GATE 2015

Electrical Engineering

General Aptitude

Question Paper & Solutions

1. Given Set A = {2, 3, 4, 5} and Set B = P{11, 12, 13, 14, 15}, two numbers are randomly selected, one from each set. What is the probability that the sum of the two numbers are equals 16?

A. 0.20   B. 0.25

C. 0.30   D. 0.33

Ans. A

Sol. A = {2, 3, 4,6}, B = [11, 12, 13, 14, 15]

Sample space will contain 4 × 5 = 20 events favourable events [2,14] [3, 13] [4, 12] [5, 11] for sum 16.

Required probability $= \dfrac{4}{20} = \dfrac{1}{5} = 0.2$

2. The probabilities that a student passes in Mathematics, Physics and Chemistry are m, p, and c respectively. Of these subjects, the student has 75% chance of passing in at least one, a 50% chance of passing in at least two and a 40% chance of passing in exactly two. Following relations are drawn in m, p, c:

(I) p + m + c = $\dfrac{27}{20}$ (II) p + m + c = $\dfrac{13}{20}$

(III) (p) × (m) × (C) = $\dfrac{1}{10}$

A. Only relation I is true

B. Only relation II is true

C. Relations II and III are true

D. Relations I and III are true

Ans. D

Sol. Given that:

Probability in passing Math P(M) = m

Probability in passing Physics P(P) = p

Probability in passing Chemistry P(C) = c

So,

Probability in failing Math $P(M^1)$ = 1 - m

Probability in failing Physics $P(P^1)$ = 1 - m

Probability in failing Chemistry $P(C^1)$ = 1 - m

Probability of passing in at least one = 0.75

1 – Probability of fail in all = 0.75

Probability of fail = 1 – 0.75

$P(M^1) \times P(P^1) \times P(C^1) = 0.25$

$(1 - M) \times (1 - P) \times (1 - C) = 0.25$

$1 - M - P - C + MP + MC + PC - MPC = 0.25$

$M + P + C - MP - MC - PC + MPC = 0.75$ ….. [A]

Given,

Probability of passing in exactly 2 subjects = 0.4

$P(M) . P(P) . P(C^1) + P(M^1) . P(P)P(C) + P(M).P(P^1) .P(C) = 0.4$

$M.P.(1-C) + (1-M).P.C + M.(1-P).C = 0.4$

$MP - MPC + PC - MPC + MC - MPC = 0.4$

$MP + PC + MC - 3MPC = 0.4$……..[B]

Given,

Probability of passing in at least 2 subject = 0.5

Probability of passing in exactly 2 + Probability of passing in all = 0.5

From Equation [B],

$0.4 + P(M).P(P).P(C) = 0.5$

$MPC = 0.1$

$MPC = 1/10$ …………. [C]

So, putting the value of MPC in equation [B], we get:

$MP + PC + MC = 0.4 + 0.3 = 0.7$ …………[D]

Similarly, Putting the value in equation [A],

$M + P + C - MP - PC - MC + MPC = 0.75$

$M + P + C - 0.7 + 0.1 = 0.75$

$M + P + C = 0.75 + 0.6$

$M + P + C = 1.35 = 0.35/100$

$= 27/20$

Hence, m + p + c = 27/20

So, The correct option is "D" i.e, Relations I and III are true.

A = {2, 3, 4,6}, B = [11, 12, 13, 14, 15]

Sample space will contain 4 × 5 = 20 events favourable events [2,14] [3, 13] [4, 12] [5, 11] for sum 16.

Required probability $= \dfrac{4}{20} = \dfrac{1}{5} = 0.2$

3. 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 numbers of female students in the Civil department and the female students in the Mechanical department?
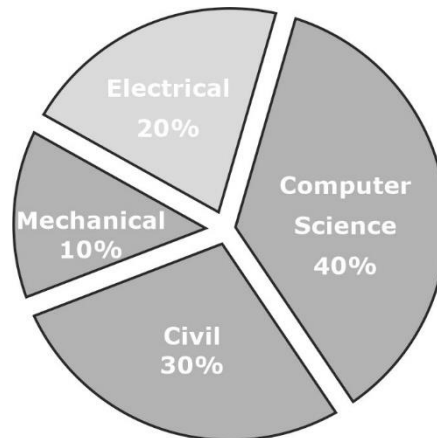
A. 32
B. 36
C. 35
D. 40

[2015 : 2 Marks, Set-1]

Ans. A

Sol. Let the total number of students in electrical be T_e. Male students in electrical is 40.

So, $\dfrac{5}{9} T_e = 40 \Rightarrow T_e = 72$

Also, let total number of students (overall) = T.

$\Rightarrow$ 20% of T = 72 $\Rightarrow$ T = 360

Now number of female students in Civil

$\Rightarrow$ 30% of $360 \times \dfrac{4}{9} = 48$

and number of female students in Mechanical

$\Rightarrow$ 10% of $360 \times \dfrac{4}{9} = 16$

Difference = 48 – 16 = 32

4. The number of students in a class who have answered correctly, wrongly, or not attempted each question in an exam, are listed in the table below. The marks for each question are also listed. There is no negative or partial marking.

