MAH BEd CET — Mental Ability

Sample Paper – 3

Duration: 36 Minutes **Maximum Marks: 40**

Instructions

- This paper contains **40** Multiple Choice Questions (Single Correct Answer), modelled on the Mental Ability portion of **MAH BEd CET**.
- Each correct answer carries **+1 mark**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Topics: Series, Analogies, Coding-Decoding, Classification, Syllogism, Blood Relations, Direction Sense, Dice Problems, Pattern Recognition.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited. This is an OMR-based pen-and-paper test.

Q1. Find the next term in the series:

$$5,\quad 8,\quad 6,\quad 9,\quad 7,\quad 10,\quad 8,\quad \_\_$$

(A) 11

(B) 10

(C) 12

(D) 9

Q2. Find the missing term in the series:

AZ, **BY**, **CX**, **DW**, __

(A) FU

(B) EV

(C) EU

(D) FV

Q3. Find the missing term in the series:

$$2, \quad 6, \quad 12, \quad 20, \quad 30, \quad \_\_$$

(A) 36

(B) 38

(C) 42

(D) 40

Q4. Find the next term in the series:

$$1, \quad 2, \quad 6, \quad 24, \quad 120, \quad \_\_$$

(A) 240

(B) 360

(C) 600

(D) 720

Q5. Find the next term in the series:

$$10, \quad 15, \quad 12, \quad 17, \quad 14, \quad 19, \quad 16, \quad \_\_$$

(A) 21

(B) 19

(C) 20

(D) 22

Q6. Find the next term in the series:

$$1, \quad 4, \quad 13, \quad 40, \quad 121, \quad \_\_$$

(A) 244

(B) 364

(C) 344

(D) 400

Q7. Find the next term in the series:

$$256, \quad 64, \quad 16, \quad 4, \quad \_\_$$

(A) 2

(B) 0

(C) 1

(D) 3

Q8. Choose the word that best completes the analogy:

Baker : **Bread** :: **Sculptor** : __

(A) Clay

(B) Museum

(C) Tool

(D) Statue

Q9. Choose the word that best completes the analogy:

Iron : **Steel** :: **Clay** : __

(A) Pottery

(B) Brick

(C) Sand

(D) Rock

Q10. Choose the number that best completes the analogy:

3 : 24 :: 5 : __

(A) 30

(B) 40

(C) 50

(D) 35

Q11. Choose the word that best completes the analogy:

Write : Pen :: Cut : __

(A) Blade

(B) Sliver

(C) Scissors

(D) Sharpen

Q12. Choose the word that best completes the analogy:

Cup : Tea :: Jug : __

(A) Coffee

(B) Glass

(C) Milk

(D) Water

Q13. Choose the word that best completes the analogy:

Red : Crimson :: Blue : __

(A) Indigo

(B) Maroon

(C) Scarlet

(D) Amber

Q14. Choose the word that best completes the analogy:

Length : **Metre** :: **Temperature** : __

(A) Degree

(B) Kelvin

(C) Heat

(D) Thermometer

Q15. In a certain code, **MATH** is written as **JXQE** (each letter is shifted back by 3 positions in the alphabet, with wrap-around). Using the same rule, what is the code for **PLAN**?

(A) MXIK

(B) NIXK

(C) MIXK

(D) NJXK

Q16. In a certain code, **FLOWER** is written as **GMPXFS** (each letter is shifted forward by 1 position). Using the same rule, what is the code for **GARDEN**?

(A) IBSEFO

(B) HBSFEO

(C) HBSDFO

(D) HBSEFO

Q17. In a certain code, **LION** is coded as **12-9-15-14** (A=1, B=2, . . . , Z=26). What is the code for **BEAR**?

(A) 2-5-1-18

(B) 3-5-1-17

(C) 1-5-2-18

(D) 2-6-1-18

Q18. Using the code A=1, B=2, . . . , Z=26, which word is represented by **20-5-1-13**?

(A) TEEM

(B) TEAM

(C) TALE

(D) TAME

Q19. In a certain code, each vowel is replaced by the next vowel in the sequence A→E, E→I, I→O, O→U, U→A (with wrap-around), while consonants remain unchanged. The code for **SHINE** is:

(A) SHENI

(B) SHONE

(C) SHONI

(D) SHUNE

Q20. If a word is coded by retaining only the letters at positions 1, 3, and 5 (counted from the left), what is the code for **STRONG**?

