GATE SOLVED PAPER
Electrical Engineering
GENERAL APTITUDE

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GATE SOLVED PAPER - EE

GENERAL APTITUDE

YEAR 2013 ONE MARK

Q. 1 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

Q. 2 Statement: You can always give me a ring whenever you need.
Which one of the following is the best inference from the above statement?
(A) Because I have a nice caller tune.
(B) Because I have a better telephone facility
(C) Because a friend in need is a friend indeed
(D) Because you need not pay towards the telephone bills when you give me a ring

Q. 3 In the summer of 2012, in New Delhi, the mean temperature of Monday to Wednesday was 41°C and of Tuesday to Thursday was 43°C. If the temperature on Thursday was 15% higher than that of Monday, then the temperature in °C on Thursday was
(A) 40 (B) 43
(C) 46 (D) 49

Q. 4 Complete the sentence: Dare ..... mistakes.
(A) commit (B) to commit
(C) committed (D) committing

Q. 5 They were requested not to quarrel with others.
Which one of the following options is the closest in meaning to the word quarrel?
(A) make out (B) call out
(C) dig out (D) fall out

Sol. 1 Option (D) is correct.
They were requested not to quarrel with others.
Quarrel has a similar meaning to 'fall out'

YEAR 2013 TWO MARKS

Q. 6 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

Q. 7 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) $\frac{9(9^n - 1)}{8} + n^2$

Q. 8 Statement: There were different streams of freedom movements in colonial India carried out by the moderates, liberals, radicals, socialists, and so on.
Which one of the following is the best inference from the above statement?

(A) The emergence of nationalism in colonial India led to our Independence

(B) Nationalism in India emerged in the context of colonialism

(C) Nationalism in India is homogeneous

(D) Nationalism in India is heterogeneous

Q. 9 The set of values of p for which the roots of the equation $3x^2 + 2x + p(p-1) = 0$ are of opposite sign is

(A) $(-\infty, 0)$ (B) $(0, 1)$

(C) $(1, \infty)$ (D) $(0, \infty)$

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

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

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

2012 ONE MARK

Q. 11 If $(1.001)^{1259} = 3.52$ and $(1.001)^{2062} = 7.85$, then $(1.001)^{3321}$

(A) 2.23 (B) 4.33

(C) 11.37 (D) 27.64

Q. 12 Choose the most appropriate alternate from the options given below to complete the following sentence :
If the tired soldier wanted to lie down, he.....the mattress out on the balcony.

(A) should take (B) shall take

(C) should have taken (D) will have taken

Q. 13 Choose the most appropriate word from the options given below to complete the following sentence :
Give the seriousness of the situation that he had to face, his.....was impressive.

(A) beggary (B) nomenclature

(C) jealousy (D) nonchalance

Q. 14 Which one of the following options is the closest in meaning to the word given below ?
Latitude

(A) Eligibility (B) Freedom

(C) Coercion (D) Meticulousness

Q. 15 One of the parts (A, B, C, D) in the sentence given below contains an ERROR. Which one of the following is INCORRECT ?

I requested that he should be given the driving test today instead of tomorrow.

(A) requested that (B) should be given

(C) the driving test (D) instead of tomorrow

2012 TWO MARKS

Q. 16 One of the legacies of the Roman legions was discipline. In the legious, military law prevailed and discipline was brutal. Discipline on the battlefield kept units obedient, intact and fighting, even when the odds and conditions were against them.

Which one of the following statements best sums up the meaning of the above passage ?

(A) Through regimentation was the main reason for the efficiency of the Roman legions even in adverse circumstances.

(B) The legions were treated inhumanly as if the men were animals

(C) Disciplines was the armies inheritance from their seniors

(D) The harsh discipline to which the legions were subjected to led to the odds and conditions being against them.