Q.No.	Marks	Answered correctly	Answered wrongly	Not attemped
1.	2	21	17	6
2.	3	15	27	2
3.	1	11	29	4
4.	2	23	18	3

5.	55	31	12	1

What is the average of the marks obtained by the class in the examination?

A. 2.290
B. 2.970
C. 6.795
D. 8.795

Ans. C

Sol. Marks are allotted only for correct answer

$$\text{Average marks} = \frac{\text{Total marks}}{\text{No. of students}}$$

$$= \frac{21 \times 2 + 15 \times 3 + 11 \times 1 + 23 \times 2 + 31 \times 5}{21 + 17 + 6} = \frac{299}{44} = 6.795$$

5. Consider a function f(x) = 1− |x| on −1 ≤ x ≤ 1. The value of x at which the function attains a maximum, and the maximum value of the function are :

A. 0, −1
B. −1, 0
C. 0, 1
D. −1, 2

Ans. C

Sol. **Given that:** f(x) = 1 − |x|

For −1 ≤ x ≤ 1, 0 ≤ |x| ≤ 1.

f(x) will be maximum, when |x| is minimum, i.e., |x| = 0 ⇒ x = 0

Maximum value of f(x) = 1 − 0 = 1

Therefore, the correct answer is Option (C)

6. If p, q, r, s are distinct integers such that:

f(p, q, r, s) = max(p, q, r, s)

g(p, q, r, s) = min(p, q, r, s)

h(p, q, r, s) = remainder of (p × q)/(r × s) if (p × q) > (r × s) or remainder of (r × s)/(p × q) if (r × s) > (p × q). Also, a function fgh(p, q, r, s) = f(p, q, r, s)× g(p, q, r, s) × h(p, q, r, s). Also, the same operations are valid with two variable function of the form f(p, q). What is the value of fg(h(2, 5, 7, 3), 4, 6, 8)?

A. 8
B. 9
C. 11
D. 13

Ans. A

Sol. fg(h (2, 5, 7, 3), 4, 6, 8)

$$fg\left[\left(Re\frac{7\times3}{2\times5}\right), 4, 6, 8\right] = fg[1, 4, 6, 8]$$

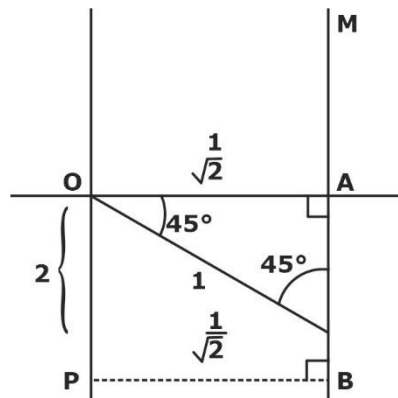$$= f[1, 4, 6, 8] \times g[1, 4, 6, 8] = 8 \times 1$$

7. Four branches of a company are located at M, N, O, and P. M is north of N at a distance of 4 km; P is south of O at a distance of 2 km; N is southeast of O by 1 km. What is the distance between M and P in km?

A. 5.34
B. 6.74
C. 28.5
D. 45.49

Ans. A

Sol. Refer to the figure below.
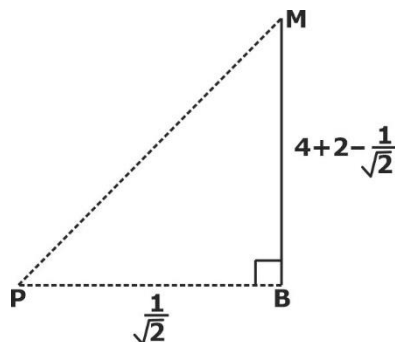

As $\quad$ ON = 1, OA = AN $= \dfrac{1}{\sqrt{2}} = PB$

So, $\quad MB = \left(4 + 2 - \dfrac{1}{\sqrt{2}}\right)$

And $\quad PB = \left(\dfrac{1}{\sqrt{2}}\right)$

$PM = \sqrt{PB^2 + BM^2} = 5.34$

8. Based on the given statements, select the most appropriate option to solve the given question. 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 foot high.

(II) Each step is $1\dfrac{3}{4}$ 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.

[2015 : 1 Mark, Set-1]

Ans. A

Sol. **Given that:** Distance between the two floors of building = 9 feet.

According to the statement I, height of each step = 3/4

According to the statement II, width of each step = 1

Using the data given in the statement I, we can calculate the number of steps in a set of stairs as

$n = \dfrac{9}{3} \times 4 = 12$ steps

So, statement I is sufficient to give the answer.

However, there is no use of width given in statement II to calculate the number of required steps in set of stairs. So, width of foot can be anything, and it is not sufficient to obtain the number of steps.

Thus, statement II alone is not sufficient to give the answer.

Hence, option A is correct..

9. 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.

[2015 : 1 Mark, Set-2]

Ans. C

Sol. From statement (I):

Given that: One-fourth of weight of a pole is 5 kg.