(A) SOG

(B) STR

(C) SRG

(D) SRN

Q21. Three of the following four share a common characteristic. Find the **odd one out**:

Sparrow, **Parrot**, **Ostrich**, **Pigeon**

(A) Ostrich

(B) Parrot

(C) Pigeon

(D) Sparrow

Q22. Find the **odd one out** from the following numbers:

$$14, \quad 21, \quad 28, \quad 35, \quad 45$$

(A) 14

(B) 45

(C) 21

(D) 28

Q23. Three of the following four instruments belong to the same category. Find the **odd one out**:

Flute, **Trumpet**, **Veena**, **Bugle**

(A) Flute

(B) Trumpet

(C) Veena

(D) Bugle

Q24. Three of the following four elements share a common property. Find the **odd one out**:

Sodium, **Calcium**, **Potassium**, **Nitrogen**

(A) Sodium

(B) Calcium

(C) Potassium

(D) Nitrogen

Q25. Three of the following four belong to the same category. Find the **odd one out**:

East, **West**, **South**, **Centre**

(A) Centre

(B) East

(C) West

(D) South

Q26. Three of the following four crops belong to the same category. Find the **odd one out**:

Wheat, **Groundnut**, **Rice**, **Maize**

(A) Wheat

(B) Groundnut

(C) Rice

(D) Maize

Q27. Read the statements and conclusions carefully. Decide which conclusion(s) logically follow from the given statements.

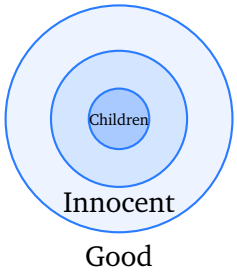
Statements:

- All children are innocent.
- All innocent people are good.

Conclusions:

I. All children are good.

II. Some good people are children.



(A) Only I

(B) Only II

(C) Both I and II

(D) Neither

Q28. Read the statements and conclusions carefully. Decide which conclusion(s) logically follow from the given statements.

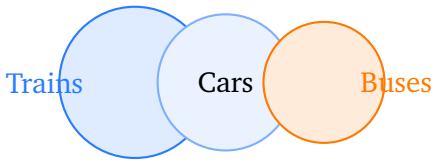
Statements:

- Some trains are cars.
- Some cars are buses.

Conclusions:

I. Some trains are buses.

II. All buses are trains.



(A) Only I

(B) Only II

(C) Both I and II

(D) Neither

Q29. Read the statements and conclusions carefully. Decide which conclusion(s) logically follow from the given statements.

Statements:

- No plant can walk.
- Cactus is a plant.

Conclusions:

I. Cactus cannot walk.

II. All non-walking things are plants.

(A) Only I

(B) Only II

(C) Both I and II

(D) Neither

Q30. Read the statements and conclusions carefully. Decide which conclusion(s) logically follow from the given statements.

Statements:

- Some vegetables are green.
- All green things are healthy.

Conclusions:

I. All vegetables are healthy.

II. Some vegetables are healthy.

(A) Only I

(B) Only II

(C) Both I and II

(D) Neither

Q31. Read the statements and conclusions carefully. Decide which conclusion(s) logically follow from the given statements.

Statements:

- All rivers flow into the sea.
- Ganga is a river.

Conclusions:

I. Ganga flows into the sea.

II. Some seas have rivers flowing into them.

(A) Only I

(B) Only II

(C) Both I and II

(D) Neither

Q32. Sita's father's sister is Geeta. What is Geeta's son to Sita?

(A) Brother

(B) Uncle

(C) Nephew

(D) Cousin

Q33. Rajan is the only son of his father. Rajan's sister's son is Mohan. How is Mohan related to Rajan?

(A) Nephew

(B) Son

(C) Brother

(D) Cousin

Q34. A's mother is B's father's wife. How is B related to A?

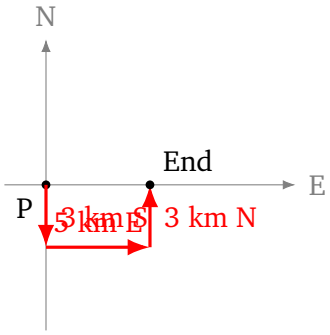
(A) Father

(B) Brother

(C) Uncle

(D) Cousin

Q35. A boy stands at point P facing East. He turns 90° clockwise and walks 3 km, then turns 90° anti-clockwise and walks 5 km, then turns 90° anti-clockwise again and walks 3 km. In which direction is point P from his **final position**?