Q. 17 Raju has 14 currency notes in his pocket consisting of only Rs. 20 notes and Rs. 10 notes. The total money values of the notes is Rs. 230. The number of Rs. 10 notes that Raju has is

(A) 5 (B) 6

(C) 9 (D) 10

Q. 18 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

Q. 19 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 percentages of the monthly budget NOT spent on savings is

(A) 10% (B) 14%

(C) 81% (D) 86%

Q. 20 A and B are friends. They decide to meet between 1 PM and 2 PM on a given day. There is a conditions that whoever arrives first will not wait for the other for more than 15 minutes. The probability that they will meet on that days is

(A) 1/4 (B) 1/16

(C) 7/16 (D) 9/16

2011 ONE MARK

Q. 21 There are two candidates P and Q in an election. During the campaign, 40% of voter 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 P and instead voted for Q. 25% of the voter 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

Q. 22 The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relations in the original pair :

Gladiator : Arena

(A) dancer : stage (B) commuter : train

(C) teacher : classroom (D) lawyer : courtroom

Q. 23 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

Q. 24 Choose the word from the from the options given below that is most opposite in meaning to the given word :

Frequency

(A) periodicity (B) rarity

(C) gradualness (D) persistency

Q. 25 Choose the most appropriate word from the options given below to complete the following sentence :

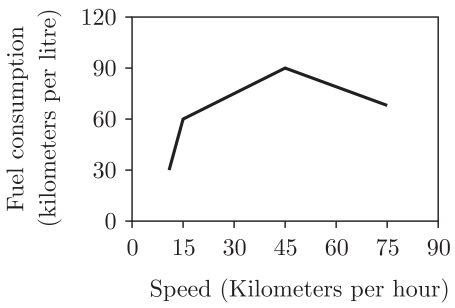
It was her view that the country's had been ..... by foreign techno-crafts, so that to invite them to come back would be counter-productive.

(A) identified (B) ascertained

(C) exacerbated (D) analysed

2011 TWO MARKS

Q. 26 The fuel consumed by a motor cycle during a journey while travelling at various speed is indicated in the graph below.



The distance covered during four laps of the journey are listed in the table below

Lap	Distance (km)	Average speed (km/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 kilometre was least during the lap

(A) P (B) Q

(C) R (D) S

Q. 27 The horse has played a little known but very important role in the field of medicine. Horses were injected with toxins of disease until their blood build up immunities. Then a serum was made from their blood. Serums to fight with diphteria and tetanus were developed this way.

It can be inferred from the passage, that horses were

(A) given immunity to diseases

(B) generally quite immune to diseases

(C) given medicines to fight toxins

(D) given diphtheria and tetanus serums

Q. 28 The sum of n terms of the series $4 + 44 + 444 + ...$

(A) $(4/81)[10^{n+1} - 9n - 1]$ (B) $(4/81)[10^{n-1} - 9n - 1]$

(C) $(4/81)[10^{n+1} - 9n - 10]$ (D) $(4/81)[10^{n} - 9n - 10]$

Q. 29 Given that $f(y) = |y|/y$, and q is any non-zero real number, the value of $|f(q) - f(-q)|$ is

(A) 0 (B) -1

(C) 1 (D) 2

Q. 30 Three friends R, S and T shared toffee from a bowl. R took $1/3^{rd}$ of the toffees, but returned four to the bowl. S took $1/4^{th}$ 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

2010 ONE MARK

Q. 31 Which of the following options is the closest in meaning to the word below ?
Circuitous
(A) Cyclic (B) Indirect
(C) Confusing (D) Crooked

Q. 32 The question below consist 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

Q. 33 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) unhold (B) restrain
(C) cherish (D) conserve

Q. 34 Choose the most appropriate word from the options given below to 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

Q. 35 25 persons are in a room 15 of them play hockey, 17 of them play football and 10 of them play hockey and football. Then the number of persons playing neither hockey nor football is
(A) 2 (B) 17
(C) 13 (D) 3

2010 TWO MARKS

Q. 36 Modern warfare has changed from large scale clashes of armies to suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare ; and regretfully, their exist people in military establishments who think that chemical agents are useful fools for their cause.
Which of the following statements best sums up the meaning of the above passage ?
(A) Modern warfare has resulted in civil strife.
(B) Chemical agents are useful in modern warfare.
(C) Use of chemical agents in ware fare would be undesirable.
(D) People in military establishments like to use chemical agents in war.

Q. 37 If $137 + 276 = 435$ how much is $731 + 672$?
(A) 534 (B) 1403
(C) 1623 (D) 1531

Q. 38 5 skilled workers can 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

Q. 39 Given digits 2, 2, 3, 3, 3, 4, 4, 4, 4 how much distinct 4 digit numbers greater than 3000 can be formed ?

(A) 50 (B) 51

(C) 52 (D) 54

Q. 40 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 :

1. Hari's age + Gita's age > Irfan's age + Saira's age.
2. The age difference between Gita and Saira is 1 year. However, Gita is not the oldest and Saira is not the youngest.
3. There are no twins.

