total quantity of exports. The pie chart for the revenues shows the percentage of the total revenue generated through export of each item. The total quantity of exports of all the items is 5 lakh tons and the total revenues are 250 crore rupees. What is the ratio of the revenue generated through export of item 1 per kilogram to the revenue generated through export of the item 4 per kilogram?

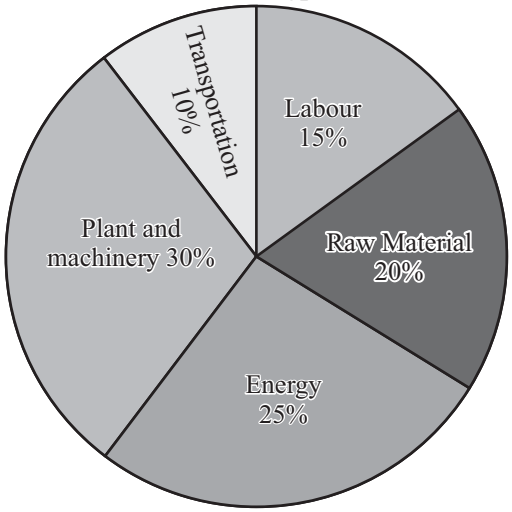
[GATE 2014 : IIT Kharagpur (CE-2, IN, PI)]



(A) 1:2 (B) 2:1
(C) 1:4 (D) 4:1

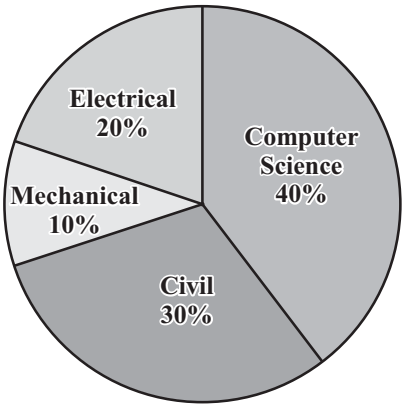
Q.15 A firm producing air purifiers sold 200 units in 2012. The following pie chart presents the share of raw material, labour, energy plant and machinery, and transportation costs in the total manufacturing cost of the firm in 2012. The expenditure on labour in 2012 is Rs. 450000. In 2013, the raw material expenses increased by 30% and all other expenses increased by 20%. What is the percentage increase in total cost for the company in 2013?

[GATE 2014 : IIT Kharagpur (EC-4, ME-4)]



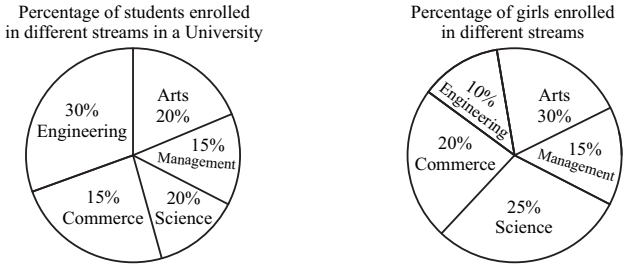
Q.16 The pie chart below has the breakup of the number of students from different departments in an engineering college for the year 2012. The proportion of male to female students in each department is 5 : 4. There are 40 males in Electrical Engineering. What is the difference between the number of female students in the Civil department and the female students in the Mechanical department?

[GATE 2015 IIT Kanpur (CS-1, EE-1)]



Q.17 The two pie-charts given below. Show the data of total students and only girls registered in different streams in a university. If the total number of students registered in the university students is 5000, and the total number of the registered girls is 1500; then the ratio of boys enrolled in Arts to the girls enrolled in the Management is _____.

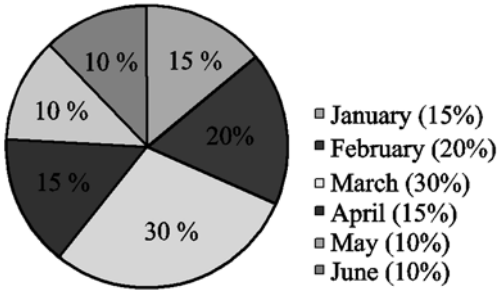
[GATE 2020 : IIT Delhi (ME-2, PI)]



(A) 2 : 1 (B) 9 : 22
(C) 11 : 9 (D) 22 : 9

Q.18 The monthly distribution of 9 Watt LED bulbs sold by two firms *X* and *Y* from January to June 2018 is shown in the pie-chart and the corresponding table. If the total number of LED bulbs sold by two firms during April-June 2018 is 50000, then the number of LED bulbs sold by the firm *Y* during April-June 2018 is _____.

[GATE 2020 : IIT Delhi (CE-2)]

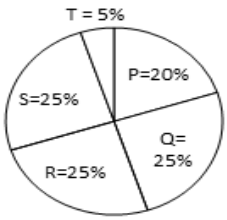


Month	Ratio of LED bulbs sold by two firms (X:Y)
January	7:8
February	2:3
March	2:1
April	3:2
May	1:4
June	9:11

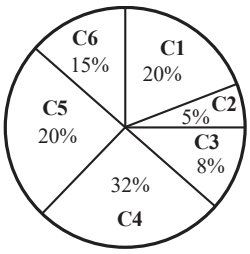
(A) 8250 (B) 9750
(C) 8750 (D) 11250

Q.19 In a company P, Q, R, S, T categories of employees' work. In 2010, total number of employees were 600. From 2010 to 2016 total number of employees increased by 15%. In S category number of employees were increased by 40% however, there is no change in number of employees in P, Q and R categories. Calculate number of T category employees in 2016?

[GATE 2019 : IIT Madras]



Q.20



Company	Ratio
C1	3 : 2
C2	1 : 4
C3	5 : 3
C4	2 : 3
C5	9 : 1
C6	3 : 4

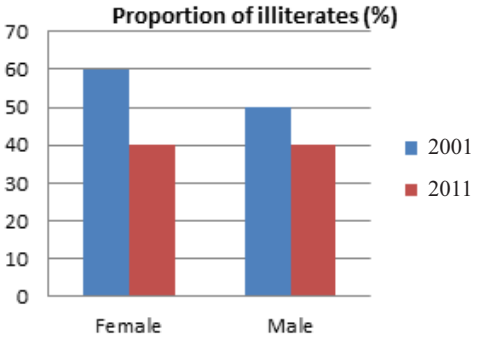
The distribution of employees at the rank of executives, across different companies C1, C2, ….., C6 is presented in the chart given above. The ratio of executives with a management degree to those without a management degree in each of these companies is provided in the table above. The total number of executives across all companies is 10,000.

The total number of management degree holders among the executives in companies C2 and C5 together is _____ .

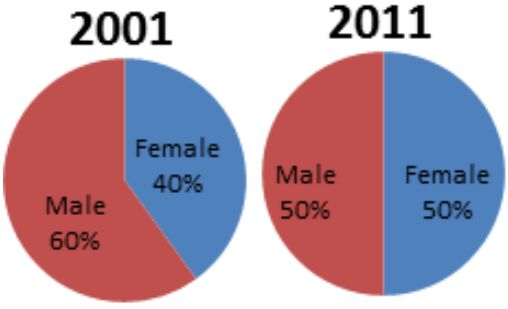
[GATE 2021 : IIT Bombay ME-1]

(A) 2500 (B) 600
(C) 1900 (D) 225

Q.21 The bar graph in Panel (a) shows the proportion of male and female illiterates in 2001 and 2011. The proportions of males and females in 2001 and 2011 are given in Panel (b) and (c), respectively. The total population did not change during this period. The percentage increase in the total numbers of literates from 2001 to 2011 is _____.



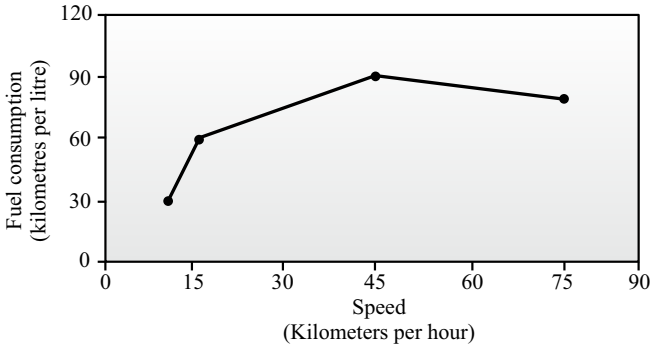
Panel (a)



Panel (b) Panel (c)

(A) 35.43 (B) 33.43
(C) 30.43 (D) 34.33

Q.22 The fuel consumed by a motorcycle during a journey while traveling at various speeds is indicated in the graph below.



The distances covered during four laps of the journey are listed in the table below :

Lap	Distance (Kilometers)	Average Speed (Kilometers per hour)
P	15	15
Q	75	45
R	40	75
S	10	10

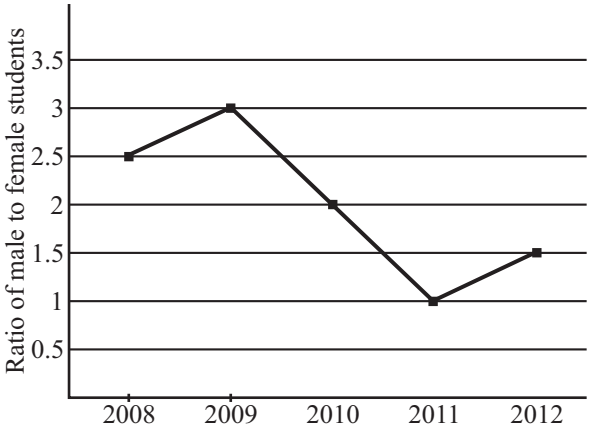
From the given data, we can conclude that the fuel consumed per kilometers was least during the lap

[GATE 2011 : IIT Madras (EC, EE, IN, MT)]

(A) *P* (B) *Q*

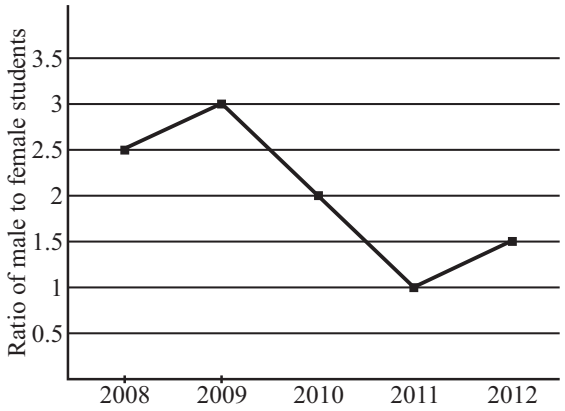
(C) *R* (D) *S*

Q.23 The ratio of male to female students in a college for five years is plotted in the following line graph. If the number of female students doubled in 2009, by what percent did the number of male students increase in 2009? **[CS-2, EE-2]**



Q.24 The ratio of male to female students in a college for five years is plotted in the following line graph. If the number of female students in 2011 and 2012 is equal, what is the ratio of male students in 2012 to male students in 2011?

[GATE 2014 : IIT Kharagpur (CS-3, EE-3)]



(A) 1 : 1 (B) 2 : 1

(C) 1.5 : 1 (D) 2.5 : 1

Q.25 The data given in the following table summarizes the monthly budget of an average household

Category	Amount (Rs.)
Food	4000
Clothing	1200
Rent	2000
Savings	1500
Other expenses	1800

The approximate percentage of the monthly budget NOT spent on savings is

(A) 10% (B) 14%

(C) 81% (D) 86%

[GATE 2012 : IIT Delhi (EC, EE)]

Q.26 A shaving set company sells 4 different types of razors, Elegance, Smooth, Soft and Executive. Elegance sells at Rs. 48, Smooth at Rs. 63, Soft at Rs. 78 and Executive at Rs. 173 per piece. The table below shows the numbers of each razor sold in each quarter of a year.

Quarter/ Product	Elegance	Smooth	Soft	Executive
Q1	27300	20009	17602	9999
Q2	25222	19392	18445	8942
Q3	28976	22429	19544	10234
Q4	21012	18229	16595	10109

Which product contributes the greatest fraction to the revenue of the company in that year?

(A) Elegance (B) Executive

(C) Smooth (D) Soft

[GATE 2016 : IISc Bangalore (CE Set – 1, CSE Set - 1)]

Q.27 The total runs scored by four cricketers P, Q, R, and S in years 2009 and 2010 are given in the following table :

Player	2009	2010
P	802	1008
Q	765	912
R	429	619
S	501	701

The player with the lowest percentage increase in total runs is

[GATE 2012 : IIT Delhi (AE, AG, MN)]

(A) P (B) Q

(C) R (D) S

Q.28 The statistics of runs scored in a series by four batsmen are provided in the following table. Who is the most consistent batsman of these four?

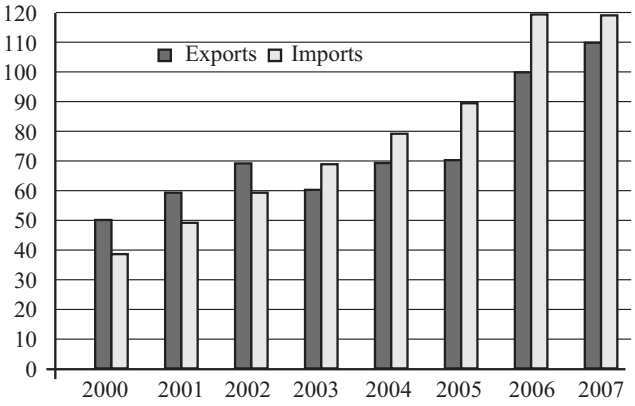
[GATE 2014 : IIT Kharagpur, (EC-1, ME-1)]

Batsman	Average	Standard deviation
K	31.2	5.21
L	46.0	6.35
M	54.4	6.22
N	17.9	5.90

(A) *K* (B) *L*

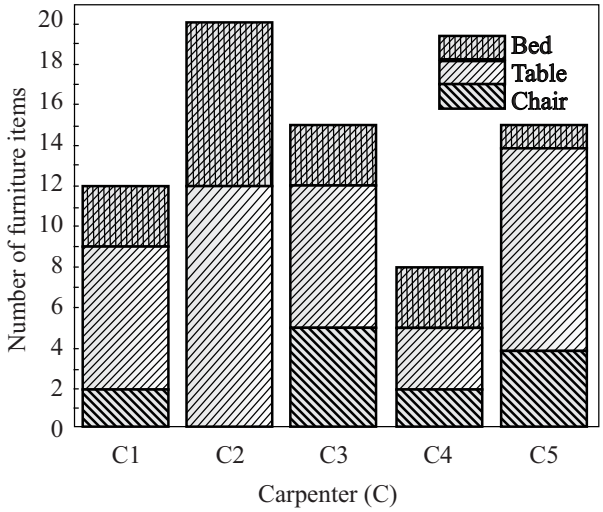
(C) *M* (D) *N*

Q.29 The exports and imports (in crores of Rs.) of a country from the year 2000 to 2007 are given in the following bar chart. In which year is the combined percentage increase in imports and exports the highest?



[GATE 2015 : IIT Kanpur (CE Set – 1, CSE Set - 3)]

Q.30 The bar graph below shows the output of five carpenters over one month, each of whom made different items of furniture : chairs, tablet, and beds.



Consider the following statements :

(i) The number of beds made by carpenter C2 is exactly the same as the number of tables made by carpenter C3.

(ii) The total number of chairs made by all carpenters is less than total number of tables.

Which one of the following is true?

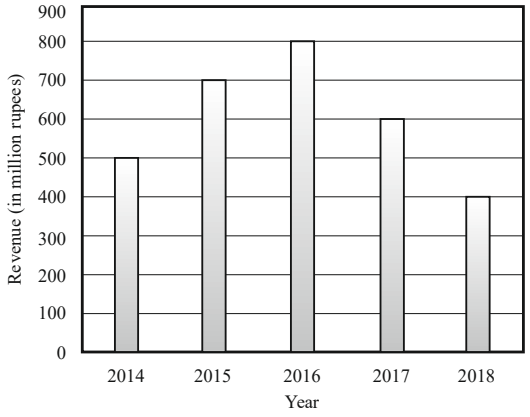
(A) Only I (B) Only II

(C) Both I and II (D) Neither I Nor II

[GATE 2017 IIT Roorkee (CE-1, CH)]

Q.31 The total revenue of a company during 2014-2018 is shown in the bar graph. If the total expenditure of the company in each year is 500 million rupees, then the aggregated profit or loss (in percentage) on the total expenditure of the company during 2014-2018 is _____.

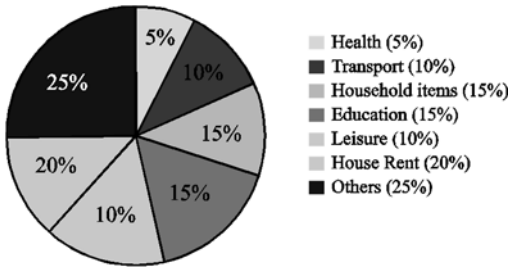
[GATE 2020 IIT Delhi (CS, IT)]



(A) 20% profit (B) 20% loss
(C) 16.67 % loss (D) 16.67% profit

Q.32 The total expenditure of a family, on different activities in a month, is shown in the pie-chart. The extra money spent on education as compared to transport (in percent) is _____.

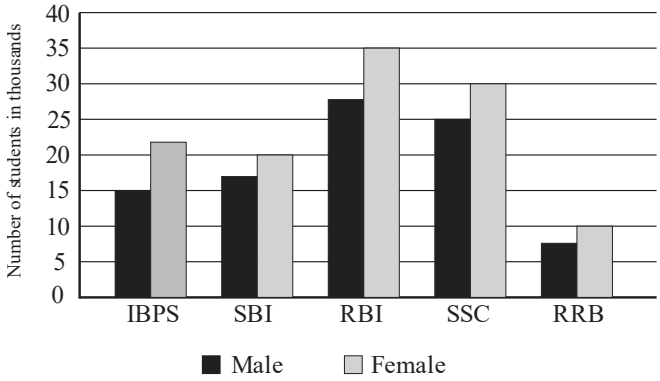
[GATE 2020 IIT Delhi (CE-1)]



(A) 100 (B) 50
(C) 33.3 (D) 5

Self Practice Questions :

Directions (Q. 1 - 5) : Study the following graph carefully to answer these questions. Number of students (Males and Females) in thousands passed out from various exams in a year.



Q.1 What is the difference between the total number of students passing out from IBPS Exam and the total number of students passing out from RRB Exam?

(A) 20,500 (B) 21,000
(C) 10,500 (D) 10,000
(E) None of these

Q.2 The number of Males passing out from IBPS Exam and SBI Exam together is what percent of the number of females passing out from RBI Exam and SSC Exam together?

(A) 45 (B) 40
(C) 35 (D) 50
(E) None of these

Q.3 The number of Females passed out from RBI Exam is approximately what percent the total number of Females passed out from all the exams together?

(A) 40 % (B) 30 %
(C) 50 % (D) 65 %
(E) 80 %

Q.4 What is the average number of students (Males & Females) passed out from all the exams together?

(A) 38000 (B) 48000
(C) 42000 (D) 51000
(E) None of these

Q.5 What is the respective ratio of the total number of Males to the total number of Females passed out from all the exams together?

(A) 37:47 (B) 18:25
(C) 23:19 (D) 25:18
(E) None of these

Directions (Q.6 - 10) : Study the following table carefully and answer the questions given below.

Amount invested by six different companies during six different months (in lakhs)

Company → Month↓	A	B	C	D	E	F
January	25	28	50	32	24	35
February	45	40	60	55	28	38
March	52	38	46	72	83	65
April	80	45	70	90	65	76
May	15	20	47	25	13	30
June	62	95	27	80	50	20

Q.6 What is the difference between the investment made by company A and E together in March and company B and D together in January (in lakh)?

(A) 75 (B) 65
(C) 50 (D) 85
(E) None of these

Q.7 What is the average of investment made by company C in May, D in February and E in January (in lakhs)?

(A) 22 (B) 36
(C) 42 (D) 46
(E) None of these

Q.8 In which month was the investment made by companies maximum?

(A) March (B) April

(C) May (D) June

(E) Other than given in the options

Q.9 By what percent approximately is the investment made by company A in June less than that by company D in the same month?

(A) 23% (B) 12%

(C) 35% (D) 42%

(E) 55%

Q.10 What was the average investment made by company F during all the months (in lakhs)?

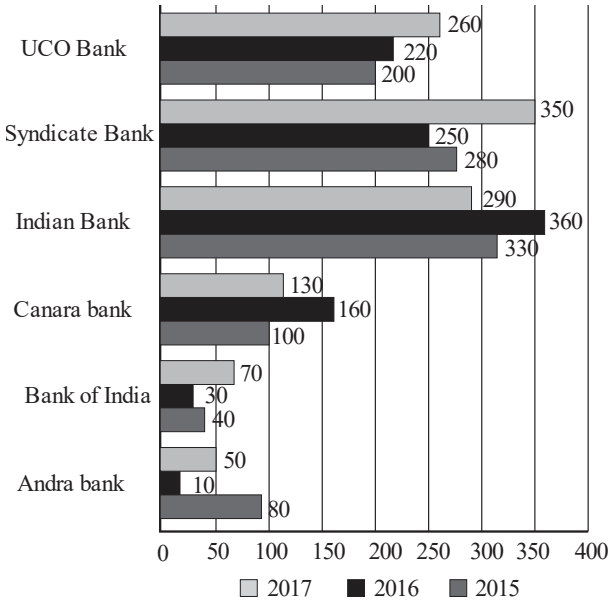
(A) 34 (B) 43

(C) 32 (D) 44

(E) 42

Directions (Q. 11 - 15): In the following graph, the number of selected candidates for 6 different banks in three different years 2015, 2016 and 2017 has been shown.

Read the graph carefully and answer the questions.



Q.11 What is the respective ratio between the average number of candidates selected in all banks in 2015 and 2017?

(A) 113 : 105 (B) 102 : 111

(C) 113 : 115 (D) 115 : 103

(E) 103 : 115

Q.12 The number of candidates recruited for Syndicate Bank in 2016 is approximately what percentage of total candidates recruited in that year?

(A) 40% (B) 25%

(C) 10% (D) 55%

(E) 65%

Q.13 The total number of candidates recruited for Andra Bank in all the years is approximately what percent of the total candidates recruited in 2015 in all banks?

(A) 60% (B) 40%

(C) 25% (D) 15%

(E) 35%

Q.14 What is the ratio between the number of all candidates selected in 2015 and selected candidates of Canara Bank and UCO Bank in all three years?

(A) 103 : 107 (B) 101 : 103

(C) 103 : 112 (D) 107 : 103

(E) 104 : 109

Q.15 The number of candidates recruited for Canara Bank and Indian Bank in 2017 is approximately what percent of the candidates recruited for UCO Bank and Andra Bank by the 2017?

(A) 125% (B) 110%

(C) 135% (D) 140%

(E) 145%

Directions (Q.16 - 20): Study the following table carefully answer the questions given below:

Number of shirts of different prices bought over the years.

Price	Years					
	2011	2012	2013	2014	2015	2016
More than 5,00	50	106	2	30	25	75
4,000-5000	105	1000	40	105	400	375
3,000-3,999	70	100	80	115	200	240
2,000-2,999	300	500	100	216	135	300
1,000-1,999	140	370	200	225	175	470
500-999	200	700	15	400	75	530
Less than 500	65	135	111	188	25	65

Q.16 In the price range of 1000 - 1999 the number of shirts bought in 2011 and 2016 together is approximately what percent of the number of shirts bought in 2013 and 2015 in the 2000 – 2999 price range?

(A) 225 % (B) 260 %

(C) 280 % (D) 245 %

(E) 200 %

Q.17 What is the ratio between the number of shirts in price range 4000 - 5000 bought in 2011 and 2015 together and number of shirts in price range 1000 - 1999 bought in 2012 and 2016 together?

(A) 168 : 101 (B) 103 : 174

(C) 91 : 159 (D) 101 : 168

(E) None of these

Q.18 What is the difference between the number of shirts bought in 2015 and 2016?

(A) 950 (B) 1080

(C) 1020 (D) 1210

(E) 1460

Q.19 In which year maximum number of shirts was bought?

(A) 2012 (B) 2016

(C) 2014 (D) 2015

(E) None of these

Q.20 In which price range maximum shirts were bought in the given years taken together?