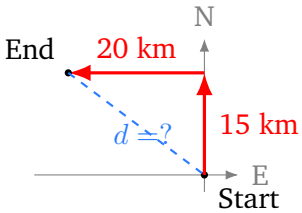
(A) East

(B) South

(C) West

(D) North

Q36. A person travels 15 km towards North and then 20 km towards West. What is the shortest distance from his starting point?



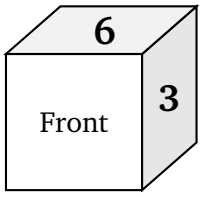
(A) 35 km

(B) 30 km

(C) 20 km

(D) 25 km

Q37. In a standard die, opposite faces always sum to 7 (pairs: 1–6, 2–5, 3–4). The **top** face shows **6** and the **right** face shows **3**. What number is on the **left** face?



Top$= 6$, Right$= 3$, Left$=?$

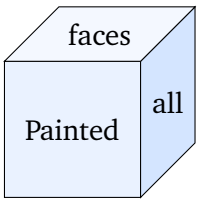
(A) 4

(B) 3

(C) 2

(D) 1

Q38. A $4 \times 4 \times 4$ cube is painted on all its outer faces and then cut into 64 equal smaller cubes. How many of the smaller cubes have **exactly 2 faces** painted?



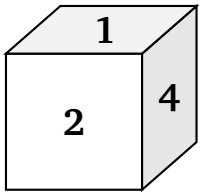
(A) 16

(B) 24

(C) 32

(D) 8

Q39. A die is placed so that **1** is on the top, **2** is on the face towards you, and **4** is on the right face. What number is on the **left** face?



Top= 1, Front= 2, Right= 4, Left=?

(A) 1

(B) 5

(C) 3

(D) 6

Q40. Study the pattern in the figure series and identify the missing figure (marked **?**):

△ △△ □ □□ △ △△ □ **?**

(A) △

(B) △△

(C) □

(D) □□

Detailed Solutions

Q1.

Solution

The series alternates between adding 3 and subtracting 2 (zigzag pattern):

$$5 \xrightarrow{+3} 8 \xrightarrow{-2} 6 \xrightarrow{+3} 9 \xrightarrow{-2} 7 \xrightarrow{+3} 10 \xrightarrow{-2} 8 \xrightarrow{+3} \mathbf{11}$$

The next term is **11**.

Answer: (A)

Q2.

Solution

Each pair combines the n-th letter from the beginning of the alphabet with the n-th letter from the end:

$$A(1) + Z(26), \quad B(2) + Y(25), \quad C(3) + X(24), \quad D(4) + W(23), \quad \mathbf{E(5) + V(22)}$$

The missing term is **EV**.

Answer: (B)

Q3.

Solution

Each term follows the formula $n(n+1)$ for $n = 1, 2, 3, \ldots$:

$$1 \times 2 = 2, \quad 2 \times 3 = 6, \quad 3 \times 4 = 12, \quad 4 \times 5 = 20, \quad 5 \times 6 = 30, \quad \mathbf{6 \times 7 = 42}$$

The missing term is **42**.

Answer: (C)

Q4.

Solution

The series consists of consecutive factorials:

$$1! = 1, \quad 2! = 2, \quad 3! = 6, \quad 4! = 24, \quad 5! = 120, \quad \mathbf{6! = 720}$$

The next term is **720**.

Answer: (D)

Q5.

Solution

The series alternates between adding 5 and subtracting 3:

$$10 \xrightarrow{+5} 15 \xrightarrow{-3} 12 \xrightarrow{+5} 17 \xrightarrow{-3} 14 \xrightarrow{+5} 19 \xrightarrow{-3} 16 \xrightarrow{+5} \mathbf{21}$$

The next term is **21**.

Answer: (A)

Q6.

Solution

Each term is obtained by multiplying the previous term by 3 and adding 1:

$$1\times3+1=4, \quad 4\times3+1=13, \quad 13\times3+1=40, \quad 40\times3+1=121, \quad \mathbf{121\times3+1=364}$$

The next term is **364**.