In what order were they born (oldest first) ?

(A) HSIG (B) SGHI

(C) IGSH (D) IHSG

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SOLUTIONS

Sol. 1 Option (D) is correct
Two and two make four

Sol. 2 Option (C) is correct.
You can always given me a ring whenever you need. Because a friend is need is a friend indeed

Sol. 3 Option (C) is correct.
Let the temperature on Monday, Tuesday, Wednesday and Thursday be respectively as T_M, T_{TU}, T_W, T_{TH}
So, from the given data we have

$$\frac{T_H + T_{TU} + T_W}{3} = 41 \quad \text{....(1)}$$

and $$\frac{T_{TU} + T_W + T_{TH}}{3} = 43 \quad \text{....(2)}$$

also, as the temperature on Thursday was 15% higher than that of Monday
i.e. $$T_{TH} = 1.15\,T_M \quad \text{....(3)}$$
solving eq (1), (2) and (3), we obtain

$$T_{TH} = 46^\circ\text{C}$$

Sol. 4 Option (B) is correct.
Dare to commit mistakes

Sol. 5 Option (D) is correct.
They were requested not to quarrel with others.
Quarrel has a similar meaning to 'fall out'

Sol. 6 Option (C) is correct.
Given, the distance travelled by the car in each quarter intervals as

Distance	Time Duration
8 km	$\frac{1}{4}$hr
6 km	$\frac{1}{4}$hr
16 km	$\frac{1}{4}$hr

$$\text{Therefore, the total time taken} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{3}{4}\text{hr}$$

$$\text{Total distance travelled} = 8 + 6 + 16 = 30\text{ km}$$

Hence, $$\text{average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

$$= \frac{30}{3/4} = 40\text{ km/hr}$$

Sol. 7 Option (D) is correct.
It will be easy to check the options for given series. From the given series.

$$10 + 84 + 734 + ...$$

We get

$$\text{Sum of 1 term} = S_1 = 10$$
$$\text{Sum of 2 terms} = S_2 = 10 + 84 = 94$$
$$\text{and sum of 3 terms} = S_3 = 10 + 84 + 734 = 828$$

Checking all the options one by one, we observe that only (D) option satisfies as

$$S_n = \frac{9(9^n - 1)}{8} + n^2$$

so,
$$S_1 \ \frac{9(9^2 - 1)}{8} + 2^2 = 10$$
$$S_2 = \frac{9(9 - 1)}{8} + 2^2 = 94$$
$$S_3 = \frac{9(9^3 - 1)}{8} + 3^2 = 828$$

Sol. 8 Option (D) is correct.

Nationalism in India is heterogeneous

Sol. 9 Option (B) is correct.

Given, the quadratic equation

$$3x^2 + 2x + P(P - 1) = 0$$

It will have the roots with opposite sign if

$$P(P - 1) < 0$$

So it can be possible only when

$$P < 0 \text{ and } P - 1 > 0$$

or
$$P > 0 \text{ and } P - 1 < 0$$

The 1st condition tends to no solution for P.

Hence, from the second condition, we obtain

$$0 < P < 1$$

i.e., P is in the range $(0, 1)$

Sol. 10 Option (A) is correct.

In a leap year, there are 366 days So, 52 weeks will have 52 saturdays and for remaining two days $(366 - 52 \times 7 = 2)$. We can have the following combinations

Saturday, Sunday
Sunday, Monday
Monday, Tuesday
Tuesday, Wednesday
Wednesday, Thursday
Thursday, Friday
Friday, Saturday

Out of these seven possibilities, only two consist a saturday. Therefore, the probability of saturday is given as

$$P = \frac{2}{7}$$

Sol. 11 Option (D) is correct.

Let
$$1.001 = x$$

So in given data :

$$x^{1259} = 3.52$$
$$x^{2062} = 7.85$$

Again
$$x^{3321} = x^{1259+2062}$$
$$= x^{1259}x^{2062}$$
$$= 3.52 \times 7.85$$
$$= 27.64$$

Sol. 12 Option (C) is correct.