(A) 500 – 999 (B) 2000 - 2999

(C) 1000 – 1999 (D) 3000 - 3999

(E) None of these

❖❖❖❖

A Answer Keys

Class Practice Questions [CPQ's]									
1.	B	2.	D	3.	C	4.	D	5.	D
6.	D	7.	120 tonne	8.	B	9.	A	10.	B
11.	C	12.	B	13.	D	14.	D	15.	Rs.20000
16.	32	17.	D	18.	B	19.	60	20.	C
21.	C	22.	B	23.	140%	24.	C	25.	D
26.	D	27.	B	28.	A	29.	2006	30.	C
31.	A	32.	B						

Self Practice Questions [SPQ's]									
1.	E	2.	D	3.	B	4.	C	5.	A
6.	A	7.	C	8.	B	9.	A	10.	D
11.	E	12.	B	13.	D	14.	A	15.	C
16.	B	17.	D	18.	C	19.	A	20	E

10 ANALYTICAL APTITUDE

10.1 Direction & Distance

Class Practice Questions :

Directions for Questions 1 to 5

Kabir was going to Shopping mall. He started walking 10m in East direction, from where he turns 90°CW direction & walk for 6m, From where he turns 90°ACW & walk for 10m & again he turns in that direction & covers the same distance, Then he turns to his right & walk for 10m, finally he walk for 4m before stopping towards his right.

Q.1 Ending Point is in which direction with respect to Starting point?

Q.2 Starting point is in which direction with respect to Ending point?

Q.3 Minimum distance between Starting point & Ending point?

Q.4 Total distance covered by kabir?

Q.5 At last Kabir is facing in which direction?

Directions for Questions 6 to 10

Kabir was going to meet Priti. He started walking 12m towards North direction, from where he turns to his right & walk for 2m, from where he again turns in that direction & walk for 4m, finally he walk for 8m before stopping towards his right.

Q.6 Ending Point is in which direction with respect to Starting point?

Q.7 Starting point is in which direction with respect to Ending point?

Q.8 Minimum distance between Starting point & Ending point?

Q.9 Total distance covered by Kabir?

Q.10 At last Kabir is facing in which direction?

Q.11 Mr. Vivek walks 6 meters North-East, then turns and walks 6 meters South-East, both at 60 degrees to East. He further moves 2 meters South and 4 meters West. What is the straight distance in meters between the point he started from and the point he finally reached?

(A) $2\sqrt{2}$ (B) 2

(C) $\sqrt{2}$ (D) $1/\sqrt{2}$

[GATE 2015 : IIT-Kanpur (CE-2)]

Q.12 Fatima starts from point P, goes North for 3 km and then East for 4 km to reach point Q. She then turns to face point P and goes 15 km in that direction. She then goes North for 6 km. How far is she from point P, and in which direction should she go to reach point P?

(A) 8 km, East (B) 12 km, North

(C) 6 km, East (D) 10 km, North

[GATE 2017 IIT-Roorkee (EC-2)]

Q.13 A person travelled by car 70 km towards north to A then covered 30 km turning left to B. Again he turned towards left and travelled 110 km to C. Then he cycled at the rate of 10 km/hour towards the starting point. The time taken by him to reach the starting point from C will be

(A) 3 hours (B) 5 hours

(C) 7 hours (D) 21 hours

[ESE 2019]

Q.14 A man walked 3 km towards East, then 5 km towards North-East, then 8 km towards South and finally 5 km towards North-East direction. The distance of his present location from the starting point will be

(A) 9 km (B) 11 km

(C) 15 km (D) 21 km

[ESE 2020]

Q.15 On a planer field, you travelled 3 units East from a point O. Next you travelled 4 units South to arrive at point P. Then you travelled from P in North-East direction such that you arrive at a point that is 6 units East of point O. Next, you travelled in the North-West direction, so that you arrive at point Q that is 8 units North of point P. The distance of point Q to point O, in same units, should be

(A) 6 units (B) 4 units

(C) 5 units (D) 3 units

[GATE 2021 IIT-Bombay [AE, AR, BM, CE-2, MN, PH)]

Q.16 I am standing at the center of the circular field from where I go down south to the edge of the circular field, From where I turn to left & walk along with the boundary of the circle covering its three-eight, from where I turn to my WEST & walk right across to the end of the circle. In which direction I am from Starting Point?

(A) North-east (B) North-west

(C) South-east (D) South-west

Q.17 K is to the north of J and I is to the east of N, who is to the east of J and south east of K.M is to the south of I and L is to the north of N.

L is in which direction with respect to M?

(A) East (B) North-East

(C) South-East (D) NOT

Q.18 X is 1 km North-East of Y. Y is 1 km South-East of Z. W is 1 km West of Z. P is 1 km South of W. Q is 1 km East of P. What is the distance between X and Q in km.

(A) 1 (B) $\sqrt{2}$

(C) $\sqrt{3}$ (D) 2

[GATE 2014 : IIT-Kharagpur (CE-2, IN, PI)]

Q.19 There are five buildings called V, W, X, Y and Z in a row (not necessarily in that order). V is to the West of W, Z is to the East of X and the West of V, W is to the West of Y. Which is the building in the middle?

(A) V (B) W

(C) X (D) Y

[GATE 2017 : IIT-Roorkee(CS-2, EE-2)]

Q.20 One day Sonu and Pinky was seating in a park on a bench, Facing each other. At that time sonu's shadow was to the Right of Pinky.

In which direction Pinky was facing?

(A) East (B) South

(C) North (D) Either B or C

Q.21 One Evening Sonu and Pinky was seating in a park on a bench, After some time they started jogging. after crossing Each other Sonu's shadow was to the Left of Pinky. In which direction Sonu is facing?

(A) North (B) South

(C) Either A or B (D) None of these

Q.22 One Evening Sejal was seating on a Beach watching sunset and Harry was seeing her. In which Direction harry was Facing?

(A) North (B) South

(C) Either A or B (D) None of these

Q.23 Ms. X came out of a building through its front door to find her shadow due to the morning sun falling to her right side with the building to her back. From this, it can be inferred that building is facing

(A) North (B) East

(C) West (D) South

[GATE 2021 : IIT-Bombay (ME – 1, XH)]

Q.24 The front door of Mr. X's house faces East. Mr. X leaves the house, walking 50 m straight from the back door that is situated directly opposite to the front door. He then turns to his right, walks for another 50 m and stops. The direction of the point Mr. X is now located at with respect to the starting point is

(A) North-West (B) North-East

(C) South-East (D) West

[GATE 2021 : IIT-Bombay (ME – 1, MT)]

Self Practice Questions :

Q.1 P is 6 km to the south of R. T is 4 km to the east of P. Q is 10 km to the south-west of R. S is 3 km to the south of T. In which direction is R with respect to S?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.2 From point A, Mohan walks 20 m in the north. Then turns to his right and walks 20 m to reach point B. In which direction is point B with respect to point A?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.3 From point A, Mohan walks 20 m in the north. Then turns to his right and walks 20 m to reach point B. Find the shortest distance between A and B.

(A) $5\sqrt{2}$ m (B) $10\sqrt{2}$ m
(C) $20\sqrt{2}$ m (D) $20\sqrt{5}$ m

Q.4 Megha started walking from point A and walk 15 km towards east and stops at point B. Now, she turns 90◎ to her left and walks 12 km to reach a point C. In which direction is point A with respect to point C?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.5 Sharmila walks 100 m to the north direction from her house. Then she walks 40m to the south. Now she turns to her right and walks 80m. In which direction is she now with respect to her house?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.6 Sharmila walks 100 m to the north direction from her house. Then she walks 40m to the south. Now she turns to her right and walks 80m. Find the distance between her initial and final point.

(A) 60m (B) 40m
(C) 80m (D) 100m

Q.7 In the morning after sunrise, Sita and Gita were talking to each other standing in front of each other. If the shadow of Sita falls to the left of Gita, then in which direction is Gita's face?

(A) East (B) West
(C) North (D) South

Q.8 In the evening after sunset, Mitu and Abhi were talking to each other standing in front of each other. If the shadow of Mitu falls to the right of Abhi, then in which direction is Mitu's face?

(A) East (B) West
(C) North (D) South

Q.9 In the evening after sunset, Mitu and Abhi were talking to each other standing in front of each other. If the shadow of Mitu falls to the right of Abhi, then in which direction is Abhi's face?

(A) East (B) West
(C) North (D) South

Q.10 Anjana is facing South. She walks 9 km and reaches point Z and then after taking a right turn she walks 12 km to reach point Y. Finally she turns to the North and walks 4 km to reach point E. In which direction is point Z with respect to point E?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.11 Anjana is facing South. She walks 9 km and reaches point Z and then after taking a right turn she walks 12 km to reach point Y. Finally she turns to the North and walks 4 km to reach point E. Find the shortest distance between point Y and her starting point.

(A) 10 m (B) 15 m
(C) 5 m (D) 17 m

Q.12 Anjana is facing South. She walks 9 km and reaches point Z and then after taking a right turn she walks 12 km to reach point Y. Finally she turns to the North and walks 4 km to reach point E. In which direction is point E with respect to the starting point?

(A) North-East (B) South-West
(C) North-West (D) South-East

Q.13 Amrita starts walking from Market towards her house. She walks 10 m towards east to reach Bus stand and then turns to her left and walks 15 m to reach a shop. She buys Lays and then turns to

her right and walks 25 m to reach her house. In which direction is her house with respect to market?

(A) North-East (B) South-West

(C) North-West (D) South-East

Q.14 Amrita starts walking from Market towards her house. She walks 10 m towards east to reach Bus stand and then turns to her left and walks 15 m to reach a shop. She buys Lays and then turns to her right and walks 25 m to reach her house. In which direction is the nus stand with respect to Amrita's house?

(A) North-East (B) South-West

(C) North-West (D) South-East

Q.15 Aditi is facing south. She turns to her left and walks 25 m and now tales a right turn and walks 5 m to reach point L. Now she turns to her right and walks 10 m and thus reaches point K. Find the shortest distance between point K and starting point.

(A) $23\sqrt{2}$ m (B) $10\sqrt{23}$ m

(C) $\sqrt{230}$ m (D) $\sqrt{250}$ m

10.2 Clock

Class Practice Questions :

Q.1 Find the Distance covered by minute hand in 2hr 46m.

Q.2 If minute hand travels for 3 hour 33 minute then what will be the distance covered by hour hand.

Q.3 If minute hand covers the distance of 1158° Then find the time for which hour hand runs for.

Q.4 What will be the angle made by minute hand in 40 sec?

Q.5 What will be the angle made by Minute hand in 1 minute 15 second?

Q.6 If the actual time is 11:30 and when we move minute hand towards clockwise direction of 135° angle. Then what will be time in clock?

Q.7 If we move the hour hand of a clock towards clockwise direction by 85° angle which is showing 4 am, then what will be the time in clock.

Q.8 Find the angle between minute hand & Hour Hand at 04:12.

Q.9 At what time between 6 am and 7 am will the minute hand and hour hand of a clock make an angle closest to 60^0?

(A) 6:22 am (B) 6.27 am

(C) 6:38 am (D) 6:45 am

[GATE 2014 : IIT KHA (CS-2, EE-2)]

Q.10 It is quarter past three in your watch. The angle between the hour hand and the minute hand is _____.

(A) 22.5^0 (B) 15^0

(C) 7.5^0 (D) 0^0

[GATE 2020 : IIT Delhi (EC)]

Q.11 Find the time between 4 to 5 at which minute hand & hour hand will coincide?

OR

At what time between 4 to 5 distance between minute hand & hour hand will 0^0?

Q.12 Find the time between 4 to 5 at which minute hand & hour hand will Opposite to each other?

OR

At what time between 4 to 5 distance/Angle between minute hand & hour hand will 180^0?

Q.13 Find the time between 8 to 9 at which minute hand & hour hand will make straight line?

Q.14 Find the time between 4 to 5 at which minute hand & hour hand will make Right Angle?

OR

At what time between 4 to 5 distance/Angle between minute hand & hour hand will 90°?

Q.15 A watch uniformly gains 5 min per hour. It was set right on 6 am Monday.

What time it will show on 7 pm of same day?

Q.16 A watch loses 5 min every hour and was set right at 6 am on a Monday. When will it show the correct time again?

Q.17 A clock gain 1 hour in each 24 hour. If clock shows correct time on Sunday 9 am then what is the correct time, when clock shows 11:00 am Tuesday?

Q.18 A clock gain 10 minute per hour. At 03:00 am Monday it set right, after few days when it was checked it was showing 03:00 am Wednesday, what is the correct time?

Q.19 A watch which gains uniformly, was observed to be 5 min slow at 12:00 noon on Monday. It was noticed 10 min fast at 6 pm on the next day. When did the watch show the correct time?

Q.20 A wall clock gains 5 min per hour while a table clock looses 10 min per hour. They both set right at 10:00 am on Sunday, when both of the clock will show the same time again?

Q.21 A wall clock gains 02 min per 12 hour while a table clock looses 02 min per 36 hour.

They both set right at 12:00 am on Monday, when both of the clock will show the same time again?

Q.22 A faulty wall clock is known to gain 15 minutes every 24 hours. It is synchronized to the correct time at 9 AM on 11th July. What will be the correct time to the nearest minute when the clock shows 2 PM on 15th July of the same year?

(A) 12:45 PM (B) 12:58 PM

(C) 1:00 PM (D) 2:00 PM

[GATE 2021 : IIT Guwahati (CE-2)]

Q.23 Two and a quarter hours back, when seen in a mirror, the reflection of a wall clock without number markings seemed to show 1:30. What is the actual current time shown by the clock?

(A) 8 : 15 (B) 11 : 15

(C) 12 : 15 (D) 12 : 45

[GATE 2016 : IISc-Banglore (EC-2, ME-3)]

Self Practice Questions :

Q.1 What is the angle between the hour hand and the minute hand at 6:30 PM?

(A) 325° (B) 330°

(C) 345° (D) 315°

Q.2 What is the angle between the hour hand and the minute hand at 2:45 AM?

(A) 227.5° (B) 127.5°

(C) 172.5° (D) 272.5°

Q.3 How many times in a day, do the hands of a clock coincide with each other?

(A) 11 (B) 48

(C) 22 (D) 24

Q.4 The hour hand takes _ fill rounds of a clock in a day.

(A) 12 (B) 2

(C) 24 (D) 4

Q.5 If mirror shows 1:13 in a clock, then what will be actual timing?

(A) 10:43 (B) 10:57

(C) 10:53 (D) 10:47

Q.6 What time is shown in the mirror if real time is 8:45?

(A) 2:15 (B) 3:15

(C) 6:25 (D) 7:15

Q.7 What time is shown in the mirror if real time is 1:47?

(A) 10:13 (B) 11:13

(C) 12:13 (D) 2:13

Q.8 Time shown in a clock is 3:13, what time will appear in the water?

(A) 1:13 (B) 2:17

(C) 2:13 (D) 3:17

Q.9 What angle is made by minute hand in 30 seconds?

(A) 3° (B) 29°

(C) 30° (D) 2.9°

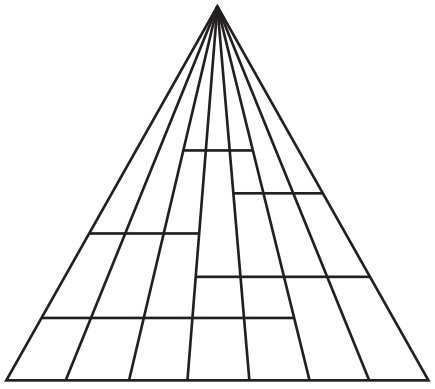
Q.10 What will be the water image of 7:45?

(A) 10:45 (B) 4:15

(C) 9:45 (D) 3:15

Counting of Figure

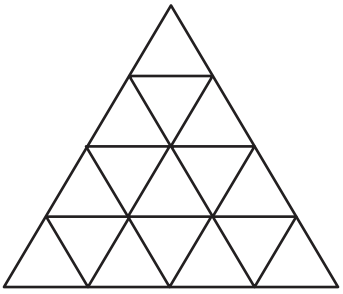
Q.1 How many Triangles are there in the figure?



(A) 33 (B) 59

(C) 71 (D) 61

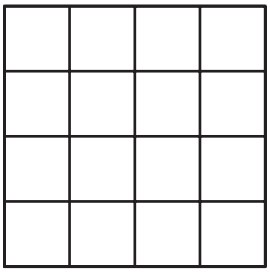
Q.2 How many Triangles are there in the figure?



(A) 16 (B) 27

(C) 32 (D) 30

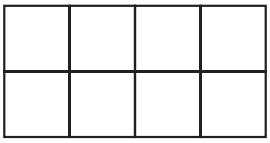
Q.3 How many Quadrilateral are there in the figure?



(A) 70 (B) 100

(C) 30 (D) 40

Q.4 In a 2×4 rectangle grid shown below, each cell is a rectangle. How many rectangles can be observed in the grid?

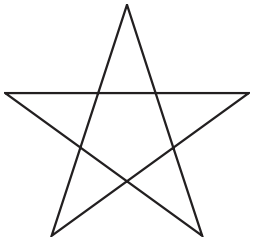


(A) 21 (B) 27

(C) 30 (D) 36

[GATE 2016 : IISc-Banglore (CS-2, EE-1)]

Q.5 How many Triangles are there in the figure?



(A) 5 (B) 6

(C) 8 (D) 10

10.3 Blood Relation

Class Practice Questions :

Q.1 M has a son Q and a daughter R. He has no other children. E is the mother of P and daughter-in-law of M. How is P related to M?

(A) P is the son-in-law of M.

(B) P is the grandchild of M.

(C) P is the daughter-in law of M.

(D) P is the grandfather of M.

[GATE 2016 : IISc Bangalore (EC-3, IN)]

Q.2 Each of P, Q, R, S, W, X, Y and Z has been married at most once. X and Y married and have two children P and Q, Z is grandfather of the daughter 'S' of P. Further Z and W married and are parents of R. Which one of the following must necessarily be FALSE?

(A) X is the mother-in-law to R

(B) P and R are not married to each other

(C) P is son of X and Y

(D) Q cannot be married to R

[GATE 2016 : IIT Roorkee (EC-2)]

Q.3 P, Q, R, S and T are related and belong to the same family. P is the brother of S. Q is the wife of P, R and T are the children of the siblings P and S respectively. Which one of the following statements is necessarily FALSE?

(A) S is the sister-in-law of Q

(B) S is the aunt of R

(C) S is the brother of P

(D) S is the aunt of T

[GATE 2019 : IIT Madras (CE-1)]

Q.4 M and N had four children (P, Q, R and S) of them, only P and R are married. They had children X and Y respectively. If Y is the legitimate child of W, which one of the following statement is necessarily FALSE?

(A) W is the wife of P

(B) W is the wife of R

(C) M is the grandmother of Y

(D) R is the father of Y

[GATE 2019 : IIT Madras (ME-1)]

Q.5 Pointing towards a Man a woman said 'he is the only son of my mother's mother, How is the woman related to the man?

(A) Mother (B) Aunt

(C) Cousin (D) Niece

Q.6 Pointing to a man in a photograph a woman says, He is the father-in-law of the wife of only grandson of my own father-in-law.
How is woman related to man?
(A) Son (B) Wife
(C) Cousin (D) Nephew

Q.7 Pointing towards Neha, Samar said 'I am the only son of her mother's son.'
How is Neha related to Samar?
(A) Aunt (B) Niece
(C) Mother (D) Cousin

Q.8 These questions are based on the following information.
'X @ Y' Means 'X is the mother of Y'
'X $ Y' Means 'X is the husband of Y'
'X # Y' Means 'X is the sister of Y'
'X * Y' Means 'X is the son of Y'
M * H @ D * K, in this what is relation of K with M?
(A) Mother (B) Father
(C) Father-in-law (D) Sister

Q.9 These questions are based on the following information.
'X @ Y' Means 'X is the mother of Y'
'X $ Y' Means 'X is the husband of Y'
'X # Y' Means 'X is the sister of Y'
'X * Y' Means 'X is the son of Y'
Which of the following indicates the relationship 'R' is the daughter of T'?
(A) R # F * B @ T (B) R # F * B $ T
(C) T @ B # R * F (D) T @ B # F * R

Q.10 These questions are based on the following information.
'X @ Y' Means 'X is the mother of Y'
'X $ Y' Means 'X is the husband of Y'
'X # Y' Means 'X is the sister of Y'
'X * Y' Means 'X is the son of Y'
If F # J * T $ R @ L, then which of the following is definitely true?
(A) L is the brother of F.
(B) F is the sister of L.
(C) F is the brother of J.
(D) L is the brother of J.

Self Practice Questions :

Q.1 Arshi is mother of Rekha. Sunita is sister-in-law of Rekha. Tapan is maternal grandfather of Girish. Anuj is son of Puneet. If Arshi is mother of a son and a daughter, then how is Anuj related to Sunita?
(A) Brother (B) Husband
(C) Father (D) Son

Q.2 Arshi is mother of Rekha. Sunita is sister-in-law of Rekha. Tapan is maternal grandfather of Girish. Anuj is son of Puneet. If Arshi is mother of a son and a daughter, then how is Tapan related to Anuj?
(A) Father (B) Father-in-law
(C) Brother-in-law (D) Son-in-law

Q.3 Mohan is son of Akash. Manchun is father-in-law of Akash. Kamla is daughter-in-law of Paravati who is married to grandfather of Mohan. How is Kamla related to Anil, if Anil is Mohan's paternal uncle?
(A) Sister-in-law (B) Sister
(C) Brother (D) Brother-in-law

Q.4 Pointing to photograph of a man Kalika said, "He is the son of the only son of my daughter". How is Kalika related to that man?
(A) Mother (B) Grandmother
(C) Great grandmother (D) None of these

Q.5 Introducing to a girl a boy said, "She is the daughter of the father of my maternal aunt". How is the girl related to the boy?
(A) Mother (B) Cousin
(C) Sister (D) Paternal Aunt

Q.6 In a family, there are six members – P, Q, R, S, T and U. There are two married couple in the family and the number of male in the family is equal to the number of female. Q is daughter of the son of T. R is son-in-law of S. U is father-in-law of P. How is T related to S?
(A) Mother (B) Sister
(C) Mother-in-law (D) Daughter-in-law

Q.7 In a family, there are six members – P, Q, R, S, T and U. There are two married couple in the

family and the number of male in the family is equal to the number of female. Q is daughter of the son of T. R is son-in-law of S. U is father-in-law of P. Who among the following is father of S?

(A) P (B) U
(C) R (D) None of these

Q.8 In a family, there are six members – P, Q, R, S, T and U. There are two married couple in the family and the number of male in the family is equal to the number of female. Q is daughter of the son of T. R is son-in-law of S. U is father-in-law of P. How is R related to P?

(A) Son-in-law (B) Father-in-law
(C) Son (D) Father

Q.9 In a family, there is one father, two daughters, three sisters, one mother, one brother and a husband, then how many members are there in the family?

(A) 9 (B) 8
(C) 7 (D) 6

Q.10 G is mother of H who is sister of K. L is son of D and husband of P. If D is married to K, then how is P related to K?

(A) Daughter (B) Son
(C) Daughter-in-law (D) Son-in-law

10.4 Coding-Decoding

Class Practice Questions :

Q.1 If "KCLFTSB" stands for "best of luck" and "SHSWDG" stands for "good wishes", which of the following indicates "ace the exam"?

(A) MCHTX (B) MXHTC
(C) XMHCT (D) XMHTC

[GATE 2014 : IIT Kharagpur (EC-4, ME-4)]

Q.2 If ROAD is written as URDG, then SWAN should be written as..

(A) VXDQ (B) VZDQ
(C) VZDP (D) UXDQ

[GATE 2015 : IIT Kanpur (EC-4, ME-4)]

Q.3 If 'relftaga' means carefree,
'otaga' means careful and
'fertaga' means careless,
Which of the following could mean 'aftercare'?

(A) Zentaga (B) Tagafer
(C) Tagazen (D) Relffer

[GATE 2016 : IISc Bangalore (CE-1, CS-1)]

Q.4 In a certain code,
AMCF is written as EQGJ and
NKUF is written as ROYJ.
How will DHLP be written in that code?

(A) RSTN (B) TLPH
(C) HLPT (D) XSVR

[GATE 2018 : IIT Guwahati (EE)]

Q.5 If E = 10; J = 20; O = 30; T = 40 , what will be P + E + S + T ?

(A) 51 (B) 120
(C) 82 (D) 164

[GATE 2019 : IIT Madras (CE-1)]

Q.6 If IMHO = JNIP, IDK = JEL and SO = TP then IDC = _____.

(A) JDE (B) JED
(C) JCE (D) JEC

[GATE 2019 : IIT Madras (ME-2)]

Q.7 P, Q, R and S are to be uniquely coded using α and β. If P is coded as αα and Q as αβ, then R and S respectively, can be coded as..

(A) βα and ββ (B) αβ and ββ
(C) ββ and αα (D) βα and αβ

[GATE 2020 : IIT Delhi (IN, ME-1, MT)]

Q.8 If P = 3, R = 27, T = 243, then Q + S = ?