Answer: (B)

Q7.

Solution

Each term is obtained by dividing the previous term by 4:

$$256\div4=64, \quad 64\div4=16, \quad 16\div4=4, \quad \mathbf{4\div4=1}$$

The next term is **1**.

Answer: (C)

Q8.

Solution

The analogy pairs a craftsperson with the product they create:

- A **Baker** creates **Bread**.
- A **Sculptor** creates a **Statue**.

Clay is the raw material used by a sculptor, not the product. The answer is **Statue**.

Answer: (D)

Q9.

Solution

The analogy describes how a raw material is transformed into a finished product:

- **Iron** is processed to produce **Steel**.
- **Clay** is fired/moulded to produce **Pottery**.

Brick requires additional materials and a different process; Pottery is the direct product of shaped and fired clay. The answer is **Pottery**.

Answer: (A)

Q10.

Solution

The relationship is multiplication by 8:

$$3 \times 8 = 24 \quad \Longrightarrow \quad 5 \times 8 = \mathbf{40}$$

The answer is **40**.

Answer: (B)

Solution

Q11. The analogy pairs an action with the specific instrument used to perform it:

- You **Write** using a **Pen**.
- You **Cut** using **Scissors**.

A blade can cut, but scissors are the standard paired instrument (as a pen is for writing). The answer is **Scissors**.

Answer: (C)

Solution

Q12. The analogy pairs a container with the liquid most commonly associated with it:

- A **Cup** is primarily associated with **Tea**.
- A **Jug** is primarily associated with **Water**.

The answer is **Water**.

Answer: (D)

Solution

Q13. The analogy links a base colour to one of its deep named shades:

- **Crimson** is a deep shade of **Red**.
- **Indigo** is a deep shade of **Blue**.

Maroon and Scarlet are shades of red, not blue. Amber is an orange-yellow hue. The answer is **Indigo**.

Answer: (A)

Solution

The analogy pairs a physical quantity with its SI base unit:

Q14.

- The SI unit of **Length** is the **Metre**.
- The SI base unit of **Temperature** is the **Kelvin**.

"Degree" is informal; Thermometer is an instrument, not a unit. The answer is **Kelvin**.

Answer: (B)

Solution

Each letter is shifted back by 3 positions (A wraps: $A(1) - 3 = -2 \equiv 24 = X$):

Q15.

Letter	P	L	A	N
Position	16	12	1	14
-3	13	9	24*	11
Code	M	I	X	K

*Wrap-around: $1 - 3 = -2;\ -2 + 26 = 24 = X$.

The code for **PLAN** is **MIXK**.

Answer: (C)

Solution

Each letter is shifted forward by 1 position:

Q16.

Letter	G	A	R	D	E	N
Position	7	1	18	4	5	14
$+1$	8	2	19	5	6	15
Code	H	B	S	E	F	O

The code for **GARDEN** is **HBSEFO**.

Answer: (D)

Solution

Using A=1, B=2, . . . , Z=26:

Q17.

Letter	B	E	A	R
Code	2	5	1	18

The code for **BEAR** is **2-5-1-18**.

Answer: (A)

Solution

Decoding each number using A=1, B=2, . . . , Z=26:

Q18.

Code	20	5	1	13
Letter	T	E	A	M

The word represented is **TEAM**.

Answer: (B)

Solution

Vowels shift to the next vowel (A→E, E→I, I→O, O→U, U→A); consonants are unchanged:

Q19.

Letter	S	H	I	N	E
Type	Cons.	Cons.	Vowel	Cons.	Vowel
Code	S	H	O	N	I

The code for **SHINE** is **SHONI**.

Answer: (C)

Solution

The letters of **STRONG** at positions 1, 3, and 5 are:

Q20.

Position	1	2	3	4	5	6
Letter	S	T	R	O	N	G

Positions 1, 3, 5 give: **S**, **R**, **N** $\Rightarrow$ Code = **SRN**.

Answer: (D)

Solution

Q21.

- **Sparrow**, **Parrot**, and **Pigeon** are birds that can *fly*.
- **Ostrich** is a flightless bird — its wings are vestigial and it *cannot fly*.

The odd one out is **Ostrich**.

Answer: (A)

Q22.