Sol. 13 Option (D) is correct.

Sol. 14 Option (B) is correct.

Sol. 15 Option (B) is correct.

Sol. 16 Option (A) is correct.

Sol. 17 Option (A) is correct.

Let no. of notes of Rs.20 be x and no. of notes of Rs. 10 be y.
Then from the given data.
$$x + y = 14$$
$$20x + 10y = 230$$
Solving the above two equations we get
$$x = 9,\ y = 5$$
So, the no. of notes of Rs. 10 is 5.

Sol. 18 Option (A) is correct.

We will categorize the 8 bags in three groups as :
(i) $A_1A_2A_3$, (ii) $B_1B_2B_3$, (iii) C_1C_2
Weighting will be done as bellow :
1st weighting → $A_1A_2A_3$ will be on one side of balance and $B_1B_2B_3$ on the other. It may have three results as described in the following cases.

Case 1 : $A_1A_2A_3 = B_1B_2B_3$
This results out that either C_1 or C_2 will heavier for which we will have to perform weighting again.
2nd weighting → C_1 is kept on the one side and C_2 on the other.

if $C_1 > C_2$ then C_1 is heavier.
$C_1 < C_2$ then C_2 is heavier.

Case 2 : $A_1A_2A_3 > B_1B_2B_3$
it means one of the $A_1A_2A_3$ will be heavier So we will perform next weighting as:
2nd weighting → A_1 is kept on one side of the balance and A_2 on the other.

if $A_1 = A_2$ it means A_3 will be heavier
$A_1 > A_2$ then A_1 will be heavier
$A_1 < A_2$ then A_2 will be heavier

Case 3 : $A_1A_2A_3 < B_1B_2B_3$
This time one of the $B_1B_2B_3$ will be heavier, So again as the above case weighting will be done.
2nd weighting → B_1 is kept one side and B_2 on the other

if $B_1 = B_2$ B_3 will be heavier
$B_1 > B_2$ B_1 will be heavier
$B_1 < B_2$ B_2 will be heavier

So, as described above, in all the three cases weighting is done only two times to

give out the result so minimum no. of weighting required = 2.

Sol. 19 Option (D) is correct.

$$\text{Total budget} = 4000 + 1200 + 2000 + 1500 + 1800 = 10,500$$

The amount spent on saving $= 1500$

So, the amount not spent on saving

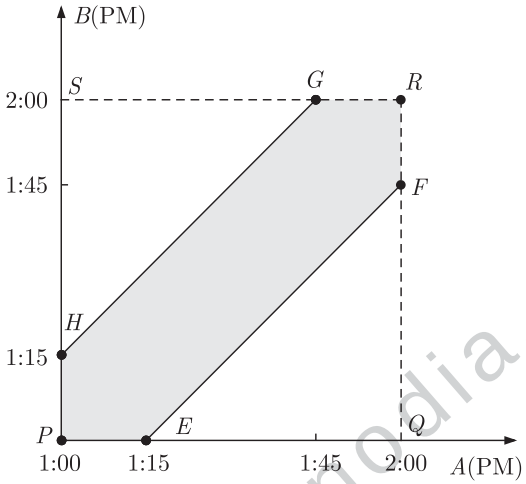
$$= 10,500 - 1500 = 9000$$

So, percentage of the amount

$$= \frac{9000}{10500} \times 100\% = 86\%$$

Sol. 20 Option (S) is correct.

The graphical representation of their arriving time so that they met is given as below in the figure by shaded region.



So, the area of shaded region is given by

$$\text{Area of } \square PQRS - (\text{Area of } \Delta EFQ + \text{Area of } \Delta GSH)$$

$$= 60 \times 60 - 2\left(\frac{1}{2} \times 45 \times 45\right)$$

$$= 1575$$

So, the required probability $= \frac{1575}{3600} = \frac{7}{16}$

Sol. 21 Option (A) is correct.

Let us assume total voters are 100. Thus 40 voter (i.e. 40 %) promised to vote for P and 60 (rest 60 %) promised to vote fore Q.