(A) 40 (B) 110
(C) 90 (D) 80

[GATE 2020 : IIT Delhi (CS, IT)]

Q.9 If 0, 1, 2…… 7, 8, 9 are coded as O, P, Q,….., V, W, X then 4,5 will be coded as..

(A) SU (B) ST
(C) SS (D) TS

[GATE 2020 : IIT Delhi (CE-1)]

Letters Series

Q.10 Given the sequence of terms, AD, CG, FK, JP, the next term is

(A) OV (B) OW
(C) PV (D) PW

[GATE 2012 : IIT Delhi (CE, CH, CS, ME, PI)]

Q.11 Find the next term in the sequence :

7G, 11K, 13M, ___

(A) 15Q (B) 17Q

(C) 15P (D) 17P

[GATE 2014 : IIT Kharagpur (EC-3, ME-3)]

Q.12 Find the next term in the sequence :

13M, 17Q, 19S, ____

(A) 21W (B) 21V

(C) 23W (D) 23V

[GATE 2014 : IIT Kharagpur (EC-4, ME-4)]

Q.13 Find the missing sequence in the letter series below: A, CD, GHI, ?, UVWXY

(A) LMN (B) MNO

(C) MNOP (D) NOPQ

[GATE 2015 : IIT Kanpur (EC-3, CH)]

Q.14 Find the missing sequence in the letter series.

B, FH, LNP, __.

(A) SUWY (B) TUVW

(C) TVXZ (D) TWXZ

[GATE 2016 : IISc Bangalore (CH, ME-2)]

Q.15 Select the next element of the series :

Z, WV, RQP, ___

(A) LKJI (B) KJIH

(C) NMLK (D) JIHG

[GATE 2020 : IIT Delhi (EE)]

Self Practice Questions :

Q.1 Complete the series.

DO, EP, FQ, GR, ?

(A) IT (B) IR

(C) HT (D) HS

Q.2 Select the letter cluster that will replace the '?' in the given series.

BCA, FGE, ? NOM, RSQ, VWU

(A) JIL (B) JIK

(C) JKI (D) IJK

Q.3 Select the term that will replace the '?' in the given series.

J, M, P ?, V, Y.

(A) T (B) R

(C) Q (D) S

Q.4 A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.

LMK, FGE, ZAY, TUS, ?

(A) BMQ (B) SRB

(C) LZD (D) NOM

Q.5 A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.

HVG, FTE, DRC, ?, ZNY

(A) CQB (B) AOZ

(C) HRB (D) BPA

Odd One Out

Q.16 Find the odd one from the following group :

W, E, K, O I, Q, W, A

F, N, T, X N, V, B, D

(A) W, E, K, O (B) I, Q, W, A

(C) F, N, T, X (D) N, V, B, D

[GATE 2014 : IIT Kharagpur (EC-1, ME-1)]

Q.17 Find the odd one in the following group

ALRVX, EPVZB, ITZDF, OYEIK

(A) ALRVX (B) EPVZB

(C) ITZDF (D) OYEIK

[GATE 2014 : IIT Kharagpur (CE-1, CH, MT)]

Q.18 Find the odd one in the following group :

Q, W, Z, B B, H, K, M

W, C, G, J M, S, V, X

(A) Q, W, Z, B (B) B, H, K, M

(C) W, C, G, J (D) M, S, V, X

[GATE 2014 : IIT Kharagpur (EC-2, ME-2)]

Q.19 Pick the odd one from the following options.

(A) CADBE (B) JHKIL

(C) XVYWZ (D) ONPMQ

[GATE 2016 : IISc Bangalore (CS-2, EE-1)]

Q.20 Pick the odd one out in the following :

13, 23, 33, 43, 53

(A) 23 (B) 33

(C) 43 (D) 53

[GATE 2016 : IISc Bangalore (EE-2)]

Self Practice Questions :

Q.1 Find the ODD one out from the given options.

(A) G (B) J

(C) T (D) P

Q.2 Four words are given below among which three are similar in some respects. Find out the odd one which is different from the rest.

(A) Onion (B) Banana

(C) Carrot (D) Potato

Q.3 Find the odd one out.

(A) CX (B) DW

(C) IR (D) ST

Q.4 Four pairs of words are given below out of which three are alike in some manner and one is different.

Which is different from the rest?

(A) FL – UO (B) BD – YW

(C) MK – NP (D) ER - VJ

Q.5 Find the odd one out.

(A) W23 (B) G7

(C) H18 (D) N14

Q.6 Four pairs are given below out of which three are alike in some manner and one is different. Which is different from the rest?

(A) MU - 34 (B) TY – 45

(C) LK – 23 (D) VF - 27

Q.7 Find the odd one out.

(A) BAL (B) FGT

(C) QEW (D) LPO

Q.8 Rearrange the jumbled letters to make a meaningful word ant then select the one which is different.

(A) GIANTLER (B) LECRIC

(C) MUBORSH (D) RASQUE

Q.9 Find the odd one out.

(A) NX (B) MW

(C) BL (D) CN

Q.10 Find the odd one out.

(A) RTVX (B) NPRT

(C) FHJL (D) GILP

Number Series

Q.21 Fill in the missing number in the series.

2 3 6 15 _____ 157.5 630

[GATE 2014 : IIT Kharagpur (EC-2, ME-2)]

Q.22 What is the next number in the series?

12 35 81 173 357 ____

[GATE 2014 : IIT Kharagpur (EC-1, ME-1)]

Q.23 The next term in the series is 81, 54, 36, 24___?

[GATE 2014 : IIT Kharagpur (EC-3, ME-3)]

Q.24 What is the missing number in the following sequence?

2, 12, 60, 240, 720, 1440, _____, 0

(A) 2880 (B) 1440

(C) 720 (D) 0

[GATE 2018 : IIT Guwahati (CS, MN)]

Q.25 The missing number in the given sequence

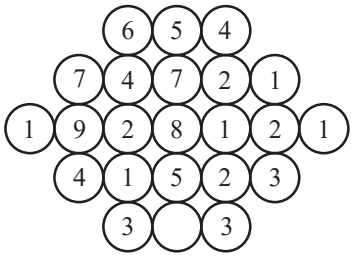
343, 1331, _____, 4913 is

(A) 4096 (B) 2744

(C) 2197 (D) 3375

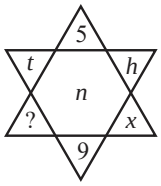
[GATE 2019 : IIT Madras (EE)]

Q.26 Fill in the missing value



[GATE 2015 : IIT Kanpur (EC-1, ME-1)]

Q.27 Find the missing element in the following figure



(A) e (B) y

(C) d (D) w

[GATE 2020 : IIT Delhi (ME-2, PI)]

Self Practice Questions :

Q.1 Complete the series.

17, 23, 31, 37, 45, 51, 59, ?

(A) 82 (B) 64
(C) 65 (D) 67

Q.2 Find the missing number in the series.

6, 8, 9, 12, ?, 18, 21

(A) 14 (B) 15
(C) 13 (D) 16

Q.3 Find the missing number in the series.

B-25, ?, F-9, H-4

(A) C-16 (B) D-16
(C) E-25 (D) C-25

Q.4 Complete the series.

12A6Z, 24C4X, 36E2V, ?

(A) 48GOT (B) 48G0T
(C) 4G80T (D) 4G8OT

Q.5 Select the number that will continue the given series.

4, 8, 8, 16, 12, 24, ?

(A) 48 (B) 32
(C) 16 (D) 12

Coding Decoding

Direction for Questions 28 and 30

In a certain code language,

'Live Today Like Last' is written as 'ra mu pe ka'

'Live Like A King' is written as 'su ka pe ke'

'Be Like Last King' is written as 'pe na ke ra'

'A Good Day Today' is written as 'da ku mu su'

Q.28 What does the code 'ka' stands for in the given code language?

(A) Live (b) Like
(C) A (d) King

Q.29 What does the code 'na' stands for in the given code language?

(A) Be (B) Like
(C) Last (D) King

Q.30 Which of the following is the code for 'Good King' in the given code language?

(A) su ke (B) ka da
(C) pe ku (D) ke su
(E) CND

Q.31 Which of the following may be the code for 'Day Was Good' in the given code language?

(A) su mu ku (B) da me mu
(C) su pe ma (D) ku pa da

Direction for Questions 32 and 36

In a certain code language

'Indian banks are associates' is written as 'za pn ka sh',

'SBI has associates banks' is written as 'pn za bi ti',

'National and Indian institute' is written as 'na ha sh sn'

'National has international banks' is written as 'bi na mn pn'.

Q.32 How is 'banks' written in that code language?

(A) Pn (B) sn
(C) ti (D) za

Q.33 International' is written as?

(A) mn (B) na
(C) bi (D) Eithr 1 or 3

Q.34 What does 'ti' stands for?

(A) sbi (B) has
(C) banks (D) Eithr 1 or 2

Q.35 What is the code for 'Indian'?

(A) na (B) sn
(C) pn (D) sh

Q.36 What is code for national?

(A) na (B) sn
(C) ti (D) mn

Direction for Questions 37 and 40

Letter	M	K	A	D	E	T	R	J	I	W	U	B	F	H	Q
Digit /Symbol code	7	%	$	6	5	8	1	9	2	@	#	©	¬	3	4

Condition :

(i) If the first letter is a consonant and the last letter is a vowel both are to be coded as the code for the vowel.

(ii) If the first letter is a vowel and the last letter is a consonant, the codes for the first and the last letters are to be interchanged.

(iii) If the third letter is a vowel it is to be coded as **'S'**

Q.37 **WHIMTD**

(A) @3S786 (B) @3S768

(C) 63S73@ (D) @3S78@

Q.38 **WEMKUA**

(A) $5d %#$ (B) $d7%#$

(C) $57%#@ (D) $57%#$

Q.39 **EMDFHK**

(A) %76¬3% (B) 576¬35

(C) 576¬3% (D) %76¬35

Q.40 **QTRUJE**

(A) 48d#95 (B) 581#95

(C) 581#94 (D) 582#95

Self Practice Questions :

Q.1 If in a certain code, "MOTHER" is written as 'JRQKBU', then how will 'PRINCIPAL' be written in that code?

(A) MRFKZLMXI (B) SULQFLSDO

(C) MUFQZLMDI (D) MRFKZFMXI

Q.2 If in a certain code, 'CRAMP' is written as 'YNWIL', then how will 'GRASP' be written in that code?

(A) CNWOL (B) CWNOL

(C) CNOWL (D) CWONL

Q.3 If APPLE is written as 36678, RUMMY is written as 91445, then '784539' is the code for:

(A) LEMYAR (B) LEYMAR

(C) LMEAYR (D) LMEYAR

Q.4 If PARTY is written as '!$%@#', COAT is written as '*?$@', then find the code for CARROT.

(A) *$%%?@ (B) *$%?%@

(C) *&%%?@ (D) *$%%?#

Q.5 If JACK is written as ACJK, HUMAN is written as AHMNU and DELIVER is written as DEEILRV, find the code for MONUMENT.

(A) EMMNNOUT (B) EMMNNTOU

(C) EMMNNOTU (D) EMMNONTU

Q.6 If OPERATE is written as QNGPCRG, then find the code for RUSSIA.

(A) TUSQKY (B) TSUQKY

(C) TSUKQY (D) TSUSQY

Q.7 If three is written as 6, seven is written as 12, fourteen is written as 24, nine is written as 90, ten is written as 34, then how is the product of 7 and 2 written in that code?

(A) 6 (B) 34

(C) 24 (D) 12

Q.8 If red is written as blue, blue is written as green, green is written as yellow, yellow is written as black, black is written as white, white is written as pink, then which of the following is the code for colour of blood of a cockroach?

(A) Blue (B) Black

(C) Pink (D) White

Q.9 In a certain code language, 'TULSI' is written as 'WXOVL'. How will 'LEAST' be written as in that language?

(A) OHWVW (B) ODHVE

(C) OHDVW (D) OHDEV

Q.10 If in a certain code, 'OTRIVIN' is written as 'NIVROTR', then how will 'RISKING' be written in that code?

(A) GINPRIS (B) GNIKRIS

(C) GNPIRIS (D) GNIPRIS

Q.11 If in a certain code, 'BROMINE' is written as 'RTCRHPJ', then how will 'RADICAL' be written in that code?

(A) GCSNOCD (B) GCNSOCD

(C) GCSNCOD (D) GSCNOCD

10.5 Order & Ranking

Q.1 In a row of 45 students, Kabir is 26th from right end of the row. What is the rank of Kabir from left end of the row?

Q.2 In a row of 38 students, Priti is 21st from Left end of the row. What is the rank of Priti from Right end of the row?

Q.3 In a Class of 36 students, Harry is 13th from left end of the row and Sejal is 15th from Right end of the row. How many students will sit between them?

Q.4 In a Class of 28 students, Sonu is 17th from left end of the row and Pinky is 19th from Right end of the row. How many students will sit between them?

Q.5 In a row of players Sachin is 13th from Left end of the row and Saurav is 17th from Right end of the row, If there are 10 players sit between them.

Then how many players are there in the row?

Q.6 In a row of Actors Guddu is 11th from Left end of the row and Bablu is 15th from Right end of the row, If there are 10 Actors sit between them.

Then how many Actors are there in the row?

Q.7 L, M and N are waiting in a queue meant for children to enter the zoo. There are 5 children between L and M, and 8 children between M and N. If there are 3 children ahead of N and 21 children behind L, then what is the minimum number of children in the queue?

(A) 28 (B) 27

(C) 41 (D) 40

[GATE 2011 : IIT- Madras (AE, MN)]

Q.8 Ravi is taller than Arun but shorter than Iqbal. Sam is shorter than Ravi. Mohan is shorter than Arun. Balu is taller than Mohan and Sam. The tallest person can be :

(A) Mohan (B) Ravi

(C) Balu (D) Arun

[GATE 2012 : IIT-Delhi (AR, GG, TF)]

Q.9 Abhishek is elder to Savar. Savar is younger to Anshul. Which of the given conclusions is logically valid and is inferred from the above statements?

(A) Abhishek is elder to Anshul

(B) Anshul is elder to Abhishek

(C) Abhishek and Anshul are of the same age

(D) No conclusions follows

[GATE 2013 : IIT-Bombay (CE, MT)]

Q.10 Tanya is older than Eric.

Cliff is older than Tanya.

Eric is older than Cliff.

If the first two statements are true, then the third statement is:

(A) True (B) False

(C) Uncertain (D) Data insufficient

[GATE 2015 : IIT-Kanpur (IN, ME-3, MT, PI)]

Q.11 In a group of four children, Som is younger to Riaz. Shiv is elder to Ansu. Ansu is youngest in the group. Which of the following statements is /are required to find the eldest child in the group?

Statements :

1. Shiv is younger to Riaz.
2. Shiv is elder to Som.

(A) Statement 1 by itself determines the eldest child.

(B) Statement 2 by itself determines the eldest child.

(C) Statements 1 and 2 are both required to determine the eldest child.

(D) Statements 1 and 2 are not sufficient to determine the eldest child.

[GATE 2014 : IIT-Kharagpur (CE-2, IN, PI)]

Q.12 Consider five people – Mita, Ganga, Rekha, Lakshmi and Sana. Ganga is taller than both Rekha and Lakshmi. Lakshmi is taller than Sana. Mita is taller than Ganga.

Which of the following conclusions are true?

1. Lakshmi is taller than Rekha
2. Rekha is shorter than Mita
3. Rekha is taller than Sana
4. Sana is shorter than Ganga

(A) 2 and 4 (B) 1 only

(C) 1 and 3 (D) 3 only

[GATE 2019 : IIT-Madras (EE)]

Q.13 Six students P, Q, R, S, T and U with distinct heights, compare their heights and make the following observations.

Observation I : S is taller than R.

Observation II : Q is the shortest of all.

Observation III : U is taller than only one student.

Observation IV : T is taller than S but is not tallest.

The number of students that are taller than R is the same as number of student shorter than_____.

(A) T (B) R

(C) S (D) P

[GATE 2019 : IIT-Madras (CS-2)]

Q.14 Consider the following gold articles P, Q, R, S and T with different weights :

- P weighs twice as much as Q
- Q weighs four and a half times as much as R
- R weighs half as much as S
- S weighs half as much as T
- T weighs less than P but more than R

Article T will be lighter in weight than :

(A) P and S (B) P and R

(C) P and Q (D) Q and R

[ESE 2020]

Q.15 Consider the following students in an examination :

- A scored more than B
- C scored as much as D
- E scored less than F
- B scored more than C
- F scored less than D

Who scored the lowest?

(A) E (B) C

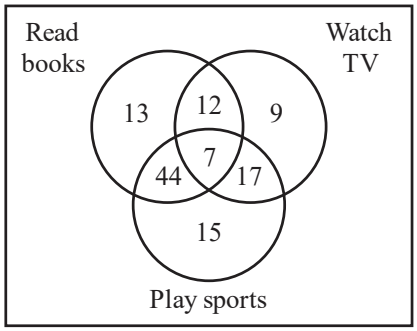
(C) D (D) F

[ESE 2020]

10.6 Venn Diagram

Class Practice Questions :

Q.1 The Venn diagram shows the preference of the student population for leisure activities. From the data given, the number of students who like to read books or play sports is ____.

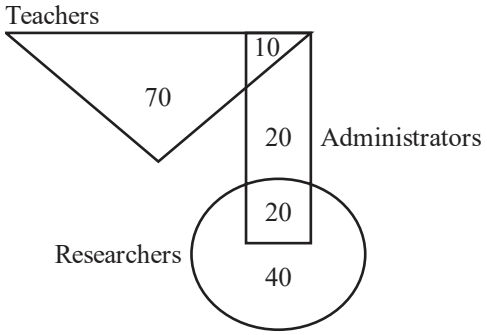


(A) 44 (B) 51

(C) 79 (D) 108

[GATE 2016 : IISc Banglore (EC-2, ME-3)]

Q.2 In the given diagram, teachers are represented in the triangle, researchers in the circle and administrators in the rectangle. Out of the total number of the people, the percentage of administrators shall be in the range of _____.



(A) 0 to 15 (B) 16 to 30

(C) 31 to 45 (D) 46 to 60

[GATE 2019 : IIT Madras (CH, CS)]

Q.3 25 persons are in a room. 15 of them play hockey, 17 of them play football and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is

(A) 2 (B) 17

(C) 13 (D) 3

[GATE 2010 : IIT Guwahati (All Branches)]

Q.4 500 students are taking one or more courses out of Chemistry, Physics and Mathematics. Registration records indicate course enrolment as follows : Chemistry (329), Physics (186), Mathematics (295), Chemistry and Physics (83), Chemistry and Mathematics (217), and Physics and Mathematics (63). How many students are taking all 3 subjects?

(A) 37 (B) 43

(C) 47 (D) 53

[GATE 2017 : IIT Roorkee (EC-2)]

Q.5 Among 150 faculty members in an institute, 55 are connected with each other through Facebook® and 85 are connected through WhatsApp®. 30 faculty members do not have Facebook® or WhatsApp® accounts. The number of faculty members connected only through Facebook® accounts is _____.

(A) 35 (B) 45
(C) 65 (D) 90

[GATE 2016 : IISc Banglore (CS-2, EE-1)]

Q.6 There are 16 teachers who can teach Thermodynamics (TD), 11 who can teach Electrical Sciences (ES), and 5 who can teach both TD and Engineering mechanics (EM). There are a total of 40 teachers, 6 can not teach any of the three subjects, i.e. EM, ES and TD. 6 can teach only ES. 4 can teach all three subjects i.e. EM, ES and TD. 4 can teach ES and TD. How many can teach both ES and EM but not TD?

(A) 1 (B) 2
(C) 3 (D) 4

[GATE 2015 : IIT Kanpur (CE-2)]

Q.7 Forty students watched films A, B and C over a week. Each student watched either only one film or all three. Thirteen students watched film A. sixteen students watched film B and nineteen students watched film C. How many students watched all three films?

(A) 0 (B) 2
(C) 4 (D) 8

[GATE 2018 : IIT Guwahati (ME-2, PI)]

Q.8 In a sports academy of 300 people, 105 play only cricket, 70 play only hockey, 50 play only football, 25 play both cricket and hockey, 15 play both hockey and football and 30 play both cricket and football. The rest of them play all three sports. What is the percentage of people who play at least two sports?

(A) 25.00 (B) 28.00
(C) 23.30 (D) 50.00

[GATE 2019 : IIT Madras (ME-2, PI)]

Q.9 In a college, there are three student clubs. Sixty students are only in the Drama club, 80 students are only in the Dance club, 30 student are only in the Maths club, 40 students are in both Drama and Dance clubs, 12 students are in both Dance and Maths clubs, 7 students are in both Drama and Maths clubs, and 2 students are in all the clubs. If 75% of the students in the college are not in any of these clubs, then the total number of students in the college is _____.

(A) 1000 (B) 975
(C) 900 (D) 225

[GATE 2019 : IIT Madras (CH, CS)]

Q.10 A gathering of 50 linguists discovered that 4 knew Kannada, Telugu and Tamil, 7 knew only Telugu and Tamil, 5 knew only Kannada and Tamil, 6 knew only Telugu and Kannada. If the number of linguists who knew Tamil is 24 and those who knew Kannada is also 24, how many linguists knew only Telugu?

(A) 9 (B) 10
(C) 11 (D) 8

[GATE 2010 : IIT Guwahati (TF)]

Q.11 In a class of 300 students in an M.Tech programme, each student is required to take at least one subject from the following three:

M600 : Advanced Engineering Mathematics

C600 : Computational Methods for Engineers

E600 : Experimental Techniques for Engineers

The registration data for the M.Tech class shows that 100 students have taken M600, 200 students have taken C600, and 60 students have taken E600. What is the maximum possible number of students in the class who have taken all the above three subjects?

(A) 20 (B) 30
(C) 40 (D) 50

[GATE 2011 : IIT Madras (GG, TF)]

Q.12 In a group of 1000 people, 750 speak Hindi and 400 speak English. The number of only Hindi speaking people is:

(A) 150 (B) 350
(C) 600 (D) 750

[ESE 2021]

Q.13 To pass a test, a candidate needs to answer at least 2 out of 3 questions correctly. A total of 6,30,000 candidates appeared for the test. Question *A* was correctly answered by 3,30,000 candidates. Question *B* was answered correctly by 2,50,000 candidates, Question *C* was answered correctly by 2,60,000 candidates. Both questions *A* and *B* were answered correctly by 1,00,000 candidates. Both questions *B* and *C*

were answered correctly by 90,000 candidates. Both questions *A* and *C* were answered correctly by 80,000 candidates. If the number of students answering all questions correctly is the same as the number answering none, how many candidates failed to clear the test?

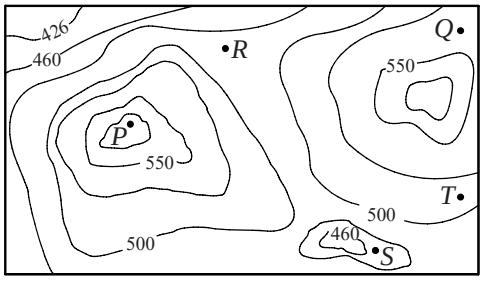
(A) 30,000 (B) 2,70,000

(C) 3,90,000 (D) 4,20,000

[GATE 2018 : IIT Guwahati (CH, IN, MT)]

Contour Line

Q.14 A contour line joins locations having the same height above the mean sea level. The following is a contour plot of a geographical region. Contour lines are shown at 25 m intervals in this plot. If in a flood the water level rises to 525 m, which of the villages *P*, *Q*, *R*, *S*, *T* gets submerged?

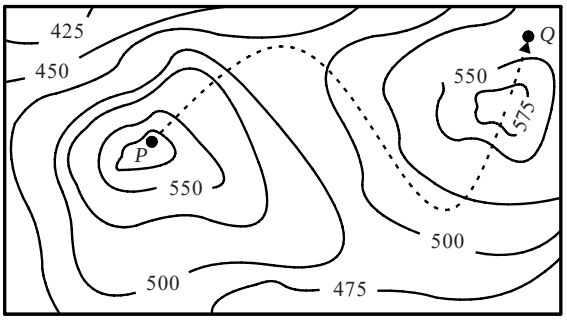


(A) *P*, *Q* (B) *P*, *Q*, *T*

(C) *R*, *S*, *T* (D) *Q*, *R*, *S*

[GATE 2017 : IIT Roorkee (EE, CS Set – 1)]

Q.15 A contour line joins locations having the same height above the mean sea level. The following is a contour plot of a geographical region. Contour lines are shown at 25 m intervals in this plot.