Let the weight of a pole = 'x' kg

$x/4$ = 5 kg

x = 20 kg

Therefore, the total weight of 10 poles is

= 20 × 10 = 200 kg

Therefore, statement (I) is sufficient.

From statement (II):

Given that: The total weight of 10 poles is 160 kg more than the total weight of two poles.

Let the weight of a pole = 'x' kg

So, total weight of 10 poles = 10x kg

From the statement II, we conclude that,

10x = 2x + 160

8x = 160

x = 20

Therefore, the total weight of 10 poles is

= 20 × 10 = 200 kg

Therefore, statement (II) is sufficient.

Hence, the given problem can be solved by using any one of the statement, i.e., either statement (I) or (II) alone is sufficient.

10. If the list of letters, P, R, S, T, U is an arithmetic sequence, which of the following are also in arithmetic sequence?

(I) 2P, 2R, 2S, 2T, 2U

(II) P – 3, R – 3, S – 3, T – 3, U – 3

(III) P^2, R^2, S^2, T^2, U^2

A. I only   B. I and II

C. II and III   D. I and III

[2015 : 1 Mark, Set-2]

Ans. B

Sol. If subtract of multiply every term of an A.P. by a constant resulting sequence will be also A.P. as common difference will still be constant.

11. Which one of the following combinations is incorrect?

    A. Acquiescence-Submission

    B. Wheedle-Roundabout

    C. Flippancy-Lightness

    D. Profligate-Extravagant

[2015 : 1 Mark, Set-1]

Ans. B

Sol. Acquiescence – Acceptance without protect

    Submission – The Act of submitting

    Wheedle – Influence and arguing by gentle urging, caressing as flattering.

    Round-about – Deviation from a straight course

    Flippancy – Inappropriate Levite (light mindedness)

    Lightness – Having a light

    Profligate – A dissolute men in fashionable society

    Extravagant – Recklessly wasteful

    So, the pair Wheedle – Roundabout is not synonym.

12. Didn't you buy _____ when you went shopping:

    A. any paper   B. much paper

    C. no paper   D. a few paper

[2015 : 1 Mark, Set-1]

Ans. A

Sol. The correct determiner to fit the given blank should be "any". This is because it is used to refer to one or some of a thing or number of things, no matter how much or how many.

"no paper" would make the construction of the sentence a double negative since 'didn't' has been used.

"much" is used for uncountable nouns and hence, cannot be used for an object like paper.

"a few paper" is also grammatically incorrect since the correct way to use this determiner would be to say, "a few sheets of paper".

Hence, option A is correct.

13. 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

Ans. C

Sol. For option A:

She had a terrible time at the party - means her time was bad at the party.

For option B:

She had a horrible time at the party - same as above; her time was bad at the party.

For option C:

She had a terrific time at the party - means she had a good time at the party.

For option D:

She had a terrifying time at the party - means she had a frightening (not good) time at the party.

Hence, option C is correct.

14. 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

Ans. C

Sol. "take to heels" means "to run away" or "to flee" which also have the same meaning as "take flight".

Hence, option C is correct.

15. 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.

Course of action:

(I) The after-supply authority should impose a partial cut in supply to tackle the situation.

(II) The government should appeal to the 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

Ans. A

Sol. 3rd course of action is not correct. Banning water supply cannot solve the problem. Hence, option A is correct.

16. We _____ our friend's birthday and we _____ how to make it up to him.

A. completely forgot, don't just know

B. forgot completely, don't just know

C. completely forgot, just don't know

D. forgot completely, just don't know

Ans. C

Sol. In first blank, adverb should be used before the verb, i.e., completely forget.

Again, in second blank, adverb should be used before the verb. We must note that adverb is not being used in between the auxiliary verb, i.e., just don't know.

Thus, the complete Sentence is

We completely forgot our friend's birthday and we just don't know how to make it up to him.

17. A generic term that includes various items of clothing such as a skirt, a pair of trousers and a shirt is

A. fabric   B. textile

C. fibre   D. apparel

Ans. D

Sol. The words given in the options are defined below:

(A) Fabric – artifact made by weaving or felting or knitting or crocheting natural or synthetic fibres.

(B) Textile – textile and fabric are synonym

(C) Fibre – a leather like material made by compressing layers of paper or cloth.

(D) apparel – clothing in general

Thus, apparel is the generic term that includes various items of clothing such as a skirt, a pair of trousers and a shirt.

18. Choose the statement where underlined word is used correctly.

A. The industrialist had a <u>personnel</u> jet.

B. I write my experience in my <u>personnel</u> diary.

C. All <u>personnel</u> are being given the day off.

D. Being religious is a <u>personnel</u> aspect.

[2015 : 1 Mark, Set-2]

Ans. C

Sol. All personnel are being given the day off. Hence, option C is correct.

19. 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.

[2015 : 2 Marks, Set-2]

Ans. A

Sol. Only option (A) seems correct.

In option (B) – were is wrong used here.

In option (C) – real is wrong, should be really

In option (D) – had is wrong. would not have been is correct.