Now, 15% changed from P to Q (15 % out of 40)

Changed voter from P to Q $\frac{15}{100} \times 40 = 6$

Now Voter for P $40 - 6 = 34$

Also, 25% changed form Q to P (out of 60%)

Changed voter from Q to P $\frac{25}{100} \times 60 = 15$

Now Voter for P $34 + 15 = 49$

Thus P P got 49 votes and Q got 51 votes, and P lost by 2 votes, which is given. Therefore 100 voter is true value.

Sol. 22 Option (A) is correct.
A gladiator performs in an arena. Commutators use trains. Lawyers performs, but do not entertain like a gladiator. Similarly, teachers educate. Only dancers performs on a stage.

Sol. 23 Option (D) is correct.
Available is appropriate because manipulation of genes will be done when other treatments are not useful.

Sol. 24 Option (B) is correct.
Periodicity is almost similar to frequency. Gradualness means something happening with time. Persistency is endurance. Rarity is opposite to frequency.

Sol. 25 Option (C) is correct.
The sentence implies that technocrats are counterproductive (negative). Only (C) can bring the same meaning.

Sol. 26 Option (B) is correct.
Since fuel consumption/litre is asked and not total fuel consumed, only average speed is relevant. Maximum efficiency comes at 45 km/hr, So least fuel consumer per litre in lap Q

Sol. 27 Option (B) is correct.
Option B fits the sentence, as they built up immunities which helped humans create serums from their blood.

Sol. 28 Option (C) is correct.

$$4+44+444+\ldots\ldots\ldots\ldots 4(1+11+111+\ldots\ldots)$$
$$=\frac{4}{9}(9+99+999+\ldots\ldots\ldots\ldots)$$
$$=\frac{4}{9}[(10-1)+(100-1)+\ldots\ldots\ldots]$$
$$=\frac{4}{9}[10(1+10+10^2+10^3)-n]$$
$$=\frac{4}{9}\left[10\times\frac{10^n-1}{10-1}-n\right]$$
$$=\frac{4}{81}[10^{n+1}-10-9n]$$

Sol. 29 Option (D) is correct.

$$f(y)=\frac{|y|}{y}$$

Now $$f(-y)=\frac{|-y|}{y}=-f(y)$$

or $$|f(q)-f(-q)|=|2f(q)|=2$$

Sol. 30 Option (C) is correct.
Let total no of toffees be x. The following table shows the all calculations.

	Friend	Bowl Status
R	$=\frac{x}{3}-4$	$=\frac{2x}{3}+4$
S	$=\frac{1}{4}\left[\frac{2x}{3}+4\right]-3$ $=\frac{x}{6}+1-3=\frac{x}{6}-2$	$=\frac{2x}{3}+4-\frac{x}{6}+2$ $=\frac{x}{2}+6$
T	$=\frac{1}{2}\left(\frac{x}{2}+6\right)-2$ $=\frac{x}{4}+1$	$=\frac{x}{2}+6-\frac{x}{4}-1$ $=\frac{x}{4}+5$

Now, $\frac{x}{4}+5=17$

or $\frac{x}{4}=17-5=12$

$x=12\times 4=48$

Sol. 31 Option (B) is correct.
Circuitous means round about or not direct. Indirect is closest in meaning to this circuitous

(A) Cyclic : Recurring in nature
(B) Indirect : Not direct
(C) Confusing : lacking clarity of meaning
(D) Crooked : set at an angle; not straight

Sol. 32 Option (B) is correct.
A worker may by unemployed. Like in same relation a sleeper may be unaware.

Sol. 33 Option (D) is correct.
Here conserve is most appropriate word.

Sol. 34 Option (C) is correct.
Betrayed means reveal unintentionally that is most appropriate.

Sol. 35 Option (D) is correct.
Number of people who play hockey $n(A)=15$
Number of people who play football $n(B)=17$
Persons who play both hockey and football $n(A\cap B)=10$
Persons who play either hockey or football or both :

$$n(A\cup B)=n(A)+n(B)-n(A\cap B)$$
$$=15+17-10=22$$

Thus people who play neither hockey nor football $=25-22=3$

Sol. 36 Option (D) is correct.

Sol. 37 Option (C) is correct.
Since $7+6=13$ but unit digit is 5 so base may be 8 as 5 is the remainder when 13 is divided by 8. Let us check.

137_8 731_8
$\underline{276_8}$ $\underline{672_8}$
435 Thus here base is 8. Now 1623

Sol. 38 Option (D) is correct.