The path from P to Q is best described by

(A) Up-Down-Up-Down

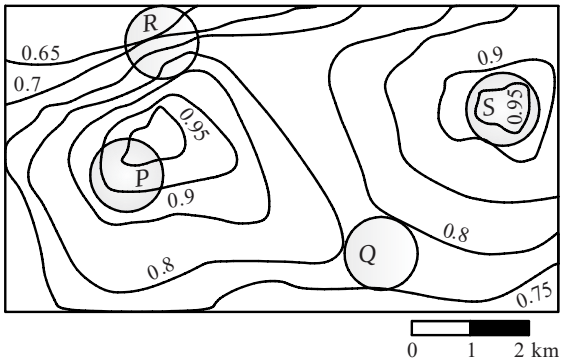
(B) Down-Up-Down-Up

(C) Down-Up-Down

(D) Up-Down-Up

[GATE 2017 : IIT Roorkee (EC, BT, PI Set – 1)]

Q.16 An air pressure contour line joins locations in a region having the same atmospheric pressure. The following is an air pressure contour plot of a geographical region. Contour lines are shown at 0.05 bar intervals in this plot. **[EE (S2)/CS(S2)]**



If the possibility of a thunderstorm is given by how fast air pressure rises or drops over a region, which of the following regions is most likely to have a thunderstorm?

(A) *P* (B) *Q*

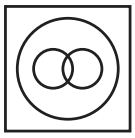
(C) *R* (D) *S*

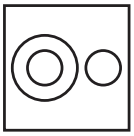
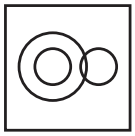
[GATE 2017 : IIT Roorkee (EE, CS Set – 2)]

Self Practice Questions :

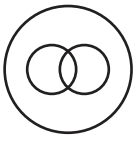
Q.1 Which of the following diagrams correctly represents the relationship between the following classes.

Vehicle, Car, Auto

(A)  (B) 

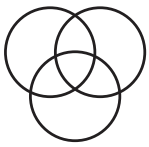
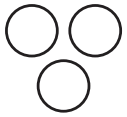
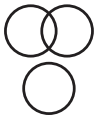
(C)  (D) 

Q.2 Select the option that is best represented by the given set of Venn diagram.

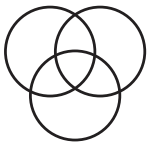
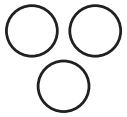
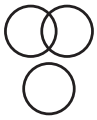


(A) Lion, Animal, Rat
(B) Professors, Male, Humans
(C) Aunt, Teacher, Father
(D) Women, Brother, Sister

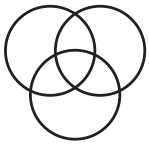
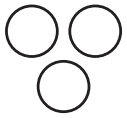
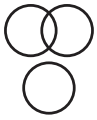
Q.3 Which of the following diagrams correctly represents the relationship between the following classes.
Mothers, Nephew, Daughter

(A) 
(B) 
(C) 
(D) 

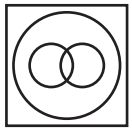
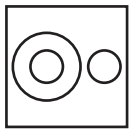
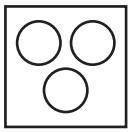
Q.4 Which of the following diagrams correctly represents the relationship between the following classes.
Brother, Mother, Father

(A) 
(B) 
(C) 
(D) 

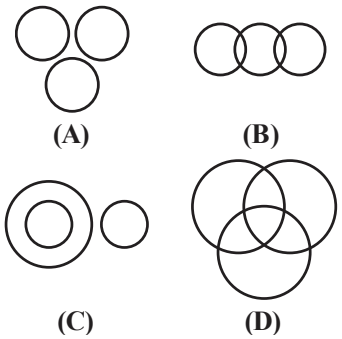
Q.5 Which of the following diagrams correctly represents the relationship between the following classes.
Octagon, Figure, Rectangle

(A) 
(B) 
(C) 
(D) 

Q.6 Which of the following diagrams correctly represents the relationship between the following classes.
Surat, Gujarat, Assam

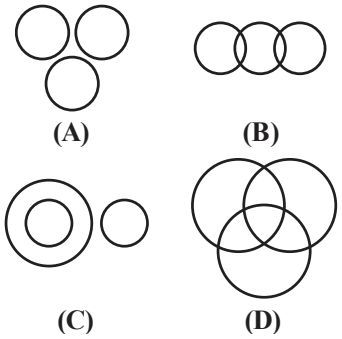
(A) 
(B) 
(C) 
(D) 

Q.7 Which of the following diagrams correctly represents the relationship between the following classes.
Boys, Player, Singer



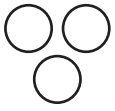
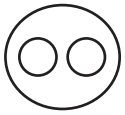
(A) C
(B) D
(C) A
(D) B

Q.8 Which of the following diagrams correctly represents the relationship between the following classes.
Earth, Sun, Moon

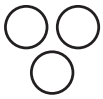


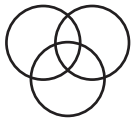
(A) C (B) D
(C) A (D) B

Q.9 Which of the following diagrams correctly represents the relationship between the following classes.
Wood, Table, Door

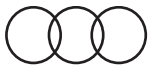
(A) 
(B) 
(C) 
(D) 

Q.10 Which of the following diagrams represent the relationship between Nepal, Kathmandu, Asia.

(A) 

(B) 

(C) 

(D) 

10.7 Syllogism

Class Practice Questions :

Q.1 Arguments :

All professors are researchers.

Some scientists are professors.

Which of the given conclusions is logically valid and is inferred from the above arguments :

(A) All scientists are researchers

(B) All professors are scientists

(C) Some researchers are scientists

(D) No conclusion follows

[GATE 2013 : IIT Bombay (CH)]

Q.2 Statements :

All women are entrepreneurs.

Some women are doctors.

Which of the following conclusions can be logically inferred from the above statements?

(A) All women are doctors.

(B) All doctors are entrepreneurs.

(C) All entrepreneurs are women.

(D) Some entrepreneurs are doctors.

[GATE 2014 : IIT Kharagpur (EC-1, ME-1)]

Q.3 Statements :

No manager is a leader.

All leaders are executive.

Conclusions :

I. No manager is an executive.

II. All executives are manager.

(A) Only conclusion I follows.

(B) Only conclusion II follows.

(C) Neither conclusion I nor II follows.

(D) Both conclusion I and II follow.

[GATE 2014 : IIT Kh (IN, ME-3, MT, PI)]

Q.4 Statements :

All film star are playback singers.

All film directors are film stars.

Conclusions :

I. All film directors are playback singers.

II. Some film stars are film directors.

(A) Only conclusion I follows.

(B) Only conclusion I nor II follows.

(C) Neither conclusion I nor II follows.

(D) Both conclusions I and II follow.

[GATE 2015 : IIT Kanpur (EC-2, ME-2)]

Q.5 Fact 1 : Humans are mammals.

Fact 2 : Some humans are engineers.

Fact 3 : Engineers build house.

If the above statements are facts, which of the following can be logically inferred?

I. All mammals build houses.

II. Engineers are mammals.

III. Some humans are not engineers.

(A) II only (B) III only

(C) I, II and III (D) I only

[GATE 2016 : IISc Banglore (CE-2, MT, PI)]

Q.6 Some tables are shelves.

Some shelves are chairs.

All chairs are benches.

Which of the following conclusions can be deduced from the preceding sentences?

(i) At least one bench is a table.

(ii) At least one shelf is a bench.

(iii) At least one chair is a table.

(iv) All benches are chairs.

(A) Only (i) (B) Only (ii)

(C) Only (ii) and (iii) (D) Only (iv)

[GATE 2016 : IISc Banglore (CE-2, MT, PI)]

Q.7 Sentences :

All benches are beds.

No bed is a bulb.

Some bulbs are lamps.

Which of the following can be inferred?

(i) Some beds are lamps.

(ii) Some lamps are beds.

(A) Only (i) (B) Only (ii)

(C) Both (i) and (ii) (D) Neither (i) nor (ii)

[GATE 2017 : IIT Roorkee (CE-1, CH)]

Q.8 Statements :

(i) Some roses are red.

(ii) All red flowers fade quickly.

(iii) Some roses fade quickly.

Which of the following statements can be logically inferred from the above statements?

(A) If (i) is true & (ii) is false, then (ii) is false

(B) If (i) is true & (ii) is false, then (iii) is true

(C) If (i) & (ii) are true, then (iii) is true

(D) If (i) & (ii) are false, then (iii) is false

[GATE 2018 : IIT Guwahati (ME-1)]

Q.9 Statement :

All purple are green.

All black are green.

Conclusion :

I. Some black are purple

II. No black is purple

Based on the above statements and conclusions, which one of the following options is logically CORRECT?

(A) Both conclusion I & II are correct.

(B) Only conclusion I is correct.

(C) Only conclusion II is correct.

(D) Either conclusion I or II is correct.

[GATE 2021 : IIT B (EC)]

Q.10 Statement :

Some football players play cricket.

All cricket players play hockey.

Among the options given below, the statement that logically follows from the two statements 1 and 2 above, is

(A) All football players play hockey.

(B) Some football players play hockey.

(C) No football player plays hockey.

(D) All hockey players play football.

[GATE 2021 : IIT B (CE-2)]

Q.11 Statement :

All entrepreneurs are wealthy.

All wealthy are risk seekers.

Conclusion :

I : All risk seekers are wealthy.

II : Only some entrepreneurs are risk seekers.

Based on the above statements and conclusions which one of the following options is CORRECT?

(A) Only conclusion I is correct.

(B) Only conclusion II is correct.

(C) Both conclusion I and II are correct.

(D) Neither conclusion I nor II is correct.

[GATE 2021 : IIT B (ME-2)]

Q.12 Statement :

All bacteria are microorganisms.

All pathogens are microorganisms.

Conclusion :

I : Some pathogens are bacteria.

II : All pathogens are not bacteria.

Based on the above statements and conclusions, which one of the following options is logically CORRECT?

(A) Only conclusion I correct.

(B) Only conclusion II is correct.

(C) Either conclusion I or II is correct.

(D) Neither conclusion I nor II is correct.

[GATE 2021 : IIT B (CS-1)]

Self Practice Questions :

Q.1 In this question, two statements are given followed by two conclusions. Choose the Conclusion (s) which best fit(s) logically.

Statements:

1. Some A are B
2. Some B are not C

Conclusions :

I. No B is C

II. Some A are C

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Either conclusion I or II follows

(D) None of the conclusion follows

Q.2 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some apples are banana
2. All bananas are fruits

Conclusions:

I. Some fruits are apple

II. Some bananas are fruits

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.3 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some A is B
2. Some B is not C

Conclusions:

I. Some C is B

II. Some C is not B

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Either conclusion I or II follows

(D) Both conclusions I and II follow

Q.4 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some matters are elements
2. Some matters are not molecules

Conclusions:

I. All elements are matter

II. Some molecules are elements

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.5 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. All men are fish
2. Some birds are fish

Conclusions:

I. Some fishes are bird

II. Some birds are not man

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.6 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some donkeys are horse
2. Some tiger are donkey

Conclusions:

I. All tiger is horse

II. Some horse is tiger

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.7 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some donkey is horse
2. Some tiger are donkey

Conclusions:

I. All donkeys is horse

II. Some horse is not tiger

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.8 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements :

1. All trees are plant
2. All fruits are tree

Conclusions:

I. Some fruits are plant

II. No plant is fruit

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.9 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some statements are paragraph
2. Some stories are not paragraph

Conclusions:

I. No story is paragraph

II. Some statements are not story

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) None of the conclusion follows

(D) Both conclusions I and II follow

Q.10 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1) All pig are animal

2) Some animal are not bird

Conclusions:

I. Some pig are not bird

II. Some animals are pig

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.11 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. No man is woman
2. No woman is lady

Conclusions:

I. No man is lady

II. Some men are not woman

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.12 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some potato are chips
2. All chips are crunchy

Conclusions:

I. All chips are potato

II. All crunchy is potato

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Both conclusions I and II follow

(D) None of the conclusion follows

Q.13 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some potato are chips
2. All chips are crunchy

Conclusions:

I. Some chips are not crunchy

II. Some chips are not potato

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Both conclusions I and II follow

(D) None of the conclusion follows

Q.14 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some Al are Ca
2. No Ca are Cu

Conclusions:

I. Some Al are Cu

II. Some Al are not Cu

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Both conclusions I and II follow

Q.15 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. No V is J
2. Some J is not K

Conclusions:

I. Some K is V

II. Some K is not V

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Either conclusion I or II follows

Q.16 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. No man is rat
2. No rat is cat

Conclusions:

I. Some cats are man

II. Some cats are not man

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Either conclusion I or II follows

(D) Both conclusions I and II follow

Q.17 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some plants are trees
2. Some leaves are trees

Conclusions:

I. Some plants are not leaves

II. Some plants are leaves

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Either conclusion I or II follows

(D) Both conclusions I and II follow

Q.18 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some matters are elements
2. Some matters are not molecules

Conclusions:

I. All elements are molecules

II. Some elements are not molecules

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Either conclusion I or II follows

Q.19 In this question, two statements are given followed by two conclusions. Choose the conclusion(s) which best fit(s) logically.

Statements:

1. Some planets are sun
2. No sun is star

Conclusions:

I. Some star is planet

II. Some star is not plane

(A) Only conclusion II follows

(B) Only conclusion I follows

(C) Neither conclusion I nor II follows

(D) Either conclusion I or II follows

10.8 Analogies

Class Practice Questions :

Q.1 The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.

Unemployed : Worker

(A) Fallow : Land

(B) Unaware : Sleeper

(C) Wit : Jester

(D) Renovated : House

[GATE 2010 : IIT- Guwahati (All branches)]

Q.2 The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.

Preamble : Constitution

(A) Amendment : Law

(B) Prologue : Play

(C) Episode : Serial

(D) Plot : Story

[GATE 2010 : IIT- Guwahati (TF)]

Q.3 The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair :

Gladiator : Arena

(A) Dancer : Stage

(B) Commuter : Train

(C) Teacher : Classroom

(D) Lawyer : Courtroom

[GATE 2011 : IIT-Madras (EC, EE, IN, MT)]

Q.4 Select the pair that best expresses a relationship similar to that expressed in the pair :

Water : pipe : : ? : ?

(A) Cart : road

(B) Electricity : wire

(C) Sea : beach

(D) Music : instrument

[GATE 2013 : IIT-Bombay (CH)]

Q.5 Select the pair that best expresses a relationship similar to the expressed in the pair

Medicine : Health

(A) Science : Experiment

(B) Wealth : Peace

(C) Education: Knowledge

(D) Money : Happiness

[GATE 2013 IIT-Bombay (CE, MT)]

Q.6 Select the pair that best expresses a relationship similar to that expressed in the pair:

Children : Pediatrician

(A) Adult: Orthopedist

(B) Females: Gynecologist

(C) Kidney: Nephrologist

(D) Skin: Dermatologist

[GATE 2015 : IIT-Kanpur (CE-1, CS-3)]

Q.7 A court is to a judge as _____ is to a teacher.

(A) A student (B) A punishment

(C) A syllabus (D) A school

Q.8 Select the word that fits the analogy :

Explicit : Implicit : : Express : _____.

(A) Repress (B) Suppress

(C) Compress (D) Impress

[GATE 2020 : IIT-Delhi (EC)]

Q.9 Select the word that fits the analogy

Do : Undo : : Trust : ____

(A) Intrust (B) Untrust

(C) Entrust (D) Distrust

[GATE 2020 : IIT-Madras (EE)]

Q.10 Select the word that fits the analogy

Build : Building : : Grow : _____

(A) Growth (B) Grew

(C) Growed (D) Grown

[GATE 2020 : IIT-Madras (IN, ME-1, MT)]

Q.11 Select the word that fits the analogy :

White : Whitening : : Light : _____

(A) Enlightening (B) Lightning

(C) Lightening (D) Lighting

[GATE 2020 : IIT-Madras(ME-2, PI)]

Q.12 Select the word that fits the analogy :

Fuse : Fusion :: Use : _____

(A) Usage (B) User

(C) Uses (D) Union

[GATE 2020 : IIT-Madras (CE-1)]

Q.13 Select the word that fits the analogy :

Partial : Impartial : : Popular : _____

(A) Unpopular (B) Impopular

(C) Dispopular (D) Mispopular

[GATE 2020 : IIT-Madras (CE-2)]

Q.14 Select the word that fits the analogy:

Cook : Cook : : Fly : _____

(A) Flyer (B) Flying

(C) Flew (D) Flightier

[GATE 2020 : IIT-Madras(CS, IT)]

Q.15 Select the word that fits the analogy:

Cover : Uncover : : Associate : ____

(A) Unassociate (B) Dissociate

(C) Inassociate (D) Misassociate

[GATE 2020 : IIT-Madras (CH, BT)]

Q.16 Nostalgia is to anticipation as _____is to _____.

Which one of the following options maintains a similar logical relation in the above sentence?

(A) Future, Past (B) Future, Present

(C) Past, Future (D) Present, Past

[GATE 2021 : IIT-Bombay (EC)]

Q.17 Oasis is to sand as island is to _____.

Which one of the following options maintains a similar logical relation in the above sentence?

(A) Mountain (B) Stone

(C) Land (D) Water

[GATE 2021 : IIT-Bombay (EE)]

Q.18 **Pen : Write : : Knife : _____**

Which one of the following options maintains a similar logical relation in the above?

(A) Sharp (B) Cut

(C) Blunt (D) Vegetables.

[GATE 2021 : IIT-Bombay (CS-2)]

Self Practice Questions :

Direction

Select the related word/letters/numbers form the given alternatives.

Q.1 Chug is to train as Bang is to _____

(A) House (B) Animal

(C) Door (D) Man

Q.2 Chiku : Fruit : Super market : : Novel : ____: _____

(A) Book : Stationary (B) Book : Bookstore

(C) Water (D) Shop : Market

Q.3 Air : Ubiquitous : : Fire : _____

(A) Explosion (B) Oxygen

(C) Water (D) Luminosity

Q.4 Cook : Cook : : Fly : _____

(A) Flyer (B) Flying

(C) Flew (D) Flighter

Q.5 Jackal : Howl : : Rain : _____

(A) Hustle (B) Thunder

(C) Patter (D) Drops

Q.6 Marathon is to race as hibernation is to ____

(A) Winter (B) Bear

(C) Dream (D) Sleep

Q.7 Yard is to inch as quart is to _____

(A) Gallon (B) Ounce

(C) Milk (D) Liquid

Q.8 Elated : Despondent : : Enlightened : ____

(A) Aware (B) Ignorant

(C) Miserable (D) Tolerant

Q.9 Select the words that sits the analog.

Sponge : Porous : : Rubber : _____

(A) Massive (B) Solid

(C) Elastic (D) Inflexible

Q.10 Oar is to rowboat as foot is to _____

(A) Skateboard (B) Sneaker

(C) Running (D) Jumping

Q.11 Choose the pair that best represents a similar relationship to the one expressed. In the original pair of words.

Monk : Devotion.

(A) Maniac : Pacifism

(B) Rover : Wanderlust

(C) Philistine : Culture

(D) Explorer : Contentment

Q.12 SPY : CLANDESTINE

(A) Accountant : Meticulous

(B) Furrier : Rambunctious

(C) Lawyer : Ironic

(D) Astronaut : Opulent

Q.13 Dependable : Capricious

(A) Fallible : Cantankerous

(B) Erasable : Obtuse

(C) Malleable : Limpid

(D) Capable : Inept

Q.14 Do : Undo : : Trust : _____

(A) Intrust (B) Untrust

(C) Entrust (D) Distrust

Q.15 Finch : Bird

(A) Frog : Toad

(B) Elephant : Reptile

(C) Dalmatian : Dog

(D) Ant : Ladybug

Q.16 Lawyer : Court

(A) Chemist : Laboratory

(B) Businessman : Office

(C) Labour : Factory

(D) Athlete : Olympics

Q.17 Kick : Football

(A) Wash : Dishes

(B) Dust : Rage

(C) Mop : Sweep

(D) Throw : Ring

Q.18 Luckhnow, Patna, Bhopal, Jaipur

(A) Shimla

(B) Mysore

(C) Pune

(D) Indore

Q.19 'Indolence' is related to 'work' in the same way as 'Taciturn' is related

(A) Cheat (B) Act

(C) Speak (D) Observe

Q.20 Nun is related to 'Convent' in the same way as 'Hen' is related to

(A) Nest (B) Shed

(C) Cell (D) Cote

10.9 Seating Arrangement

Class Practice Questions :

Q.1 S, T, U, V, W, X, Y and Z are seated around a circular table. T's neighbors are Y and V. Z is seated third to the left of T and second to the right of S. U's neighbors are S and Y; and T and W are not seated opposite each other. Who is third to the left of V?

(A) X (B) W

(C) U (D) T

[GATE 2017 : IIT-Roorkee (EC-1, PI)]

Q.2 P, Q, R, S, T and U are seated around a circular table. R is seated two places to the right of Q. P is seated three places to the left of R. S is seated opposite U. If P and U now switch seats, which of the following must necessarily be true?

(A) P is immediately to the right of R.

(B) T is immediately to the left of P.

(C) T is immediately to the left of P or P is immediately to the right of Q.

(D) U is immediately to the right of R or P is immediately to the left of T.

[GATE 2017 : IIT-Roorkee(CE-2, IN)]

Q.3 P, Q, R, S, T, U, V, and W are seated around a circular table.

(i) S is seated opposite to W.

(ii) U is seated at the second place to the right of R.

(iii) T is seated at the third place to the left of R.

(iv) V is a neighbor of S.

Which of the following must be true?

(A) P is not seated opposite to Q

(B) R is the left neighbor of S

(C) Q is a neighbor of R

(D) P is a neighbor of R

[GATE 2020 : IIT-Delhi (CH, BT)]

Q.4 Six people are seated around a circular table. There are atleast two men and two women. There are atleast three right-handed persons. Every woman has a left-handed person to her immediate right. None of the women are right-handed. The number of women at the table is

(A) 2

(B) 3

(C) 4

(D) Cannot be determined

[GATE 2017 : IIT-Roorkee (CS-1, EE-1)]

Q.5 Four people are standing in a line facing you. They are Rahul, Mathew, Seema and Lohit. One is engineer, one is a doctor, one a teacher and another a dancer. You are told that :

1. Mathew is not standing next to Seema.
2. There are two people standing between Lohit and the engineer.
3. Rahul is not a doctor.
4. The teacher and the dancer are standing next to each other.
5. Seema is turning to her right to speak to the doctor standing next to her.

Who among them is an Engineer?

(A) Lohit (B) Seema

(C) Rahul (D) Mathew

[GATE 2019 : IIT-Madras (EC)]

Q.6 Five friends P, Q, R, S and T went camping. At night, they had to sleep in a row inside the tent. P, Q, and T refused to sleep next to R since he snored loudly. P and S wanted to avoid Q as he usually hugged people in sleep.

Assuming everyone was satisfied with the sleeping arrangements, what is the order in which they slept?

(A) RSPTQ (B) QRSPT
(C) QTSPR (D) SPRTQ

[GATE 2020 : IIT-Delhi (CE-1)]

Q.7 Five different books (P, Q, R, S, T) are to be arranged on a shelf. The books R and S are to be arranged first and second respectively from right side of the shelf. The number of different orders in which P, Q and T may be arranged is _____.

(A) 6 (B) 2
(C) 12 (D) 120

[GATE 2019 : IIT-Madras (EC)]

Q.8 Four persons P, Q, R and S are to be seated in a row, all facing the same direction, but not necessarily in the same order. P and R cannot sit adjacent to each other. S should be seated to the right of Q. Then number of distinct seating arrangements possible is

(A) 4 (B) 2
(C) 8 (D) 6

[GATE 2021 : IIT-Bombay (IN, CE-1)]

Q.9 Four persons P, Q, R and S are to be seated in row. R should not be seated at the second position from the left end of the row. The number of distinct seating arrangements possible is

(A) 6 (B) 18
(C) 24 (D) 9

[GATE 2021 : IIT-Bombay (CE-2)]

Q.10 Five persons P, Q, R, S and T are sitting in a row not necessarily in the same order. Q and R are separated by one person, and S should not be seated adjacent to Q. The number of distinct seating arrangements possible is

(A) 10 (B) 8
(C) 4 (D) 16

[GATE 2021 : IIT-Bombay (ME-1)]

Q.11 Five person P, Q, R, S and T are to be seated in a row, all facing the same direction, but not necessarily in the same order. P and T cannot be seated at either end of the row. P should not be seated adjacent to S. R is to be seated at the second position from the left end of the row. The number of distinct seating arrangements possible is :

(A) 2 (B) 4
(C) 3 (D) 5

[GATE 2021 : IIT-Bombay (ME-2)]

Q.12 Rahul, Murali, Srinivas and Arul are seated around a square table. Rahul is sitting to the left of Murali, Srinivas is sitting to the right of Arul. Which of the following pairs are seated opposite each other?