Solution

Checking divisibility by 7:

$$14 \div 7 = 2, \quad 21 \div 7 = 3, \quad 28 \div 7 = 4, \quad 35 \div 7 = 5, \quad 45 \div 7 \approx 6.43$$

All numbers except **45** are exactly divisible by 7. The odd one out is **45**.

Answer: (B)

Solution

Q23.

- **Flute**, **Trumpet**, and **Bugle** are *wind instruments* (sound produced by blowing air through a tube).
- **Veena** is a *string instrument* (sound produced by plucking strings).

The odd one out is **Veena**.

Answer: (C)

Solution

Q24.

- **Sodium** (Na), **Calcium** (Ca), and **Potassium** (K) are *metals* (alkali/alkaline-earth group).
- **Nitrogen** (N) is a *non-metal* — a diatomic gas at room temperature, belonging to Group 15.

The odd one out is **Nitrogen**.

Answer: (D)

Solution

Q25.

- **East**, **West**, and **South** are cardinal compass *directions*.
- **Centre** denotes a *position* (the middle point), not a direction of travel.

The odd one out is **Centre**.

Answer: (A)

Solution

Q26.

- **Wheat**, **Rice**, and **Maize** are *cereal crops* (grains from the grass family, Poaceae).
- **Groundnut** (peanut) is an *oilseed/legume crop* belonging to the family Fabaceae — not a cereal.

The odd one out is **Groundnut**.

Answer: (B)

Q27.

Solution

The three concentric circles show Children $\subset$ Innocent $\subset$ Good.

Statement 1: All children are innocent $\Rightarrow$ Children $\subseteq$ Innocent.

Statement 2: All innocent people are good $\Rightarrow$ Innocent $\subseteq$ Good.
By transitivity: Children $\subseteq$ Good.

Conclusion I: "All children are good." **TRUE** — follows directly by transitivity.
Conclusion II: "Some good people are children." **TRUE** — children form a non-empty subset of good people, so this converse partial relation holds.

Both conclusions follow. The answer is **Both I and II**.

Answer: (C)

Q28.

Solution

The Venn diagram shows Trains and Cars partially overlapping, and Cars and Buses partially overlapping. The Trains and Buses circles may be entirely disjoint.

Conclusion I: "Some trains are buses." **NOT CERTAIN** — the overlap between Trains and Cars, and Cars and Buses, does not guarantee any overlap between Trains and Buses.
Conclusion II: "All buses are trains." **FALSE** — this far stronger claim is not supported by the statements.

Neither conclusion follows. The answer is **Neither**.

Answer: (D)

Q29.

Solution

Statement 1: No plant can walk (Plants $\cap$ Walking-things $= \emptyset$).
Statement 2: Cactus is a plant (Cactus $\in$ Plants).

Conclusion I: "Cactus cannot walk." **TRUE** — Cactus is a plant and no plant can walk, so Cactus cannot walk.
Conclusion II: "All non-walking things are plants." **FALSE** — many non-plants (rocks, rivers, etc.) also cannot walk; the converse does not hold.

Only Conclusion I follows. The answer is **Only I**.

Answer: (A)

Q30.

Solution

Statement 1: Some vegetables are green (at least some members of Vegetables $\in$ Green set).

Statement 2: All green things are healthy (Green $\subseteq$ Healthy).

Conclusion I: "All vegetables are healthy." **FALSE** — only the green vegetables are guaranteed to be healthy; non-green vegetables may not be.
Conclusion II: "Some vegetables are healthy." **TRUE** — the green vegetables are healthy (by Statement 2), and some vegetables are green (Statement 1), so at least some vegetables are healthy.

Only Conclusion II follows. The answer is **Only II**.

Answer: (B)

Q31.

Solution

Statement 1: All rivers flow into the sea (Rivers $\subseteq$ {things that flow into the sea}).
Statement 2: Ganga is a river (Ganga $\in$ Rivers).

Conclusion I: "Ganga flows into the sea." **TRUE** — direct deduction from both statements.
Conclusion II: "Some seas have rivers flowing into them." **TRUE** — since rivers exist and all rivers flow into the sea, at least one sea receives river flow.

Both conclusions follow. The answer is **Both I and II**.

Answer: (C)

Q32.