Let W be the total work.

Per day work of 5 skilled workers $= \frac{W}{20}$

Per day work of one skill worker $= \frac{W}{5 \times 20} = \frac{W}{100}$

Similarly per day work of 1 semi-skilled workers $= \frac{W}{8 \times 25} = \frac{W}{200}$

Similarly per day work of one semi-skill worker $= \frac{W}{10 \times 30} = \frac{W}{300}$

Thus total per day work of 2 skilled, 6 semi-skilled and 5 unskilled workers is

$= \frac{2W}{100} + \frac{6W}{200} + \frac{5W}{300} = \frac{12W + 18W + 10W}{600} = \frac{W}{15}$

Therefore time to complete the work is 15 days.

Sol. 39 Option (B) is correct.

As the number must be greater than 3000, it must be start with 3 or 4. Thus we have two case:

Case (1) If left most digit is 3 an other three digits are any of 2, 2, 3, 3, 4, 4, 4, 4.

(1) Using 2, 2, 3 we have 3223, 3232, 3322 i.e. $\frac{3!}{2!} = 3$ no.

(2) Using $2,2,4$ we have 3224, 3242, 3422 i.e. $\frac{3!}{2!} = 3$ no.

(3) Using $2,3,3$ we have $3233, 3323, 3332$ i.e. $\frac{3!}{2!} = 3$ no.

(4) Using $2,3,4$ we have $3! = 6$ no.

(5) Using $2,4,4$ we have $3244, 3424, 3442$ i.e. $\frac{3!}{2!} = 3$ no.

(6) Using $3,3,4$ we have 3334, 3343, 3433 i.e. $\frac{3!}{2!} = 3$ no.

(7) Using $3,4,4$ we have $3344, 3434, 3443$ i.e. $\frac{3!}{2!} = 3$ no.

(8) Using $4,4,4$ we have 3444 i.e. $\frac{3!}{3!} = 1$ no.

Total 4 digit numbers in this case is

$1 + 3 + 3 + 3 + 6 + 3 + 3 + 3 + 1 = 25$

Case 2 : If left most is 4 and other three digits are any of 2, 2, 3, 3, 3, 4, 4, 4.

(1) Using $2,2,3$ we have 4223, 4232, 4322 i.e. . $\frac{3!}{2!} = 3$ no

(2) Using $2,2,4$ we have 4224, 4242, 4422 i.e. . $\frac{3!}{2!} = 3$ no

(3) Using $2,3,3$ we have 4233, 4323, 4332 i.e. . $\frac{3!}{2!} = 3$ no

(4) Using $2,3,4$ we have i.e. . $3! = 6$ no

(5) Using $2,4,4$ we have 4244, 4424, 4442 i.e. . $\frac{3!}{2!} = 3$ no

(6) Using $3,3,3$ we have 4333 i.e $\frac{3!}{3!} = 1.$ no.

(7) Using $3,3,4$ we have 4334, 4343, 4433 i.e. . $\frac{3!}{2!} = 3$ no

(8) Using $3,4,4$ we have 4344, 4434, 4443 i.e. . $\frac{3!}{2!} = 3$ no

(9) Using $4,4,4$ we have 4444 i.e. $\frac{3!}{3!} = 1$. no

Total 4 digit numbers in 2nd case$= 3+3+3+6+3+3+1+3+1 = 26$
Thus total 4 digit numbers using case (1) and case (2) is $= 25+26 = 51$

Sol. 40 Option (B) is correct.

Let H, G, S and I be ages of Hari, Gita, Saira and Irfan respectively.

Now from statement (1) we have $H+G > I+S$

Form statement (2) we get that $G-S=1$ or $S-G=1$

As G can't be oldest and S can't be youngest thus either GS or SG possible.

From statement (3) we get that there are no twins

(A) HSIG : There is I between S and G which is not possible

(B) SGHI : SG order is also here and $S > G > H > I$ and $G+H > S+I$ which is possible.

(C) IGSH : This gives $I > G$ and $S > H$ and adding these both inequalities we have $I+S > H+G$ which is not possible.

(D) IHSG : This gives $I > H$ and $S > G$ and adding these both inequalities we have $I+S > H+G$ which is not possible.

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