(A) Rahul and Murali
(B) Srinivas and Arul
(C) Srinivas and Murali
(D) Srinivas and Rahul

[GATE 2017 IIT-Roorkee (CS-1, EE-1)]

Directions for Questions 13 to 15

P, Q, R, S, T, U, V, and W are seating around a square table facing the center in such a way that four of them sit at four corners of the square while four sit in the middle of each of the four sides. P sits second to right of U. U sits in the middle of one of the sides of the table. V who does not sit at any of the corners of the table sits second to the right of S. Only two people sit between S and Q (taken from one side).R is not an immediate neighbor of V. W is sits second to the left of Q.T is not an immediate neighbor of V or U.

Q.13 Who sits exactly between U and P?

(A) Q (B) R.
(B) T (D) W

Q.14 How many persons sit between P and W when counted in anti-clockwise direction from P?

(A) One (B) Two.
(C) Three (D) four

Q.15 What is the position of U with respected to R?

(A) Immediate to the right
(B) Second to the left
(C) Immediate to the left.
(D) Third to the right

Directions for Questions 16 to 18

A, B, C, D, E, F, G and H are sitting around a square table in such a way that four of them sit at four corners of the square while four sit in the middle of each of the four sides. Those who sit at the four corners faces outside while those who sit in the middle of the sides face the center of the table. D sits third to the left of G. E sits third to the left of C. C does not sits any of the corners. Only one person sits between E and F. F is not an immediate neighbour of C. H is facing outside. A is not an immediate neighbour of F and H. The number of person sitting between B and D is same as between D and C.

Q.16 Who sits exactly between E and F?

(A) A (B) B

(C) C (D) H

Q.17 Which of the following pairs represents the persons who sit in the middle of the sides and face to each other?

(A) AC (B) BD

(C) BC. (D) EH

Q.18 If A is made to face outside direction, who would sit to the immediate right of A?

(A) G (B) D

(C) B (D) E

Self Practice Questions :

Direction for Questions 1 to 4

Study the following information carefully to answer these questions. P, Q, R, S, T, U, V and W are sitting around a circular table, facing the centre. P sits third to the right of W and third to the left of Q. S sits second to the right of T. V sits second to the left of R. T is not the neighbour of Q while U is neither a neighbour of T nor of W.

Q.1 Starting from P's position, if all the eight are arranged in alphabetical order in clockwise direction, the seating position of how many members (excluding P) would not change?

(A) None (B) One

(C) Two (D) Three

Q.2 Who sits second to the left of V?

(A) R (B) P

(C) U (D) T

Q.3 Who sits between U and P?

(A) S (B) R

(C) V (D) Q

Direction

Eight friends A, B, C, D, E, F, G and H are Seating in a circle facing the centre. B is Seating between G and D. H is third to the left of B and second, to the right of A. C is Seating between A and G and B and E are not Seating opposite to each other.

Q.4 Which of the following statements is not correct?

(A) C is third to the right of D.

(B) E is Seating between F and D.

(C) A is Seating between C and F.

(D) E and C are Seating opposite of each other.

Direction

Study the following information carefully and answer the questions given below :

Eight people X, W, Z, F, T, L, P and S are sitting in a straight line facing north and south directions. X is sitting second to the right of T and W. T is sitting third to the right of F. S is sitting fourth to the left of X. Second and fourth persons are facing south from the left end. F is sitting fourth to the left of L who is second from the left. Z is not facing towards south but sitting fourth to the left of P who is third to the right of S who is facing north. W is not a neighbour of L.

Q.5 In which direction is W facing?

(A) North (B) East

(C) West (D) South

Q.6 If T changes his or her position with F, who would be sitting fourth to right of F?

(A) L (B) W

(C) Z (D) P

Q.7 6 people are sitting in a row. A is sitting towards immediate left of B and immediate right of C. C is sitting to immediate right of F. D is immediate

right of E who is to the left of F, then which two people are sitting in the center?

(A) D and B (B) A and B
(C) F and C (D) E and D

Q.8 Five students P, Q, R, S and T are sitting on a bench. Q is to the left of P and right of T. S is at the extreme right end and R is to the left of S. Who is sitting third from the left?

(A) P (B) Q
(C) R (D) T

Q.9 Vishu, Pooja, Vishakha, Rani and Ram are sitting in a line. Pooja is third to the extreme right end. Vishu is second to the left of Pooja. Vishakha is to the right of Pooja. Rani is third to the right of Ram, who is the immediate neighbour of Vishu. Who is sitting in the middle?

(A) Pooja (B) Ram
(C) Visakha (D) Rani

Direction

Eight girl's are seating around a square table, they are facing center.

A sits 6th to the left of B, who is sits third to the right of F. E sits 2nd to the left of F. G sits in between A and B. C sits immediate left of F, who is immediate left of D

Q.10 Who sits second to the left of D?

(A) E (B) A
(C) C (D) F

Q.11 What is the position of E with the respect to H?

(A) 2nd to the left.
(B) 2nd to the right.
(C) Fourth to the right.
(D) Third to the left.

Q.12 What is G position with respect to C ?

(A) Third to the right.
(B) Third to the left.
(C) Fourth to the left.
(D) 2nd to the right.

Q.13 Who sits in between E and D ?

(A) AH (B) GB
(C) CF (D) AB
(E) AG

Q.14 Who sits fourth to the left of B?

(A) G (B) F
(C) D (D) C

Direction

Eight persons A, B, C, D, E, F, G and H have different height. G is not 3rd shortest. D is not 5th tallest. Only two persons are taller than C. E is taller than F but shorter than D. H is the shortest. D is taller than G but shorter than A and C. A is not the 2nd tallest. E is not 3rd shortest.

Q.15 Who among the following is 2nd tallest?

(A) E (B) F
(C) C (D) B

Q.16 How many persons are shorter than F?

(A) Two (B) One
(C) Three (D) Four

Q.17 Who among the following is just taller to E?

(A) D (B) F
(C) C (D) B

Q.18 Who among the following is 5th shortest?

(A) E (B) F
(C) C (D) None of these

Q.19 Who among the following is third shortest?

(A) E (B) F
(C) C (D) B

10.10 Logical Puzzle

Q.1 There are eight bags of rice looking alike, seven of which have equal weight and one is slightly heavier. The weighing balance is of unlimited capacity. Using this balance, the minimum number of weighings required to identify the heavier bag is

(A) 2 (B) 3
(C) 4 (D) 8

[GATE 2012 : IIT-Delhi (EC, EE, IN, MT)]

Q.2 Two design consultants, P and Q, started working from 8 AM for a client. The client budgeted a total of USD 3000 for the consultants. P stopped working when hour hand moved by 210 degrees on the clock. Q

stopped working when the hour hand moved by 240 degrees. P took two tea breaks of 15 minutes each during her shift, but took no lunch break. Q took only one lunch break for 20 minutes, but no tea breaks. The market rate for consultants is USD 200 per hour and breaks are not paid. After paying the consultants, the client shall have USD _____ remaining in the budget.

(A) 000.00 (B) 300.00
(C) 166.67 (D) 433.33

[GATE 2019 : IIT-Madras (EC)]

Q.3 There are three boxes. One contains apples, another contains oranges and the last one contains both apples and oranges. All three are known to be incorrectly labelled. If you are permitted to open just one box and then pull out and inspect only one fruit, which box would you open to determine the contents of all three boxes?

(A) The box labelled 'Apples'
(B) The box labelled 'Apples and Oranges'
(C) The box labelled 'Oranges'
(D) Cannot be determined

[GATE 2017 : IIT-Roorkee(CS-2, EE-2)]

Q.4 In the following question, the first and the last sentence of the passage are in order and numbered 1 and 6. The rest of the passage is split into 4 parts and numbered as 2, 3, 4 and 5. These 4 parts are not arranged in proper order. Read the sentences and arrange them in a logical sequence to make a passage and choose the correct sequence from the given options.

1. On Diwali, the family rises early in the morning.
2. The whole family, including the young and the old enjoy doing this.
3. Children let off fireworks later in the night with their friends.
4. At sunset, the lamps are lit and the family performs various rituals.
5. Father, mother and children visit relatives and exchange gifts and sweets.
6. Houses looks so pretty with lighted lamps all around.

(A) 2, 5, 3, 4 (B) 5, 2, 4, 3
(C) 3, 5, 4, 2 (D) 4, 5, 2, 3

[GATE 2015 : IIT-Kanpur (EC-3, CH)]

Q.5 If two floors in a certain building are 9 feet apart, how many steps are there in a set of stairs that extends from the first floor to the second floor of the building?

Statements :

I. Each step is 3/4 foot high.
II. Each step is 1 foot wide.

(A) Statement I alone is sufficient, but statement II alone is not sufficient.
(B) Statement II alone is sufficient, but statement I alone is not sufficient.
(C) Both statements together are sufficient, but neither statement alone is sufficient.
(D) Statement I and II together are not sufficient.

[GATE 2015 : IIT-Kanpur (CS-1, EE-1)]

Q.6 Based on the given statements, select the most appropriate option to solve the given question.

What will be the total weight of 10 poles each of same weight?

Statements:

I. One fourth of the weight of a pole is 5 kg.
II. The total weight of these poles is 160 kg more than the total weight of two poles.

(A) Statement I alone is not sufficient.
(B) Statement II alone is not sufficient.
(C) Either I or II alone is sufficient.
(D) Both statement I and II together are not sufficient.

[GATE 2015 : IIT-Kanpur (CS-2, EE-2)]

Q.7 The head of a newly formed government desires to appoint five of the six selected members P, Q, R, S, T and U to portfolios of Home, Power, Defense, telecom and Finance. U does not want any portfolio if S gets one of the five. R wants either Home or Finance or no portfolio. Q says that if S gets either Power or Telecom, then she must get the other one. T insists on a portfolio if P gets one.

Which is the valid distribution of portfolio?

(A) P-Home, Q-Power, R-Defense, S-Telecom, T-Finance

(B) R-Home, S-Power, P-Defense, Q-Telecom, T-Finance

(C) P-Home, Q-Power, T-Defense, S-Telecom, U-Finance

(D) Q-Home, U-Power, T-Defense, R-Telecom, P-Finance

[GATE 2015 : IIT-Kanpur (CE-1, CS-3)]

Q.8 P, Q, R and S crossed a lake in a boat that can hold a maximum of two persons, with only one set of oars. The following additional facts are available.

(i) The boat held two persons on each of the three forward trips across the lake and one person on each of the two return trips.

(ii) P is unable to row when someone else is in the boat.

(iii) Q is unable to row with anyone else except R.

(iv) Each person rowed for at least one trip

(v) Only one person can row during a trip

Who rowed twice?

(A) P (B) Q

(C) R (D) S

[GATE 2018 : IIT- Guwahati (EE)]

Q.9 Each of the letters arranged as below represents a unique integer from 1 to 9. The letters are positioned in the figure such that (A×B×C), (B×G×E) and (D×E×F) are equal. Which integer among the following choices cannot be represented by the letters A, B, C, D, E, F and G?

A		D
B	G	E
C		F

(A) 4 (B) 5

(C) 6 (D) 9

[GATE 2018 : IIT-Guwahati(CE-1)]

Q.10 Each of the letters in the figure below represents a unique integer from 1 to 9. The letters are positioned in the figure such that each of (A + B + C), (C + D + E), (E + F + G) and (G + H + K) is equal to 13. Which integers does E represent?

A	B	C			
		D			
		E	F	G	
				H	
				K	

(A) 1 (B) 4

(C) 6 (D) 7

Q.11 P, Q, and R talk about S's car collection. P states that S has at least 3 cars. Q believes that S has less than 3 cars. R indicates that to his knowledge, S has at least one car. Only one of P, Q and R is right. The number of cars owned by S is

(A) 0

(B) 1

(C) 3

(D) Cannot be determined

[GATE 2017 : IIT-Roorkee (ME – 1)]

Q.12 The police arrested four criminals – P, Q, R and S. The criminals knew each other. They made the following statements :

P says "Q committed the crime"

Q says "S committed the crime"

R says "I did not do it"

S says "What Q said about me is false"

Assume only one of the arrested four committed the crime and only one of the statements made above is true. Who committed the crime?

(A) P (B) R

(C) S (D) Q

[GATE 2019 : IIT-Madras (CH, CS)]

Q.13 Hari (H), Gita (G), Irfan (I) and Saira (S) are siblings (i.e. brothers and sisters). All were born on 1st January. The age difference between any two successive siblings (that is born one after another) is less than 3 years. Given the following facts :

(i) Hari's age + Gita's age > Irfan's age + Saira's age.

(ii) The age difference between Gita and Saira is 1 year. However, Gita is not the oldest and Saira is not the youngest.

(iii) There are no twins.

In what order were they born (oldest first)?

(A) HSIG (B) SGHI

(C) IGSH (D) IHSG

[GATE 2010 IIT-Guwahati (All Branches)]

Q.14 For submitting tax returns, all resident males with annual income below Rs. 10 lakh should fill up form P and all resident females with income below Rs. 8 lakh should fill up form Q. All people with incomes above Rs. 10 lakh should fill up form R, except non-residents with income above Rs. 15 lakhs, who should fill up form S. All others should fill form T. An example of a person who should fill form T is,

(A) A resident male with annual income Rs. 9 lakh.

(B) A resident female with annual income Rs. 9 lakh.

(C) A non-resident male with annual income Rs. 16 lakh.

(D) A non-resident female with annual income Rs. 16 lakh

[GATE 2014 : IIT-Kharagpur (EC-1, ME-1)]

Q.15 Lights of four colors (red, blue, green, yellow) are hung on a ladder. On every step of the ladder there are two lights. If one of the lights is red, the other light on that step will always be blue. If one of the lights on a step is green, the other light on that step will always be yellow. Which of the following statements is not necessarily correct?

(A) The number of red lights is equal to the number of blue lights.

(B) The number of green lights is equal to the number of yellow lights.

(C) The sum of the red and green lights is equal to the sum of the yellow and blue lights.

(D) The sum of the red and blue lights is equal to the sum of the green and yellow lights.

[GATE 2014 : IIT-Kharagpur (EC-2, ME-2)]

Q.16 Mohan, the manager, wants his four workers to work in pairs. No pairs should work for more than 5 hours. Ram and John have worked together for 5 hours. Krishna and Amir have worked as a team for 2 hours. Krishna does not want to work with Ram. Whom should Mohan allot to work with John, if he wants all the workers to continue working?

(A) Amir (B) Krishna

(C) Ram (D) None of the three

[GATE 2019 : IIT-Madras (CE-2)]

10.11 Logical Reasoning

Class Practice Questions :

Q.1 The given statement is followed by some courses of action. Assuming the statement to be true decide the correct option.

Statement: There has been a significant drop in the water level in the lakes supplying water to the city.

I. The water supply authority should impose a partial cut in supply to tackle the situation.

II. The government should appeal to all the residents through mass media for minimal use of water.

III. The government should ban the water supply in lower areas.

(A) Statements I and II follow.

(B) Statements I and III follow.

(C) Statements II and III follow.

(D) All statements follow.

[GATE 2015 : IIT-Kanpur (CS-1, EE-1)]

Q.2 Climate change and resilience deal with two aspects - reduction of sources of nonrenewable energy resources and reducing vulnerability of climate change aspects. The terms 'mitigation' and 'adaptation' are used to refer to these aspects, respectively.

Which of the following assertions is best supported by the above information?

(A) Mitigation deals with consequences of climate change.

(B) Adaptation deals with causes of climate change.

(C) Mitigation deals with actions taken to reduce the use of fossil fuels.

(D) Adaptation deals with actions taken to combat green-house gas emissions.

[GATE 2020 : IIT-Delhi (ME-2, PI)]

Q.3 After several defeats in wars, Robert Bruce went in exile and wanted to commit suicide. Just before committing suicide, he came across a spider attempting tirelessly to have its net. Time and again, the spider failed but that did not deter it to refrain from making attempts. Such attempts by the spider made Bruce curious. Thus, Bruce started observing the near impossible goal of the spider to have the net. Ultimately, the spider succeeded in having its net despite several failures. Such act of the spider encouraged Bruce not to commit suicide. And then, Bruce went back again and won many a battle, and the rest is history.

Which of the following assertions is best supported by the above information?

(A) Failure is the pillar of success.

(B) Honesty is the best policy.

(C) Life begins and ends with adventures.

(D) No adversity justifies giving up hope.

[GATE 2013 : IIT-Bombay (CS, ME, PI)]

Q.4 The American psychologist Howard Gardner expounds that human intelligence can be sub-categorised into multiple kinds, in such a way that individuals differ with respect to their relative competence in each kind. Based on this theory, modern educationists insist on prescribing multi-dimensional curriculum and evaluation parameters that enable development and assessment of multiple intelligences.

Which of the following statements can be inferred from the given text?

(A) Howard Gardner insists that the teaching curriculum and evaluation needs to be multi-dimensional.

(B) Modern educationists insist that the teaching curriculum and evaluation needs to be multi-dimensional.

(C) Modern educationists want to develop and assess the theory of multiple intelligences.

(D) Howard Gardner wants to develop and assess the theory of multiple intelligences.

[GATE 2020 : IIT-Delhi (CE-1)]

Q.5 The dawn of the 21st century witnessed the melting glaciers oscillating between giving too much and too little to billions of people who depend on them for fresh water. The UN climate report estimates that without deep cuts to ma-made emissions, at least 30% of the northern hemisphere's surface permafrost could melt by the end of the century. Given this situation of imminent global exodus of billions of people displaced by rising seas, nation-states need to rethink their carbon footprint for political concerns, if not for environmental ones.

Which one of the following statements can be inferred from the given passage?

(A) Nation-states do not have environmental concerns.

(B) Billions of people are responsible for man-made emissions.

(C) Billions of people are affected by melting glaciers.

(D) Nation-states are responsible for providing fresh water to billions of people.

[GATE 2020 : IIT-Delhi (CS, IT)]

Q.6 Goods and Services Tax (GST) is an indirect tax introduced in India in 2017 that is imposed on the supply of goods and services, and it subsumes all indirect taxes except few. It is a destination-based tax imposed on goods and services used, and it is not imposed at the point of origin from where goods come. GST also has a few components specific to state governments, central government and Union Territories (UTs).

Which one of the following statements can be inferred from the given passage?

(A) GST is imposed at the point of usage of goods and services.

(B) GST does not have a component specific to UT.

(C) GST includes all indirect taxes.

(D) GST in imposed on the production of goods and services.

[GATE 2020 : IIT-Delhi (CS, IT)]

Q.7 Repo rate is the rate at which Reserve Bank of India (RBI) lends commercial banks, and reverse repo rate is the rate at which RBI borrows money from commercial banks.

Which of the following statements can be inferred from the above passage?

(A) Decrease in repo rate will decrease cost of borrowing and increase lending by commercial banks.

(B) Decrease in repo rate will increase cost of borrowing and decrease lending by commercial banks.

(C) Increase in repo rate will decrease cost of borrowing and decrease lending by commercial banks.

(D) Increase in repo rate will increase cost of borrowing and Increase lending by commercial banks.

[GATE 2020 : IIT-Delhi (CH, BT)]

Q.8 Geneticists say that they are very close to confirming the generating roots of psychiatric illnesses such as depression and schizophrenia, and consequently, that doctors will be able to eradicate these diseases through early identification and gene therapy.

On which of the following assumptions does the statement above rely?

(A) Strategies are now available for eliminating psychiatric illnesses.

(B) Certain psychiatric illnesses have a genetic basis.

(C) All human diseases can be traced back to genes and how they are expressed.

(D) In the future, genetics will become the only relevant field for identifying psychiatric illnesses.

[GATE 2014 : IIT-Kharagpur (CS-1, EE-1)]

Q.9 **Statement :** Either P marries Q or X marries Y.
Among the given options below, the logical negation of the above statement is

(A) Neither P marries Q nor X marries Y.

(B) P does not marry Q and X marries Y.

(C) P marries Q and X marries Y.

(D) X does not marries Y and P marries Q.

[GATE 2021 : IIT-Bombay (IN, CE-1)]

Q.10 Some people suggest Anti-Obesity Measures (AOM) such as displaying calorie information in restaurant menus. Such measures sidestep addressing the core problems that cause obesity, poverty and income inequality.

Which one of the following statements summarizes the passage?

(A) AOM are addressing the core problems and are likely to succeed.

(B) The proposed AOM addresses the core problems that cause obesity.

(C) AOM are addressing the problem superficially.

(D) If obesity reduces, poverty will naturally reduce, since obesity causes poverty.

[GATE 2021 : IIT-BOM (CS-1)]

Self Practice Questions :

Directions for Questions 1 to 4

Given statement is followed by four assumptions numbered I, II, III and IV. An assumption is something supposed or taken for granted. You have to consider the statements and the following assumptions and decide which of the assumptions is implicit in the statement.

Q.1 Statement: An advertisement: Now you can own a new car in just Rs 1,999 per month.

Assumptions:

(A) People do not want to buy used cars.

(B) Most people can afford to pay Rs 1,999 per month for a new car

(C) People did not want to buy new cars.

(D) People wants to buy expensive cars

Q.2 Statement: Beware of dogs. Our dogs do not bark but they are trained to distinguish between genuine guests and intruders.

Assumptions:

(A) Barking dogs rarely bite.

(B) Our dogs could be dangerous for intruders.

(C) Biting dogs rarely barks.

(D) Dogs are pet animals

Q.3 Statement: His recent investment in the shares of company 'A' is only a gamble.

Assumptions:

(A) Gambling is a crime in the country.

(B) Share market is full of risks & enjoyment.

(C) He may incur loss or may gain from his investment.

(D) Every one should plan investment is share market.

Q.4 Statement : If you could not collect the required amount by oral call you must publish an advertisement in a widely read newspaper.

Assumptions:

(A) People rarely respond to oral call

(B) Generally, people are reluctant to read an advertisement in a newspaper.

(C) advertisement in a read newspaper is better then oral call.

(D) None follows

Directions for Questions 5 to 6

Each question below is followed by two arguments numbered I and II. You have to decide which of the argument is a 'strong' argument and which is a 'weak' argument.

Q.5 Statement : Should sex determination test during pregnancy be completely banned?

Arguments :

I. Yes, this leads to indiscriminate female foeticide and eventually will lead to social imbalance.

II. No, people have a right to know about their unborn child.

(A) If only argument I is strong.

(B) If only argument II is strong.

(C) If neither 1 nor II is strong.

(D) If both I and II are strong.

Q.6 Statement : Should the examination bodies for all university examinations permit the use of calculators?

Arguments:

I. No, it is necessary for the students to know the methods of manual calculation to make their concepts clear.

II. Yes, manual calculations are no more required with extensive use of computers in all fields.

(A) If only argument I is strong.

(B) If only argument II is strong.

(C) If either I or II is strong.

(D) If both I and II are strong.

Directions for Questions 7 to 8

Based on the statement given below, choose the best possible conclusion(s) that follows.

Q.7 Statement : "Triple your money in 6 months" reads an advertisement.

Conclusions:

I. The assurance is not genuine.

II. People want their money to grow.

(A) Only Conclusion I follow

(B) Only Conclusion II follows

(C) Both Conclusions I and II follow

(D) Neither Conclusion I nor II follows

Q.8 Statement : Smoking is one of the human weaknesses, which tends to test the willpower of the smoker to the edge.

Conclusions :

I. It is very difficult for the smokers to give up smoking even if they want to.

II. Human beings have other weaknesses as well.

(A) If only Conclusion I follow

(B) Only Conclusion II follows

(C) If either Conclusion I or II follows

(D) If both Conclusions I and II follows

Directions for Questions 9 to 10

Q.9 Assertion : (A) Earthworms are not good for agriculture.

Reason: (R) Earthworms break down the soil into fine particles and make it soft.

Choose the correct option

(A) A is true but R is false

(B) A is false but R is true

(C) Both A and R are true and R is the correct explanation of (A)

(D) Both A and R are false

Q.10 Assertion : (A) Water is essential for life.

Reason : (R) It is formed using three parts of hydrogen and one part of oxygen.

(A) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(B) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(C) Both Assertion and Reason are false.

(D) Assertion is true but Reason is false.

Directions for Questions 11 to 12

In each question below is given a statement followed by two courses of action numbered I and II. On the basis of the information given in the statement, you have to assume everything in the statement to be true, then decide which of the suggested courses of action logically follow(s) for pursuing.

Q.11 Statement : A speeding truck has seriously injured many persons sleeping on the roadside early in the morning.