Solution

Chain:

$$\text{Sita's father's sister} = \text{Geeta} \Rightarrow \text{Geeta is Sita's } \textit{Paternal Aunt}$$

$$\text{Geeta's son} = \text{Sita's aunt's son} = \textbf{Cousin (first cousin)}$$

The answer is **Cousin**.

Answer: (D)

Q33.

Solution

Rajan is the *only son* of his father, so Rajan has no brothers. The question mentions Rajan's sister, so Rajan does have a sister.

Chain:

$$\text{Rajan's sister's son} = \text{Mohan}$$

A sister's son is a *nephew*. Therefore, Mohan is Rajan's **Nephew**.

Answer: (A)

Q34.

Solution

A's mother is B's father's wife.
B's father's wife = B's mother (in a standard family).
So A's mother = B's mother $\Rightarrow$ A and B share the same mother.

Therefore, B is A's **Brother**.

Answer: (B)

Q35.

Solution

Tracing the path from P:

1. Facing East, turn 90° clockwise $\Rightarrow$ faces **South**. Walk 3 km South.
2. Turn 90° anti-clockwise from South $\Rightarrow$ faces **East**. Walk 5 km East.
3. Turn 90° anti-clockwise from East $\Rightarrow$ faces **North**. Walk 3 km North.

Net displacement: 3 km South and 3 km North cancel out; net position is **5 km East of P**.
Since the final position is 5 km East of P, point P lies to the **West** of the final position.

The answer is **West**.

Answer: (C)

Q36.

Solution

The path forms a right-angled triangle with legs of 15 km (North) and 20 km (West).

Applying the Pythagorean theorem:

$$d = \sqrt{15^2 + 20^2} = \sqrt{225 + 400} = \sqrt{625} = \mathbf{25}\ \text{km}$$

The shortest distance from the starting point is **25 km**.

Answer: (D)

Q37.

Solution

In a standard die, opposite faces always sum to 7:

$$1 \leftrightarrow 6, \quad 2 \leftrightarrow 5, \quad 3 \leftrightarrow 4$$

Given: Top $= 6$ (opposite face $= 1 =$ bottom), Right $= 3$ (opposite face $= 4 =$ left).

The face opposite to the right face (3) is the left face: $7 - 3 = \mathbf{4}$.
The left face shows **4**.

Answer: (A)

Solution

In a $4 \times 4 \times 4$ cube $(n = 4)$ with all faces painted and cut into $4^3 = 64$ unit cubes:

Q38.

- **3 faces painted** (corner cubes): 8 (one per vertex).
- **2 faces painted** (edge cubes): Each of the 12 edges has $(n - 2) = 2$ non-corner cubes.

$$\text{Total} = 12 \times 2 = \mathbf{24}$$

- **1 face painted** (face-centre cubes): $6 \times (n - 2)^2 = 6 \times 4 = 24$.
- **0 faces painted** (interior cubes): $(n - 2)^3 = 2^3 = 8$.

The number of smaller cubes with exactly 2 faces painted is **24**.

Answer: (B)

Q39.

Solution

In a standard die, opposite faces always sum to 7:

$$1 \leftrightarrow 6, \quad 2 \leftrightarrow 5, \quad 3 \leftrightarrow 4$$

Given: Top $= 1$, Front $= 2$, Right $= 4$.

The face opposite to the right face (4) is the left face: $7 - 4 = \mathbf{3}$.
The left face shows **3**.

Answer: (C)

Solution

The series follows a repeating block of 4 figures:

$$\underbrace{\triangle,\ \triangle\triangle,\ \square,\ \square\square}_{\text{Block 1 (positions 1–4)}},\quad \underbrace{\triangle,\ \triangle\triangle,\ \square,\ \square\square}_{\text{Block 2 (positions 5–8)}}$$

Q40.

Pos.	1	2	3	4	5	6	7	**8**
Fig.	△	△△	□	□□	△	△△	□	□□

Position 8 corresponds to the 4th element of the repeating block, which is □□.

The missing figure is □□.

Answer: (D)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	B	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	B
11	C	12	D	13	A	14	B	15	C
16	D	17	A	18	B	19	C	20	D
21	A	22	B	23	C	24	D	25	A
26	B	27	C	28	D	29	A	30	B
31	C	32	D	33	A	34	B	35	C
36	D	37	A	38	B	39	C	40	D