Courses of action:

I. The local administration should immediately put a complete ban on people sleeping on the roadsides

II. The driver of the speeding truck should be nabbed and tried for the crime he committed.

(A) If only I follow

(B) If only II follows

(C) If neither I nor II follows

(D) If both I and II follow

Q.12 Statement : Many students were caught redhanded while using unfair means during the recent university examinations.

Courses of action

I. All these students should be debarred from taking university examination in future.

II. The students apprehended while using unfair means should be handed over to the police.

(A) If only I follow

(B) If only II follows

(C) If neither I nor II follows

(D) If both I and II follow

❖❖❖❖

A Answer Keys

10.1 Direction & Distance [CPQ's]									
1.	East	2.	West	3.	30 m	4.	50 m	5.	South
6.	Northwest	7.	Southeast	8.	10 m	9.	24 m	10.	West
11.	A	12.	B	13.	B	14.	B	15.	C
16.	D	17.	D	18.	C	19.	A	20.	D
21.	D	22.	D	23.	D	24.	A		
10.1 Direction & Distance [SPQ's]									
1.	C	2.	A	3.	C	4.	B	5.	C
6.	D	7.	C	8.	D	9.	C	10.	D
11.	B	12.	B	13.	A	14.	B	15.	C

10.2 Clock [CPQ's]									
1.	996°	2.	106.5°	3.	3h 13m	4.	4°	5.	7.5°
6.	11:52.5	7.	06:50 am	8.	54°	9.	A	10.	C
11.	04:21*9/11	12.	04:54*6/11	13.	08:43*7/11 8:10*10/11	14.	04:5*5/11 04:38*2/11	15.	08:05 pm
16.	6 am Sunday	17.	9am Tuesday	18.	08:08 pm Tuesday	19.	10 pm Monday	20.	10 am Tuesday
21.	After 135 Days	22.	B	23.	D				
10.2 Clock [SPQ's]									
1.	C	2.	C	3.	C	4.	B	5.	D
6.	B	7.	A	8.	B	9.	A	10.	A
Counting of Figure									
1.	D	2.	B	3.	B	4.	C	5.	D

10.3 Blood Relation [CPQ's]									
1.	B	2.	B	3.	D	4.	A	5.	D
6.	B	7.	A	8.	B	9.	B	10.	B
10.3 Blood Relation [SPQ's]									
1.	B	2.	B	3.	A	4.	C	5.	A
6.	C	7.	B	8.	A	9.	D	10.	C

10.4 Coding-Decoding [CPQ's]									
1.	B	2.	B	3.	C	4.	C	5.	B
6.	B	7.	A	8.	C	9.	B		
Letters Series [CPQ's]									
10.	A	11.	B	12.	C	13.	C	14.	C
15.	B								
Letters Series [SPQ's]									
1.	D	2.	C	3.	D	4.	D	5.	D
Odd One Out [CPQ's]									
16.	D	17.	B	18.	C	19.	D	20.	B
Odd One Out [SPQ's]									
1.	A	2.	B	3.	D	4.	D	5.	C
6.	D	7.	B	8.	B	9.	D	10.	D
Number Series [CPQ's]									
21.	45	22.	725	23.	16	24.	B	25.	C
26.	3	27.	C						
Number Series [SPQ's]									
1.	C	2.	A	3.	B	4.	B	5.	C

Coding Decoding [CPQ's]								
28.	A	29.	A	30.	B	31.	D	32.	A
33.	A	34.	A	35.	D	36.	A	37.	A
38.	D	39.	D	40.	B				
Coding Decoding [SPQ']								
1.	C	2.	A	3.	A	4.	A	5.	C
6.	B	7.	C	8.	C	9.	C	10.	D
11.	A								

10.5 Order & Ranking								
1.	20	2.	18	3.	8	4.	6	5.	40 or 18
6.	36	7.	A	8.	C	9.	D	10.	B
11.	A	12.	C	13.	C	14.	C	15.	A

10.6 Venn Diagram [CPQ's]								
1.	D	2.	C	3.	D	4.	D	5.	A
6.	A	7.	C	8.	C	9.	C	10.	C
11.	B	12.	C	13.	D				
Contour Line								
14.	C	15.	C	16.	B				

10.6 Venn Diagram [SPQ's]								
1.	A	2.	B	3.	C	4.	C	5.	A
6.	C	7.	B	8.	C	9.	A	10.	C

10.7 Syllogism [CPQ's]								
1.	C	2.	D	3.	C	4.	D	5.	B
6.	B	7.	D	8.	C	9.	D	10.	B
11.	D	12.	D.						
10.7 Syllogism [SPQ's]								
1.	D	2.	D	3.	A	4.	C	5.	B
6.	C	7.	C	8.	B	9.	C	10.	A
11.	C	12.	D	13.	D	14.	A	15.	D
16.	C	17.	C	18.	D	19.	D		

10.8 Analogies [CPQ's]								
1.	A	2.	B	3.	A	4.	B	5.	C
6.	B	7.	D	8.	A	9.	D	10.	A
11.	D	12.	A	13.	A	14.	A	15.	B
16.	C	17.	D	18.	B				

10.8 Analogies [SPQ's]								
1.	C	2.	B	3.	D	4.	A	5.	C
6.	D	7.	B	8.	B	9.	C	10.	A
11.	B	12.	A	13.	D	14.	D	15.	C
16.	A	17.	D	18.	A	19.	C	20.	D

10.9 Seating Arrangement [CPQ's]								
1.	A	2.	C	3.	A	4.	A	5.	D
6.	A	7.	A	8.	D	9.	B	10.	D
11.	C	12.	C	13.	B	14.	B	15.	C
16.	B	17.	C	18.	D				
10.9 Seating Arrangement [SPQ's]								
1.	B	2.	C	3.	A	4.	B	5.	D
6.	B	7.	C	8.	A	9.	A	10.	C
11.	C	12.	B	13.	C	14.	D	15.	D
16.	B	17.	A	18.	D	19.	B		

10.10 Logical Puzzle								
1.	A	2.	C	3.	B	4.	B	5.	A
6.	C	7.	B	8.	C	9.	B	10.	B
11.	A	12.	B	13.	B	14.	B	15.	D
16.	B								

10.11 Logical Reasoning (CPQ's)								
1.	A	2.	C	3.	D	4.	B	5.	C
6.	A	7.	A	8.	B	9.	A	10.	C
10.11 Logical Reasoning (SPQ's)								
1.	B	2.	B	3.	C	4.	D	5.	A
6.	C	7.	B	8.	D	9.	B	10.	B
11.	B	12.	C						

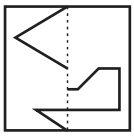
❖❖❖❖

11 SPATIAL APTITUDE

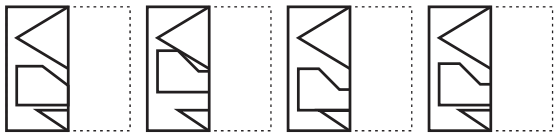
11.1 Paper Folding & Cutting

Class Practice Questions :

Q.1 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.



(X)

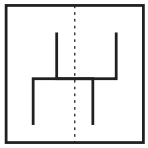


(1) (2) (3) (4)

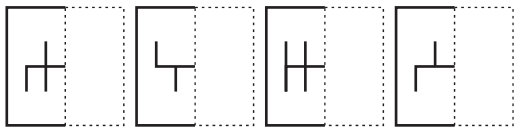
(A) 1 (B) 2

(C) 3 (D) 4

Q.2 A figure of transparent sheet with a pattern is given below. Select the option that shows how the paper would appear when the transparent sheet is folded at the dotted line.

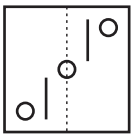


Questions figure

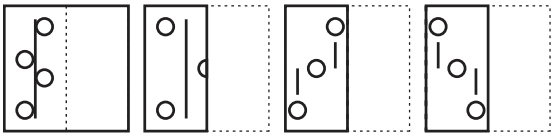


(A) (B) (C) (D)

Q.3 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.



(X)

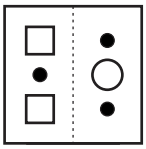


(1) (2) (3) (4)

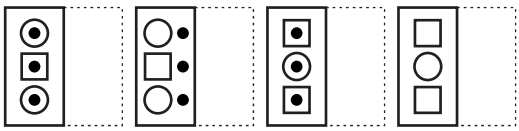
(A) 1 (B) 2

(C) 3 (D) 4

Q.4 A square transparent sheet with a pattern is given in Figure. Find out from amongst the alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

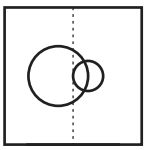


Questions figure

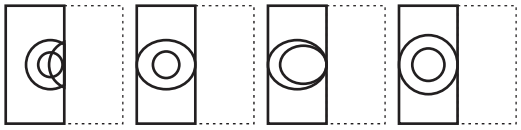


(A) (B) (C) (D)

Q.5 A square transparent sheet with a pattern is given in Figure. Find out from amongst the alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

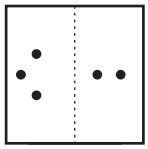


Questions figure

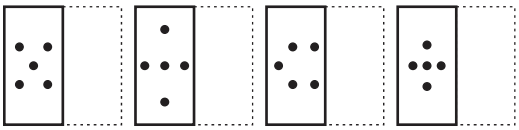


(A) (B) (C) (D)

Q.6 A square transparent sheet with a pattern is given in Figure. Find out from amongst the alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

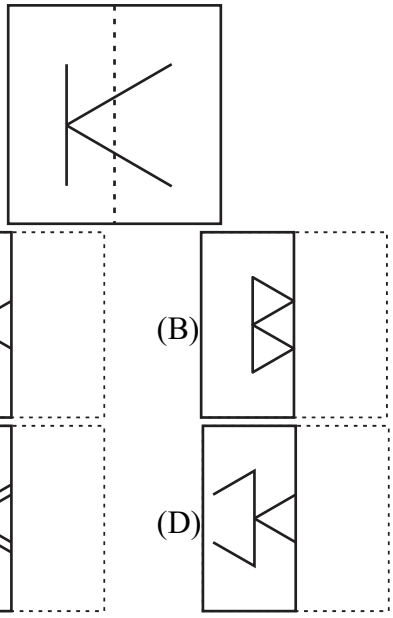


Questions figure



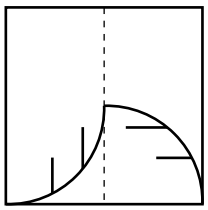
(A) (B) (C) (D)

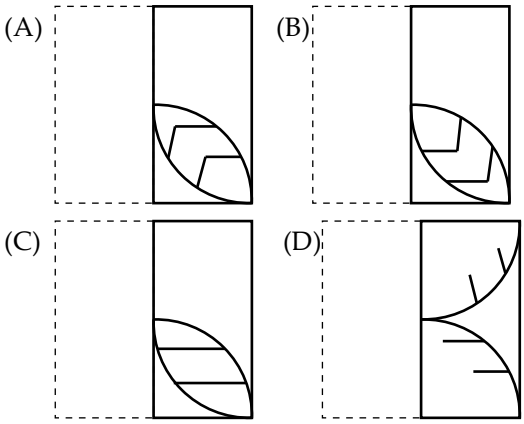
Q.7 A transparent square sheet shown below is folded along the dotted line. The folded sheet will look like _____.



[GATE 2021 : IIT-Bombay(EE)]

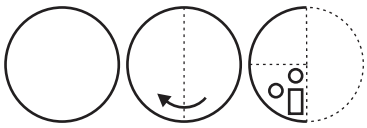
Q.8 A transparent square sheet shown below is folded along the dotted line. The folded sheet will look like_____



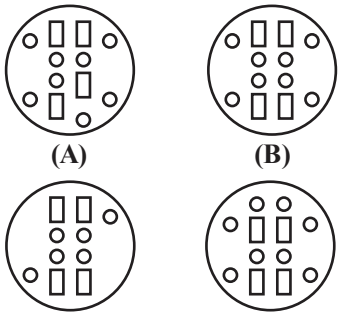


[GATE 2021 : IIT-Bombay(CS-2)]

Q.9 A piece of paper is folded and cut as shown below in the questions figures. Select from the given answer figure, how it will appear when unfolded.

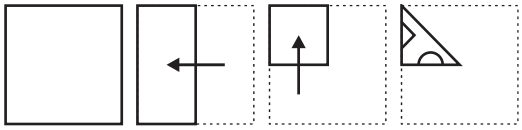


Questions figure

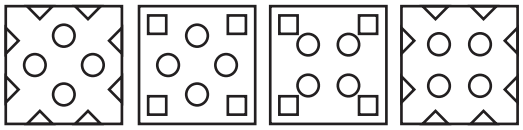


(A) (B) (C) (D)

Q.10 A piece of paper is folded and punched as shown below in the question figure. From the given answer figure, indicate how it will appear when opened.

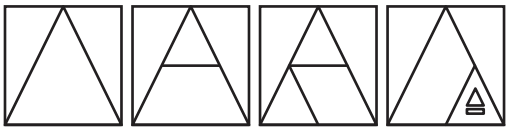


Questions figure

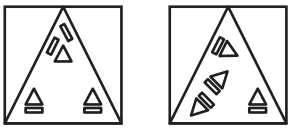


(A) (B) (C) (D)

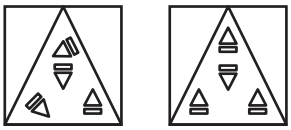
Q.11 A piece of paper is folded and cut as shown below in the question figures. From the given answer figure, indicate how it will appear when opened.



Questions figure

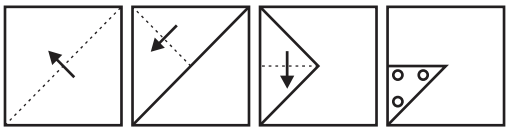


(A) (B)

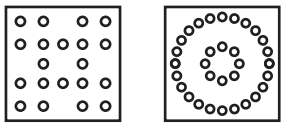


(C) (D)

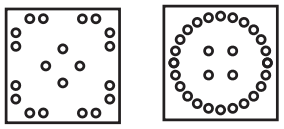
Q.12 A piece of paper is folded and punched as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?



Questions figure

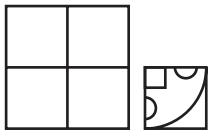


(A) (B)

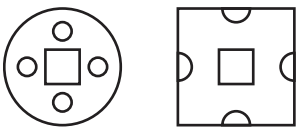


(C) (D)

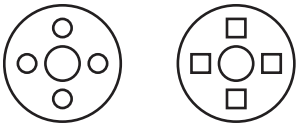
Q.13 A piece of paper is folded and cut as shown below in the question figures. From the given answer figure, indicate how it will appear when opened.



Questions figure

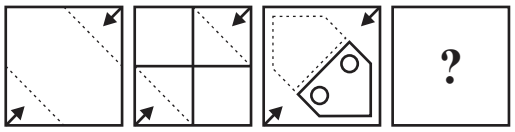


(A) (B)

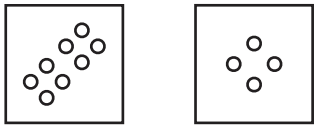


(C) (D)

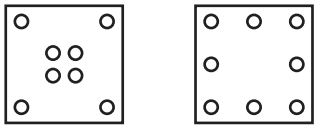
Q.14 A piece of paper is folded and punched as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?



Questions figure

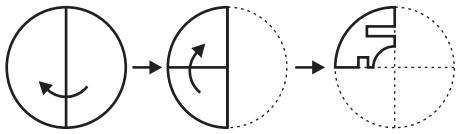


(A) (B)

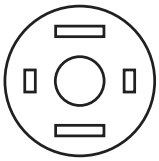
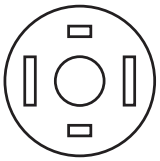


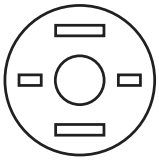
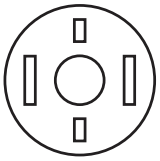
(C) (D)

Q.15 A circular sheet of paper is folded along the lines in the directions shown. The paper, after being punched in the final folded state as shown and unfolded in the reverse order of folding, will look like_____.



Questions figure

(A)  (B) 

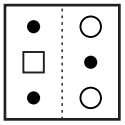
(C)  (D) 

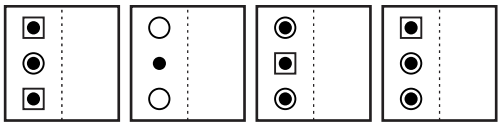
[GATE 2021 : IIT-Bombay (CS-1)]

Self Practice Questions :

Q.1 A figure of transparent sheet with a pattern is given below. Select the option that shows how the paper would appear when the transparent sheet is folded at the dotted line.

Problem Figure





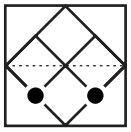
(A) (B) (C) (D)

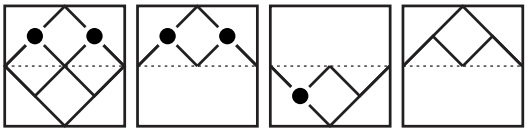
(A) B (B) C

(C) D (D) A

Q.2 A figure of transparent sheet with a pattern is given below. Select the option that shows how the paper would appear when the transparent sheet is folded at the dotted line.

Problem figure



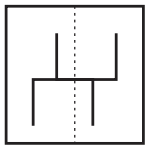


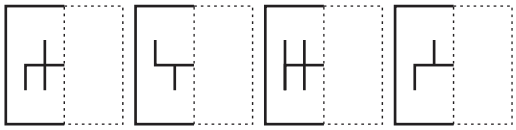
(A) (B) (C) (D)

(A) B (B) C

(C) D (D) A

Q.3 A figure of transparent sheet with a pattern is given below. Select the option that shows how the paper would appear when the transparent sheet is folded at the dotted line.



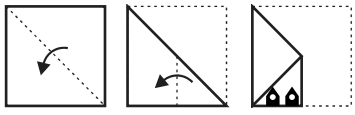


(A) (B) (C) (D)

(A) B (B) C

(C) D (D) A

Q.4 Question figure :



(A)

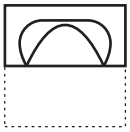
(B)

(C)

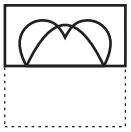
(D)

Q.5 A figure of transparent sheet with a pattern is given below. Select the option that shows how the paper would appear when the transparent sheet is folded at the dotted line.

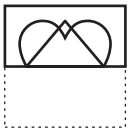
(A)



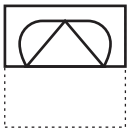
(B)



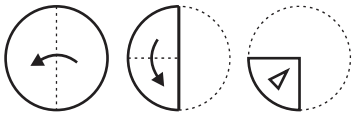
(C)



(D)



Q.6 A paper is folded and cut as shown below. How will it appear when unfolded?



(A)

(B)

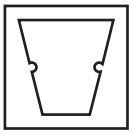
(C)

(D)

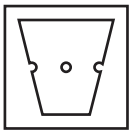
Q.7 A paper is folded and cut as shown below. How will it appear when unfolded?

(A)

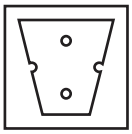
(B)



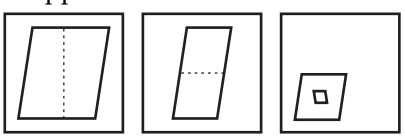
(C)



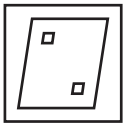
(D)



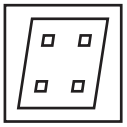
Q.8 A paper is folded and cut as shown below. How will it appear when unfolded?

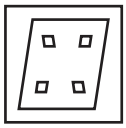
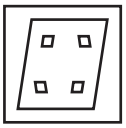


(A)

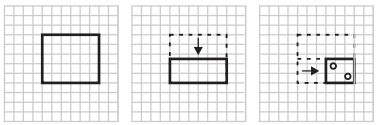


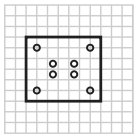
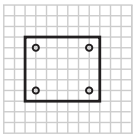
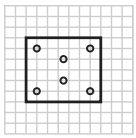
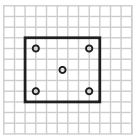
(B)



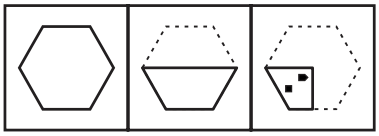
(C) 
(D) 

Q.9 A paper is folded and cut as shown below. How will it appear when unfolded?

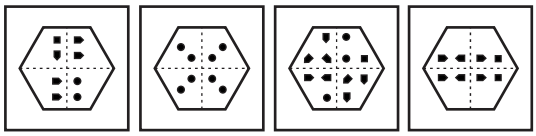


(A) 
(B) 
(C) 
(D) 

Q.10 A paper is folded and cut as shown below. How will it appear when unfolded?



Answer figure

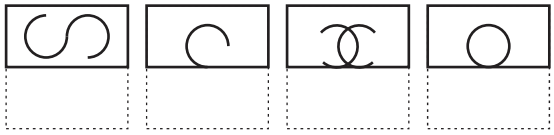


(A) **(B)** **(C)** **(D)**

(A) B (B) C
(C) D (D) A

Q.11 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

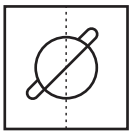
(X)

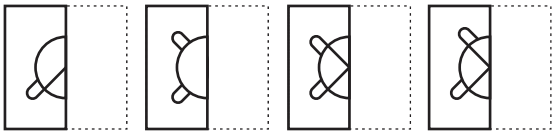


(1) **(2)** **(3)** **(4)**

(A) 1 (B) 2
(C) 3 (D) 4

Q.12 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

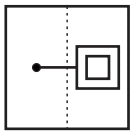


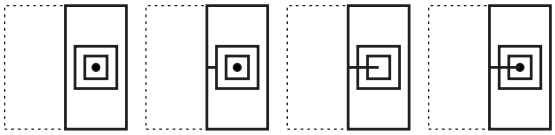


(A) **(B)** **(C)** **(D)**

(A) A (B) B
(C) C (D) D

Q.13 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

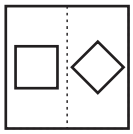


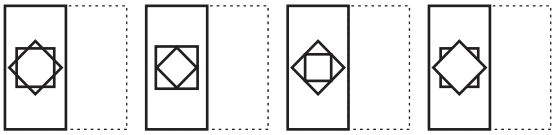


(A) **(B)** **(C)** **(D)**

(A) A (B) B
(C) C (D) D

Q.14 Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

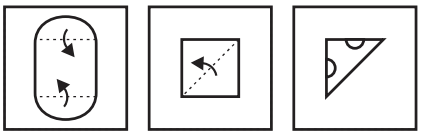




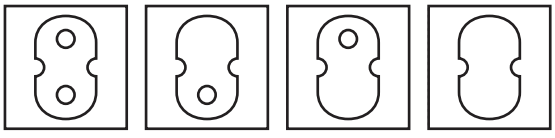
(A) **(B)** **(C)** **(D)**

(A) A (B) B
(C) C (D) D

Q.15 A piece of paper is folded and punched as shown. Indicate how it is when opened?



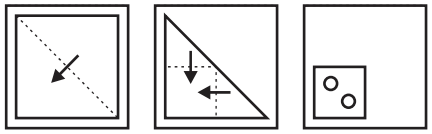
Options :

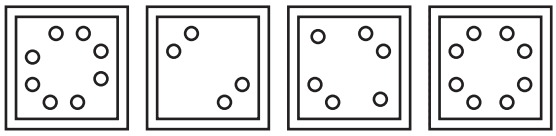


(1) **(2)** **(3)** **(4)**

(A) 1 (B) 2
(C) 3 (D) 4

Q.16 Appear when it is opened?





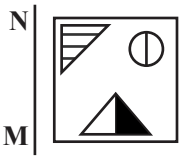
(1) (2) (3) (4)

(A) 1 (B) 2
(C) 3 (D) 4

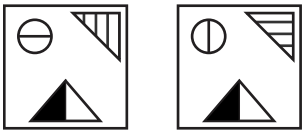
11.2 Mirror Images

Class Practice Questions :

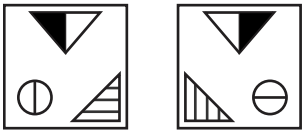
Q.1 If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figure?



Questions figure

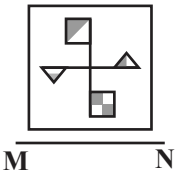


(A) (B)

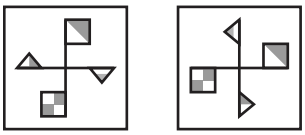


(C) (D)

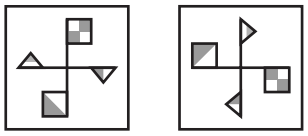
Q.2 If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figures?



Questions figure



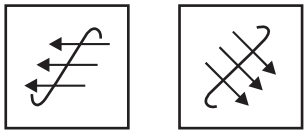
(A) (B)



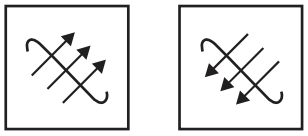
(C) (D)

Q.3 If a mirror placed on the line MN, then which of the answer figure is the correct image of the question figure?

Questions figure



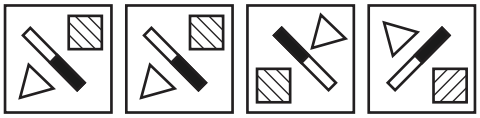
(A) (B)



(C) (D)

Q.4 If a mirror is placed on the line MN, then which of the answer figure is the right images of the given figure?

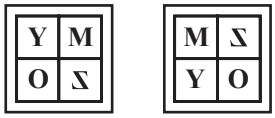
Questions figure



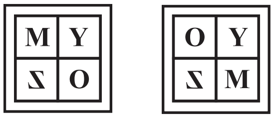
(A) (B) (C) (D)

Q.5 Which of the answer figures is exactly the mirror image of the given figure, when the mirror is held on the line AB?

Questions figure



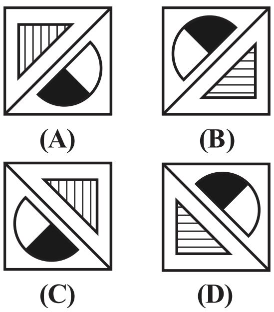
(A) (B)



(C) (D)

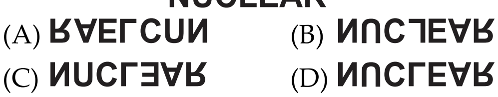
Q.6 If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figure?

Questions figure



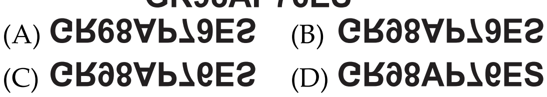
Q.7 Choose the alternative which is closely resembles the water-image of the given combination?

NUCLEAR



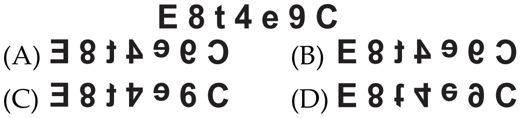
Q.8 Choose the alternative which is closely resembles the water-image of the given combination.?

GR98AP76ES



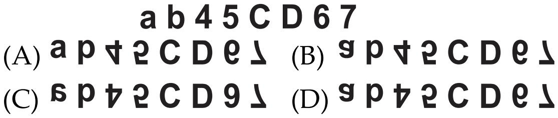
Q.9 Choose the alternative which is closely resembles the water-image of the given combination?

E 8 t 4 e 9 C



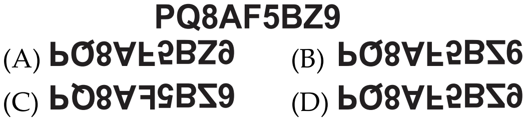
Q.10 Choose the alternative which is closely resembles the water-image of the given combination?

a b 4 5 C D 6 7



Q.11 Choose the alternative which is closely resembles the water-image of the given combination?

PQ8AF5BZ9



Q.12 Choose the alternative which is closely resembles the water-image of the given combination?

N 4 t Q j 3

Q.13 Choose the alternative which is closely resembles the mirror image of the given combination?

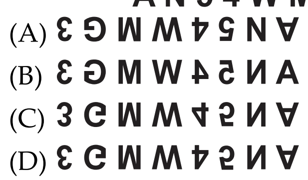
T A R A I N 1 0 1 4 A

Q.14 Choose the alternative which is closely resembles the mirror image of the given combination?

1 9 6 5 I N D O P A K

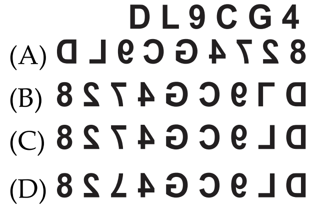
Q.15 Choose the alternative which is closely resembles the mirror image of the given combination?

A N 5 4 W M G 3

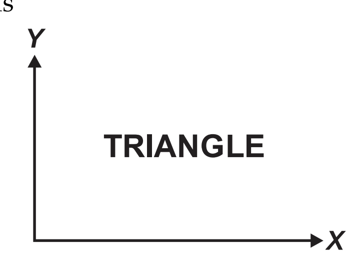


Q.16 Choose the alternative which is closely resembles the mirror image of the given combination?

D L 9 C G 4 7 2 8

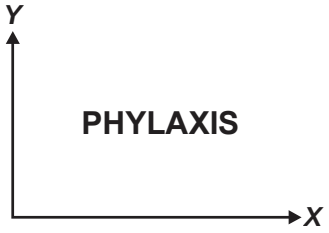


Q.17 The mirror image of the above text about the X-axis is



[GATE 2021 : IIT-Bombay (IN, CE-1)]

Q.18 The mirror image of the above text about the X-axis is



(A) PHʎLAXIS (B) ⊬HʎLAXIS
(C) ⊬HʎLAXIƧ (D) dHʎLAXIƧ

[GATE 2021 : IIT-Bombay (CE-2)]

Self Practice Questions :

Q.1 Select the appropriate water image for the given question from the following options :

ALPACA

(A) ∀LqACA (B) ACAqLA
(C) ∀L⊬ACA (D) ∀L⊬ACA

Q.2 Select the appropriate water image for the given question from the following options :

DIESEL

(A) DIESEL (B) DIƎSEL
(C) LƎSƎIᗡ

Q.3 Select the appropriate water image for the given question from the following options :

AGOUTI

(A) ∀ƆOUTI (B) ∀ƆOUTI
(C) AƆOUTI (D) ITUOGA

Q.4 Select the appropriate water image for the given question from the following options :

CROW

(A) CRꟻW (B) CROM
(C) WORƆ (D) CRꟻM

Q.5 Select the appropriate water image for the given question from the following options :

BABOON

(A) BABOOИ (B) B∀BOON
(C) ИOOBAB (D) B∀BOOИ

Q.6 If you put a mirror on the shaded line, which of the following options would be the right image of the given figure?

LATVIA

(A) AIΛTAL (B) AIVTAL
(C) LATΛIA (D) ∀IVTAL

Q.7 If you put a mirror on the shaded line, which of the following options would be the right image of the given figure?

FRANCE

(A) ƎƆИARꟻ (B) ꟻRAИCE
(C) ƎƆИARꟻ (D) ƎƆИARꟻ

Q.8 If you put a mirror on the shaded line, which of the following options would be the right image of the given figure?

PELICAN

(A) ИAƆILEꟻ (B) NAƆILEꟻ
(C) ИAƆILƎP (D) ИAƆILEꟻ

Q.9 If you put a mirror on the shaded line, which of the following options would be the right image of the given figure?

WASP

(A) dSAW (B) MASb
(C) dSAM (D) qSAW

Q.10 If you put a mirror on the shaded line, which of the following options would be the right image of the given figure?

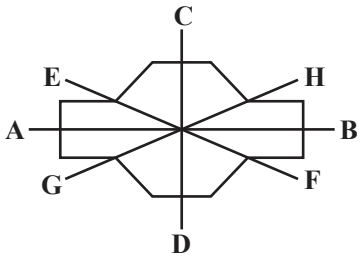
MONKEY

(A) YƎKИOM (B) MOИKEY
(C) ʎƎKИOM (D) YƎKИOM

11.3 Figure Symmetry

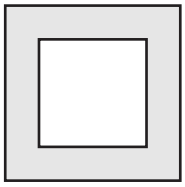
Class Practice Questions :

Q.1 Which of the following are the lines of symmetry?



(A) AB and CD
(B) EF and GH
(C) All of the above
(D) None of the above

Q.2 How many lines of symmetry can be drawn for given figure?



Questions figure

(A) 01 (B) 02
(C) 04 (D) 06

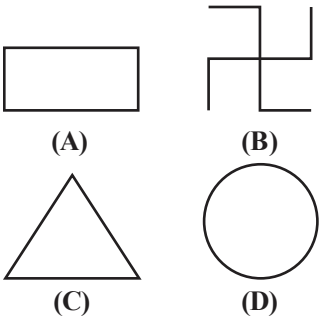
Q.3 How may capital letters of English alphabets have both vertical line of symmetry?

(A) 04 (B) 06
(C) 05 (D) 03

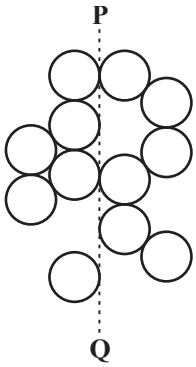
Q.4 What letters of the English alphabet have reflectional symmetry (i.e., symmetry related to mirror reflection) about a vertical mirror.

(A) 11 (B) 09
(C) 10 (D) 12

Q.5 In the following figures, the figure that is not symmetric with respect to any line is :

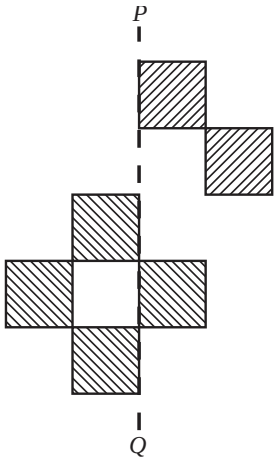


Q.6 How may circles are needed to make line PQ symmetric?



(A) 06 (B) 05
(C) 04 (D) 07

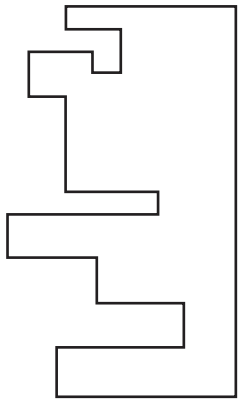
Q.7 The least number of squares that must be added so that the line P-Q becomes the line of symmetry is _____.



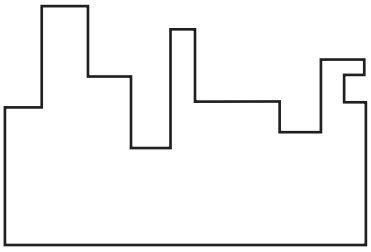
(A) 4 (B) 7
(C) 6 (D) 3

[GATE 2021 : IIT-Bombay (EC)]

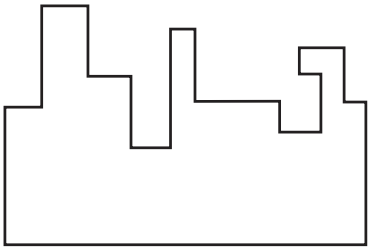
Q.8 A jigsaw puzzle has 2 pieces. One of the pieces is shown above. Which one of the given options for the missing piece when assembled will form a rectangle? The piece can be moved, rotated or flipped to assemble with the above piece.



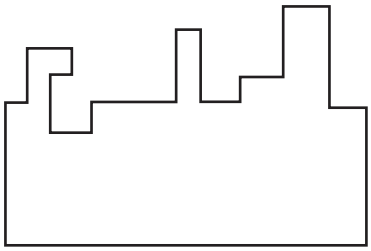
(A)



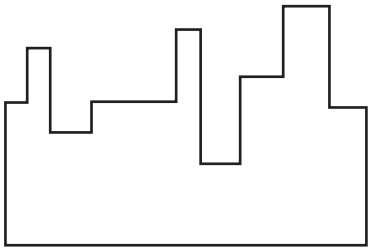
(B)



(C)

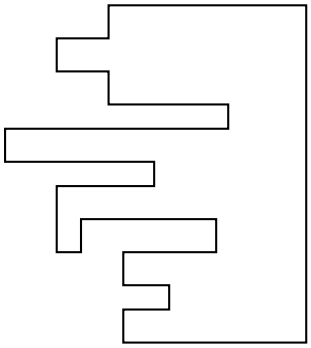


(D)

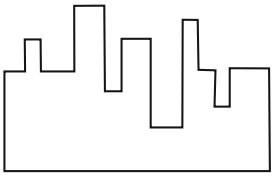


[GATE 2021 : IIT-Bombay (ME-1)]

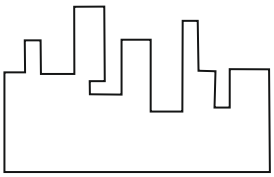
Q.9 A jigsaw puzzle has 2 pieces. One of the pieces is shown above. Which one of the given options for the missing piece when assembled will form a rectangle? The piece can be moved, rotated or flipped to assemble with the above piece.



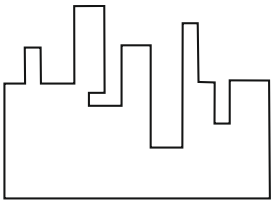
(A)



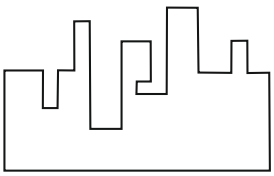
(B)



(C)



(D)



[GATE 2021 : IIT-Bombay (CS-2)]

❖❖❖❖

A Answer Keys

11.1 Paper Folding & Cutting [CPQ's]									
1.	C	2.	C	3.	B	4.	C	5.	A
6.	D	7.	C	8.	B	9.	B	10.	A
11.	B	12.	B	13.	B	14.	A	15.	A
11.1 Paper Folding & Cutting [SPQ's]									
1.	B	2.	A	3.	B	4.	A	5.	C
6.	D	7.	A	8.	D	9.	A	10.	A
11.	D	12.	D	13.	D	14.	A	15.	A
16.	A								

11.2 Mirror Image [CPQ's]								
1.	B	2.	C	3.	D	4.	D	5.	C
6.	C	7.	D	8.	C	9.	D	10.	B
11.	D	12.	A	13.	D	14.	D	15.	B
16.	C	17.	B	18.	C				
11.2 Mirror Image [SPQ's]								
1.	D	2.	A	3.	B	4.	D	5.	D
6.	B	7.	A	8.	D	9.	D	10.	D

11.3 Figure Symmetry [CPQ's]								
1.	C	2.	C	3.	A	4.	C	5.	B
6.	A	7.	C	8.	B	9.	B		

12 VERBAL ABILITY & VERBAL GRAMMAR (VA VG)

12.1 Sentence Completion

Class Practice Questions :

Q.1 She hadn't eaten all day, and by the time she got home she was _____.

(A) blighted (B) confutative
(C) ravenous (D) ostentatious
(E) blissful

Q.2 The movie offended many of the parents of its younger viewers by including unnecessary _____ in the dialogue.

(A) Vulgarity (B) Verbosity
(C) Vocalizations (D) Tonality

Q.3 His neighbours found his _____ manner bossy and irritating, and they stopped inviting him to backyard barbeques.

(A) Insentient (B) Magisterial
(C) Restorative (D) Modest

Q.4 The two-child norm with _____ for the violators will have significant implications for our demographic profile.

(A) Disincentives (B) Incitements
(C) Restrictions (D) Restrains

[GATE 2010 : IIT Guwahati]

Q.5 Suresh's dog is the one _____ was hurt in the stampede.

(A) That (B) Which
(C) Who (D) Whom

[GATE 2012 : IIT Delhi]

Q.6 The author's first novel had such a _____ story that critics quickly dismissed the author as a _____.

(A) hackneyed ... professional
(B) suspenseful ... poseur
(C) transparent ... scamp
(D) trite ... hack

Q.7 In making the decision on whether to drop the atomic bomb, President Truman attempted to _____ the weapon's _____ effects, ultimately deciding that ending World War II outweighed the harmful consequences he imagined.

(A) foresee ... benevolent
(B) presage ... deleterious
(C) prognosticate ... healthful
(D) refute ... noxious

Q.8 Oscar _____ the laundry right now.

(A) is making (B) is being
(C) is doing (D) is having

Q.9 The _____ woman has grey hair and many wrinkles. She was born many years ago.

(A) strong (B) young
(C) old (D) kind

Q.10 Unlike Bermuda, which has a _____ climate, Minnesota is often _____, especially in the winter.

(A) breezy … windy
(B) stormy … unpredictable
(C) warm … humid
(D) tropical … frigid

Q.11 After living in a _____ for many years, Pete realized he needed a change and decided to retire to a small cottage in a quiet, _____ town.

(A) town … familiar
(B) village … tiny
(C) metropolis … country
(D) house … soothing

Q.12 Jacob's mother and father both had to _____ him from his sleep because he had slept through his alarm.

(A) Rouse (B) Fluctuate
(C) Lull (D) Tremble

Q.13 The coach just wanted Sara to _____ the new technique, so she was upset when Sara refused to _____ it.

(A) Explain … learn
(B) Perform … enjoy
(C) Try … attempt
(D) Examine … understand

Q.14 Food prices _____ again this month.

(A) Have raised
(B) Have been raising
(C) Have been rising
(D) Have arose.

[GATE 2012 : IIT Delhi]

Q.15 Some people _____ themselves into believing that, they are the only honest and hardworking employees in the company.

(A) Keep (B) Fool
(C) Delude (D) Force

Q.16 Rajesh, two of _____ brothers play cricket, wishes to be a coach after his retirement.

(A) Whom (B) Which
(C) Them (D) Whose

Q.17 Even a _____ glance will let you catch the mistake.

(A) Crude (B) Curious
(C) Cursory (D) Prefers

Q.18 _____ students whether from primary or secondary divisions struggle to understand mathematics.

(A) The large number of
(B) A large number of
(C) Large
(D) More

Q.19 I thought over this decision to a great length after we _____ it the other day.

(A) discussed
(B) discussed about
(C) discussed regarding
(D) discussed on

Q.20 My coach is one of the best coaches _____.

(A) that I know
(B) I know
(C) who I know
(D) which I know

Q.21 Choose the most appropriate word from the options given below to the complete the following sentence:

His rather casual remarks on politics _____ his lack of seriousness about the subject.

(A) Masked (B) Belied
(C) Betrayed (D) Suppressed

[GATE 2010 : IIT Guwahati (CSE, EE, ME, CE, EC, IN)]

Q.22 Choose the most appropriate word(s) from the options given below to complete the following sentence.

I contemplated _____ Singapore for my vacation but decided against it.

(A) To visit (B) Having To Visit
(C) Visiting (D) For A Visit

[GATE 2011 : IIT Madras (CSE, ME, CE)]

Q.23 Research in the workplace reveals that people work for many reasons _____.

(A) Money beside (B) Beside money
(C) Money besides (D) Besides money

[GATE 2017 : IIT Roorkee (EE, CS Set – 1)]

Q.24 Choose the most appropriate pair of words from the options given below to complete the following sentence.

She could not _____ the thought of _____ the election to her bitter rival.

(A) Bear, loosing (B) Bare, loosing
(C) Bear, losing (D) Bare, losing

[GATE 2014 : IIT Kharagpur (EC Set - 2, ME Set - 2)]

Q.25 Choose the most appropriate word from the options given below to complete the following sentence the official answered _____ that the complaints of the citizen would be looked into.

(A) Respectably (B) Respectfully
(C) Reputably (D) Respectively

[GATE 2015 : IIT Kanpur (CE Set - 2)]

Q.26 The driver applied the _____ as soon as she approached the hotel where she wanted to take a_____?

(A) Brake, Break (B) Break, Break
(C) Brake, Brake (D) Break, Brake

[GATE 2018 : IIT Guwahati (CE Set – 1)]

Q.27 "Although it does contain some pioneering ideas, one would hardly characterize the work as _____."

The word that best fills the blank in the above sentence is

(A) Innovative (B) Simple
(C) Dull (D) Boring

[GATE 2018 : IIT Guwahati (CE Set – 2)]

Q.28 "By giving him the last _____ of the cake, you will ensure lasting _____ in our house today."

The words that best fill the blanks in the above sentence are

(A) peas, piece (B) piece, peace
(C) peace, pieces (D) peace, peas

[GATE 2018 : IIT Guwahati (EC Set – 1)]

Q.29 "His face _____ with joy when the solution of the puzzle was _____ to him."

The words that best fill the blanks in the above sentence are

(A) Shone, shown (B) Shone, shone
(C) Shown, shone (D) Shown, shown

[GATE 2018 : IIT Guwahati (CE Set – 2)]

Q.30 Choose the most appropriate word from the options given below to complete the following sentence:

If we manage to _____ our natural resources, we would leave a better planet for our children.

(A) Uphold (B) Restrain
(C) Cherish (D) Conserve

[GATE 2010 : IIT Guwahati (CSE, ME, EE, EC, CE)]

Q.31 Choose the most appropriate word from the options given below to complete the following sentence: **Under ethical guidelines recently adopted by the Indian Medical Association, human genes are to be manipulated only to correct diseases for which_____ treatments are unsatisfactory.**

(A) Similar (B) Most
(C) Uncommon (D) Available

[GATE 2011 : IIT Madras (EC, EE)]

Q.32 "When she fell down the _____, she received many _____ but little help." The words that best fill the blanks in the above sentence are

(A) stairs, stares (B) stairs, stairs
(C) stares, stairs (D) stares, stares

[GATE 2018 : IIT Guwahati (IN Set – 1)]

Q.33 "In spite of being warned repeatedly, he failed to correct his _____ behaviour."

The word that best fills the blank in the above sentence is

(A) rational (B) reasonable
(C) errant (D) good

[GATE 2018 : IIT Guwahati (IN Set – 1)]

Q.34 Choose the appropriate word/phrase, out of the four options given below, to complete the following sentence:

Apparent lifelessness _____ dormant life.

(A) Harbours (B) Leads to
(C) Supports (D) Affects

[GATE 2015 : IIT Kanpur (ME Set – 3, IN)]

Q.35 Choose the most appropriate alternative from the options given below to complete the following sentence:

Despite several _____ the mission succeeded in its attempt to resolve the conflict.

(A) Attempts (B) Setbacks
(C) Meetings (D) Delegations

[GATE 2012 : IIT Delhi (CSE, ME, CE)]

12.2 Sentence Improvement

Directions for Questions 1 to 12

In each question, a part of the sentence is underlined. Each sentence is followed by some phrases which can replace the underlined part to make it better. Choose the option that can correctly substitute that part of the sentence. If the sentence is correct as it, the answer is "No correction required" or "No improvement".

Q.1 John is as fast as or perhaps faster than Sarah.
(A) as fast
(B) almost as fast
(C) equally fast
(D) No correction required

Q.2 This worker is the most skilled of all the other workers in our factory.
(A) worker
(B) of all the others workers
(C) of all workers
(D) No improvement

Q.3 The girl told her teacher to explain the whole lesson again.
(A) Called her teacher
(B) Said to her teacher
(C) Asked her teacher
(D) No improvement

Q.4 The speaker of Lok Sabha broke away the meeting as it turned violent.
(A) broke up
(B) broke off
(C) broke through
(D) No improvement

Q.5 The burning of coal in thermal electricity plants release dust particles and greenhouse gases that contribute to pollution.
(A) Releases dust particles and greenhouse gases that
(B) Release dust particle and greenhouse gases which
(C) Releases dust particles and greenhouse gas that
(D) No improvement

Q.6 Newton explored the Laws of motion.
(A) Decoded
(B) Discovered
(C) Invented
(D) No improvement

Q.7 The SIT made a request to sought permission to conduct NARCO test on the convict.
(A) To seeking permission
(B) For seeking permission
(C) Seeking permission
(D) No improvement

Q.8 Had you been told father about your difficulties; he would have helped you find a solution.
(A) Had you told
(B) If you have told
(C) Had you have told
(D) No improvement

Q.9 The analyst said that since the rate of gold would go up, the cost of ornaments is also increasing
(A) Would also increase
(B) Will increased
(C) Will be also increasing
(D) No improvement

Q.10 What were you doing ever since mom left?
(A) Are you doing
(B) Did you do
(C) Have you been doing
(D) No improvement

Q.11 Neither do I nor does my brother tell lies.
(A) Neither I live nor does
(B) Neither I nor
(C) Neither I do nor does
(D) No improvement

Q.12 I congratulated him because of his good performance in exams.
(A) Due to
(B) For
(C) On
(D) No improvement

Q.13 The following question presents a sentence, part of which is underlined. Beneath the sentence you find four ways of phrasing the underlined part. Following the requirements of the standard written English, select the answer that produces the most effective sentence.

Tuberculosis, together with its effects, ranks one of the leading causes of death in India.

(A) Ranks as one of the leading causes of death
(B) Rank as one of the leading causes of death
(C) Has the rank of one of the leading causes of death
(D) Are one of the leading causes of death

[GATE 2015 : IIT Kanpur (EC Set - 1]

12.3 Sentence Correction

Directions for Questions 1 to 10

In each of the following questions, select the most preferable sentence with respect to grammar, meaning and usage.

Q.1 (A) Our team had won the competition if only we would have concentrated.
(B) Our team would have won the competition if only we had concentrated.
(C) Our team would win the competition only if we had concentrated.
(D) Our team had won the competition if only we would have concentrated.

Q.2 (A) She came in too quickly to avoid waking her child.
(B) She entered in quickly, so as not to wake her child.
(C) Having not to wake her child, she came in quickly.
(D) She came in very quickly so that she might avoid waking her child.

Q.3 (A) Many trains must stop owing to floods, if the rains last till the weekend.
(B) If the rains last for the weekend, owing to floods, many trains must stop.
(C) Owing to floods, many trains must stop if the rains last over the weekend.
(D) Having the rains lasting to the weekend, many trains must stop.

Q.4 (A) People are rather impressed by the style of dressing than by a person's character.
(B) People are impressed rather by the style of dressing than by a person's character.
(C) Rather people are impressed by the style of a dressing than by a person's character.
(D) People are impressed by the style of dressing than by a person's character.

Q.5 (A) In four bomb-blasts, fortunately only three lives were lost.
(B) In a four bomb-blasts only three lives were fortunately lost.
(C) Fortunately, in four bomb-blasts, only three lives were lost.
(D) In fortunately four bomb- blast, only three lives were lost

Q.6 (A) As one travels from kulumanali to shimla, he finds the line most beautifully laid.
(B) Travelling from kulumanali to shimla, one finds the line most beautifully laid.
(C) While travelling from kulumanali to shimla, one would find the line most beautifully laid.
(D) If one travels from kulumanali to shimla, he will find the line beautifully laid.

Q.7 (A) Being two years completed, Sahil will be working in this office till May next.
(B) Till May next year, Sahil will work in the office for two years.
(C) By May next year, Sahil will have been working in the office for two years.
(D) Sahil will be working in this office upon completing two years by next May.

Q.8 (A) I went yesterday to the school to collect the Leaving certificate.
(B) To collect the Leaving certificate yesterday, I went to the school.
(C) Yesterday to collect the Leaving certificate I went to the school.
(D) I went to the school yesterday to collect the Leaving certificate.

Q.9 (A) There will be a meeting in the long room at 11 o' clock of all the students who play badminton.

(B) There will be a meeting of all the students who play badminton in the long room at 11 o' clock.

(C) There will be in the long room at 11 o' clock a meeting of all the students who play badminton.

(D) In the long room, at 11 o' clock there will be a meeting of all the students who play badminton.

Q.10 (A) As soon as rains begin than this waterfall will look very beautiful.

(B) As soon as the rains begin this waterfall will look very beautiful

(C) No sooner did the rains begin than this waterfall will look very beautiful.

(D) Scarcely had the rains begin than this waterfall becomes very beautiful.

Q.11 Which of the following options is the closest in meaning to the sentence below?

She enjoyed herself immensely at the party.

(A) She had a terrible time at the party.

(B) She had a horrible time at the party.

(C) She had a terrific time at the party

(D) She had a terrifying time at the party

[GATE 2015 : IIT Kanpur (CSE Set - 1, EE Set - 1)]

Q.12 Ram and Shyam shared a secret and promised to each other that it would remain between them. Ram expressed himself in one of the following ways as given in the choices below. Identify the correct way as per standard English.

(A) It would remain between you and me.

(B) It would remain between I and you

(C) It would remain between you and I

(D) It would remain with me.

[GATE 2015 : IIT Kanpur (EC Set - 3, ME Set - 2)]

Q.13 Choose the grammatically CORRECT sentence

(A) Two and two add four

(B) Two and two become four

(C) Two and two are four

(D) Two and two make four

[GATE 2013 : IIT Bombay (EC, EE, IN)]

Q.14 Which of the following options is the closest in meaning to the sentence below?

"As a woman, I have no country."

(A) Women have no country

(B) Women are not citizens of any country.

(C) Women's solidarity knows no national boundaries

(D) Women of all countries have equal legal rights.

[GATE 2014 : IIT Kharagpur (CE Set – 2, IN)]

Q.15 "India is a country of rich heritage and cultural diversity".

Which one of the following facts best supports the claim made in the above sentence?

(A) India is a union of 28 states and 7 union territories.

(B) India has a population of over 11 billion.

(C) India is home to 22 official languages and thousands of dialects.

(D) The Indian cricket team draws players from over ten states.

[GATE 2014 : IIT Kharagpur (EC Set – 3, ME Set - 3)]

Q.16 Out of the following four sentences, select the most suitable sentence with respect to grammar and usage.

(A) Since the report lacked needed information, it was of no use to them.

(B) The report was useless to them because there were no needed information in it.

(C) Since the report did not contain the needed information, it was not real useful to them

(D) Since the report lacked needed information, it would not had been useful to them.

[GATE 2015 : IIT Kanpur (CSE Set - 2, EE Set - 2)]

12.4 Idioms and Phrases

Directions for Questions 1 to 8

Choose the alternative that best expresses the meaning of the given idiom.

Q.1 To talk one's head off

(A) To shout loudly

(B) To talk in whispers

(C) To talk to oneself

(D) To talk excessively

Q.2 To save one's face

(A) To hide oneself

(B) To oppose

(C) To evade disgrace

(D) To protect

Q.3 Hush money

(A) Money overdue

(B) Easy money

(C) Bribe paid to secure silence

(D) Money earned by illegally

Q.4 To bite one's lips

(A) To gossip

(B) To have doubt

(C) To feel sorry

(D) To be angry

Q.5 A tall order

(A) A big issue

(B) A royal disperses

(C) A task difficult

(D) A big demand

Q.6 To see eye to eye with

(A) To love someone

(B) To agree

(C) To be angry

(D) To take revenge

Q.7 To talk shop

(A) To talk about interesting facts

(B) To talk reasonably

(C) To abuse someone

(D) To talk about business

Q.8 To strike one's colors

(A) To fight vigorously

(B) To surrender

(C) To work hard

(D) To make a rude gesture

Directions for Questions 9 to 20

Choose the option that best describes the meaning of the idioms and phrases underlined in the given sentences.

Q.9 After facing all the hardships, I'm happy to see that you have turned a new leaf.

(A) Proved to be successful

(B) Stayed strong

(C) Begun a different mode of life

(D) Applied common sense

Q.10 The rich and the poor sat cheek by jowl in the rescue ferry.

(A) Separately

(B) Very near

(C) Irritated

(D) Very far

Q.11 Try to end your dependency on alcohol otherwise you'll end in smoke one day.

(A) Ruin yourself completely

(B) Become the victim

(C) Die

(D) Loose all your money

Q.12 Inspite of the immense pressure by the opposition, the ruling party, has decided not to give in.

(A) Conform

(B) Accede

(C) Oblige

(D) Yield

Q.13 Being an introvert that he is wearing his heart on his sleeves is not possible to him.

(A) Talking endlessly

(B) Saying something which can't be taken seriously

(C) Being friendly with others

(D) Exposing innermost feelings to others

Q.14 I did not even listen to him, he was only talking through his hat.

(A) Talking ignorantly

(B) Talking non-stop

(C) Talking garrulously

(D) Talking nonsense

Q.15 The thieves took to heels as they heard the siren.

(A) Moved back

(B) Ran away

(C) Took off their shoes

(D) Put on the shoes

Q.16 I cannot put up with your insulting behaviour now.

(A) Refuse (B) Accept

(C) Excuse (D) Tolerate

Q.17 The mob outside the police station was up in arms against the recent incidence of child abuse.

(A) Vandalising the check post

(B) Pained

(C) Shouting slogans

(D) Angry

Q.18 The bus sped and turned turtle in the ditch.

(A) Stopped

(B) Failed

(C) Turned upside down

(D) Fell flat

Q.19 Nobody takes Reema's complains seriously as she is a cry wolf.

(A) Raises false alarms

(B) Selfish

(C) Always keeps crying

(D) Always complaining

Q.20 This project is a Gordian knot.

(A) Ordinary project

(B) Big project

(C) Easy job

(D) Difficult job

Q.21 Select the alternative meaning of the underlined part of the sentence. The chain snatchers **took to their heels** when the police party arrived.

(A) Took shelter in a thick jungle

(B) Open indiscriminate fire

(C) Took to flight

(D) Unconditionally surrendered

[GATE 2015 : IIT Kanpur (EE Set - 1, CSE Set - 1)]

Q.22 After India's cricket world cup victory in 1985, Shrotria who was playing both tennis and cricket till then, decided to concentrate only on cricket. And the rest is history.

What does the underlined phrase mean in this context?

(A) history will rest in peace

(B) rest is recorded in history books

(C) rest is well known

(D) rest is archaic

[GATE 2016 : IISc Bangalore (EC Set – 2, ME Set - 3)]

Q.23 He **turned a deaf ear to** my request.

What does the underlined phrasal verb mean?

(A) Ignored (B) Appreciated

(C) Twisted (D) Returned

[GATE 2016 : IISc Bangalore (CE Set-2)]

Q.24 In a press meet on the recent scam, the minister said, "The buck stops here". What did the minister convey by the statement?

(A) He wants all the money

(B) He will return the money

(C) He will assume final responsibility

(D) He will resist all enquiries

[GATE 2014 : IIT Kharagpur (CSE Set - 1, EE Set - 1)]

12.5 Synonyms & Antonyms

Directions for Questions 1 to 10

In each of the questions below, choose the word opposite in meaning to the given word.

Q.1 Endanger

(A) Venture (B) Threatens

(C) Defends (D) Careless

Q.2 Judicious

(A) Indiscreet (B) Unlawful

(C) Impure (D) Unequal

Q.3 Stimulate

(A) Yield (B) Grab

(C) Benign (D) Discourages

Q.4 Knack

(A) Flair (B) Ineptitude

(C) Expertise (D) Capability

Q.5 Inquisitive

(A) Insincere (B) Insensitive

(C) Indifferent (D) Insulting

Q.6 Hegemony

(A) Leadership (B) Helplessness

(C) Dominance (D) Discipline

Q.7 Sow

(A) Scatter (B) Sprinkle

(C) Reap (D) Water

Q.8 Subsume

(A) Hold (B) Exclude

(C) Enclose (D) Classify

Q.9 Fickle

(A) Quick (B) Erratic

(C) Constant (D) Volatile

Q.10 Conformity

(A) Distraction (B) Dilution

(C) Deviation (D) Diversion

Directions for Questions 11 to 20

In each of the questions below, choose the word that best expresses the meaning of the given word.

Q.11 Perpetuate

(A) Halt (B) Neglect

(C) Maintains (D) Let go

Q.12 Mendicant

(A) Reformer (B) Advisor

(C) Beggar (D) Dealer

Q.13 Privy

(A) Obvious (B) Known

(C) Secret (D) Candid

Q.14 Frivolous

(A) Sensible (B) Silly

(C) Wise (D) Supported

Q.15 Asperity

(A) Mild (B) Civil

(C) Polite (D) Harshness

Q.16 Monument

(A) Epitaph (B) Memorial

(C) Tomb (D) Mausoleum

Q.17 Insurmountable

(A) Defeatable (B) Reachable

(C) Impossible (D) Attainable

Q.18 Soporific

(A) Lethargic (B) Happy

(C) Terrifying (D) Alert

Q.19 Doleful

(A) Mournful (B) Regretful

(C) Cheerless (D) Sober

Q.20 Squander

(A) Procure (B) Hoard

(C) Save (D) Misuse

Q.21 Which of the following options is closest in meaning to the word given below

Nadir

(A) Highest (B) Lowest

(C) Medium (D) Integration

[GATE 2013 : IIT Bombay (CSE, ME)]

Q.22 Which of the following options is closest in meaning to the word Circuitous.

(A) Cyclic (B) Indirect

(C) Confusing (D) Crooked

[GATE 2010 : IIT Guwahati (EC, EE, ME, IN, CE, CSE)]

Q.23 Which of the following options is the closest in the meaning to the word below :

Inexplicable

(A) Incomprehensible (B) Indelible

(C) Inextricable (D) Infallible

[GATE 2011 : IIT Madras (CSE, ME, CE)]

Q.24 There was no doubt that their work was thorough.

Which of the words below is closest in meaning to the underlined word above?

(A) Pretty (B) Complete

(C) Sloppy (D) Haphazard

[GATE 2017 : IIT Roorkee (IN, CE Set - 2)]

Q.25 Which one of the following options is the closest in meaning to the word given below?

Mitigate

(A) Diminish (B) Divulge
(C) Dedicate (D) Denote

[GATE 2012 : IIT Delhi (BT, ME, CE)]

Q.26 The word similar in meaning to 'dreary' is

(A) Cheerful (B) Dreamy
(C) Hard (D) Dismal

[GATE 2015 : IIT Kanpur (CE Set - 2)]

Q.27 Which one of the following option is the closest in meaning to the word given below

Latitude

(A) Eligibility (B) Freedom
(C) Coercion (D) Meticulousness

[GATE 2012 : IIT Delhi (EC, EE, IN)]

Q.28 Which of the following options is closest in meaning to the word given below?

"Primeval"

(A) Modern (B) Historic
(C) Primitive (D) Antique

[GATE 2013 : IIT Bombay (CE)]

Q.29 Which of the following options is the closest in meaning to the phrase underlined in the sentence below?

It is fascinating to see life forms **cope with** varied environmental conditions.

(A) Adopt to (B) Adapt to
(C) Adept in (D) Accept with

[GATE 2014 : IIT Kharagpur (CSE Set -1, EE Set-1)]

Q.30 While receiving the award, the scientist said, "I feel vindicated". Which of the following is closest in meaning to the word 'vindicated'?

(A) Punished (B) Substantiated
(C) Appreciated (D) Chastened

[GATE 2014 : IIT Kharagpur (EC Set -4, ME Set-4)]

Q.31 Choose the word that is opposite in meaning to the word "coherent".

(A) Sticky (B) Well-connected
(C) Rambling (D) Friendly

[GATE 2014 : IIT Kharagpur (EE)] (CSE Set -3, EE Set-3)]

Q.32 Which word is not a synonym for the word vernacular?

(A) Regional (B) Indigeneous
(C) Indigent (D) Colloquial

[GATE 2015 : IIT Kanpur (CE Set- 2)]

Q.33 The Buddha said, "Holding on to anger is like grasping a hot coal with the intent of throwing it at someone else; you are the one who gets burnt."

Select the word below which is closest in meaning to the word underlined above.

(A) Burning (B) Igniting
(C) Clutching (D) Flinging

[GATE 2016 : IISc Bangalore (EC Set – 3, IN)]

Q.34 Choose the option with words that are not synonyms.

(A) Aversion, dislike
(B) Luminous, radiant
(C) Plunder, loot
(D) Yielding, resistant

[GATE 2017 : IIT Roorkee (EE, CS Set – 2)]

Q.35 Match the columns :

Column 1	**Column 2**
(1) Eradicate	(P) Misrepresent
(2) Distort	(Q) Soak Completely
(3) Saturate	(R) Use
(4) Utilize	(S) Destroy Utterly

(A) 1:S, 2:P, 3:Q, 4:R
(B) 1:P, 2:Q, 3:R, 4:S
(C) 1:Q, 2:R, 3:S, 4:P
(D) 1:S, 2:P, 3:R, 4:Q

[GATE 2014 : IIT Kharagpur (CSE Set -2, EE Set-2)]

Q.36 Which of the following options is closest in meaning to the word given below

VERNACULAR

(A) Faulty speech
(B) Language of a locality
(C) Foreign accent
(D) Gibberish

[GATE 2019 : IIT Madras (EE)]

Q.37 Which of the following options is closest in meaning to the word given below

Puerile

(A) Humorous (B) Virtuous

(C) Childish (D) Whimsical

[GATE 2019 : IIT Madras (ME)]

12.6 Spellings

Directions for Questions 1 to 2

In each of the following questions, choose the correctly spelt word out of the given alternatives.

Q.1 (A) Apalogy (B) Apollogie

(C) Appology (D) Apology

Q.2 (A) Ceasar (B) Cizaer

(C) Cizar (D) Caesar

Directions for Questions 3 to 12

In the following questions, groups of four words are given. In each group one word is wrongly spelt. Find out the wrongly spelt word and mark the answer.

Q.3 (A) Attendence (B) Providence

(C) Evidence (D) Preference

Q.4 (A) Deleterious (B) Perseverence

(C) Inexorable (D) Bowdlerise

Q.5 (A) Genarally (B) Normally

(C) Effectively (D) Grandly

Q.6 (A) Genre (B) Obsene

(C) Caliber (D) Cavil

Q.7 (A) Argument (B) Trickery

(C) Comotion (D) Uproar

Q.8 (A) Agrendise (B) Squalid

(C) Squeamish (D) Rudimentary

Q.9 (A) Sympathatic (B) Generous

(C) Compassionate (D) Benevolent

Q.10 (A) Acquiesce (B) Acquire

(C) Acquatic (D) Acquittal

Q.11 (A) Manhandle (B) Associate

(C) Bruere (D) Traipse

Q.12 (A) Therapeutic (B) Barricade

(C) Thermometer (D) Bureaucretic

Q.13 Identify the correct spelling out of the given options :

(A) Manageable (B) Manageble

(C) Mangaeble (D) Managible

[GATE 2016 : IISc Bangalore (EE Set - 2)]

Q.14 The policeman asked the victim of a theft, "What did you _____ ?

(A) Loose (B) Lose

(C) Loss (D) Louse

[GATE 2016 : IISc Bangalore (EC Set - 1)]

12.7 One Word Substitution

Directions for Questions 1 to 10

In each of the following questions, out of the four alternatives, choose the one which can be substituted for the given words/ sentence.

Q.1 A short, amusing story about some real person or event is called as _____

(A) Myth (B) Anecdote

(C) Fable (D) Allegory

Q.2 Act of bringing gentle and painless death from incurable disease is called as _____

(A) Suicide (B) Fatality

(C) Euthanasia (D) Gallows

Q.3 A small enclosure for cattle, sheep, poultry etc. is called as _____

(A) Eyrie (B) Sty

(C) Pen (D) Lair

Q.4 Music sung or played at night below a person's window is called as _____.

(A) Serenade (B) Sonnet

(C) Lyric (D) Primo

Q.5 Anything written in a letter after it is signed is known as _____.

(A) Corrigendum (B) Postdiction

(C) Postscript (D) Plutocracy

Q.6 Endurance of pain without display of feelings or complaint

(A) Stoicism (B) Perseverance

(C) Reticence (D) Tolerance

Q.7 In a state of anxiety -

(A) Bellicose (B) Frightened

(C) Gloom (D) On tenterhooks

Q.8 A word that refers to small, fast, continuous shaking movement

(A) Oscillation (B) Vibration

(C) Distillation (D) Permutation

Q.9 The act of walking slowly, wasting time -

(A) Stagger (B) Stride

(C) Dawdle (D) Plod

Q.10 A person who easily gives up his party -

(A) Turntake (B) Turncoat

(C) Turnover (D) Turnaround

Q.11 A rewording of something written or spoken is a _____.

(A) Paraphrase (B) Paradox

(C) Paradigm (D) Paraffin

[GATE 2016 : IISc Bangalore (CE Set - 1)]

Q.12 A generic term that include various items of clothing such as a skirt, a pair of trousers and a shirt is

(A) Fabric (B) Textile

(C) Fibre (D) Apparel

[GATE 2015 : IIT Kanpur (CSE Set - 2, EE Set - 2)]

12.8 Error Finding

Directions for Questions 1 to 10

Every sentence is divided into four sections (a, b, c). There is some error in one of these sections. Read the sentence carefully and mark the incorrect section. However, if you feel the sentence contains no error, mark part 'd'.

Q.1 Although he was late (A)/ but he stopped on the way (B)/ to have coffee with his friends. (C)/ No error (D)

Q.2 She was taking care of her baby for two hours (A)/ before she (B)/ was called by her mother. (C)/ No error (D)

Q.3 No sooner did he see his teacher (A)/ when he (B)/ stopped copying. (C)/ No error (D)

Q.4 Had you been to Mumbai, (A)/ I would also go (B)/ with you (C)/ No error (D).

Q.5 She ran so fastly (A)/ that she was able to catch (B)/ the running bus (C)/ No error (D)

Q.6 He met me two days ago (A)/ but he never told me (B)/ about his grandmother's death. (C)/ No error (D).

Q.7 I would request to you (A)/ to consider my application (B)/ for the role of junior engineer. (C)/ No error (D)

Q.8 We are (A)/ looking forward (B)/ to see you personally. (C)/ No error (D)

Q.9 Companies who are (A)/ into manufacturing, particularly in the (B)/ gems and stones business, would benefit the most from the new scheme. (C)/ No error (D)

Q.10 The bill that I have (A)/ says the payment can be made (B)/ until April 30, 2018. (C)/ No error (D)

Q.11 A student is required to demonstrate a high level of **comprehension** of the subject, especially in the social sciences. The word closest in meaning to **comprehension** is

(A) Understanding (B) Meaning

(C) Concentration (D) Stability

[GATE 2014 : IIT Kharagpur (CE Set - 1)]

Q.12 Choose the statement where underlined word is used correctly.

(A) When the teacher eludes to different authors, he is being elusive

(B) When the thief keeps eluding the police, he is being elusive

(C) Matters that are difficult to understand, identify or remember are allusive

(D) Mirages can be allusive, but a better way to express them is illusory

[GATE 2015 : IIT Kanpur (ME Set - 3, IN]

Q.13 Choose the statement where underlined word is used correctly

(A) The minister insured the victims that everything would be all right.

(B) He ensured that the company will not have to bear any loss.

(C) The actor got himself ensured against any accident.

(D) The teacher insured students of good results

[GATE 2015 : IIT Kanpur (CE Set - 2)]

Q.14 Choose the statement where underlined word is used correctly.

(A) The industrialist load a personnel jet.

(B) I write my experience in my personnel diary.

(C) All personnel are being given the day off.

(D) Being religious is a personnel aspect.

[GATE 2015 : IIT Kanpur (CSE Set - 1, EE Set - 1)]

Q.15 Choose the statement(s) where the underlined word is used correctly :

(i) A prone is a dried plum.

(ii) He was lying prone on the floor.

(iii) People who eat a lot of fat are prone to heart disease.

(A) (i) and (ii) only

(B) (iii) only

(C) (i) and (ii) only

(D) (ii) and (iii) only

[GATE 2016 : IISc Bangalore (ME Set - 2)]

❖❖❖❖

A Answer Keys

12.1 Sentence Completion								
1.	C	2.	A	3.	B	4.	A	5.	A
6.	D	7.	B	8.	C	9.	C	10.	D
11.	C	12.	A	13.	C	14.	C	15.	C
16.	D	17.	C	18.	B	19.	A	20.	A
21.	C	22.	C	23.	D	24.	C	25.	B
26.	A	27.	A	28.	B	29.	A	30.	D
31.	C	32.	A	33.	C	34.	A	35.	B

12.2 Sentence Improvement								
1.	A	2.	A	3.	C	4.	A	5.	A
6.	A	7.	B	8.	A	9.	A	10.	C
11.	D	12.	C	13.	A				

12.3 Sentence Correction								
1.	B	2.	D	3.	C	4.	D	5.	C
6.	B	7.	C	8.	D	9.	D	10.	B
11.	C	12.	A	13.	D	14.	C	15.	C
16.	A								

12.4 Idioms & Phrases								
1.	D	2.	C	3.	C	4.	D	5.	C
6.	B	7.	D	8.	B	9.	C	10.	B
11.	A	12.	D	13.	D	14.	D	15.	B
16.	D	17.	D	18.	C	19.	A	20.	D
21.	C	22.	C	23.	A	24.	C		

12.5 Synonyms & Antonyms								
1.	C	2.	A	3.	D	4.	B	5.	C
6.	B	7.	C	8.	B	9.	C	10.	C
11.	C	12.	D	13.	C	14.	C	15.	D
16.	D	17.	C	18.	D	19.	A	20.	D
21.	B	22.	B	23.	A	24.	B	25.	A
26.	D	27.	B	28.	C	29.	B	30.	B
31.	C	32.	C	33.	C	34.	D	35.	A
36.	A	37.	C						

12.6 Spellings								
1.	D	2.	D	3.	A	4.	B	5.	A
6.	B	7.	C	8.	A	9.	A	10.	C
11.	C	12.	D	13.	A	14.	B		

12.7 One Word Substitution								
1.	B	2.	C	3.	C	4.	A	5.	C
6.	A	7.	D	8.	B	9.	C	10.	B
11.	A	12.	D						

12.8 Error Finding								
1.	B	2.	A	3.	B	4.	B	5.	A
6.	B	7.	A	8.	C	9.	A	10.	C
11.	A	12.	B	13.	B	14.	C	15.	D