

Scholastic Aptitude Test, 2014 EC, natural science, entrance exam, round 1

Grade 12 · Aptitude · 2014 E.C.

MARKING KEY — CONFIDENTIAL

Time allowed: 120 minutes

Questions: 44

Total marks: 44

1. APPARENT (1)
- A. ✓ **Masked** B. Evident
C. Perceptible D. Obvious

Answer: A

The word 'apparent' means clearly visible, obvious, or evident. Its antonym is 'masked', which means hidden or concealed, while 'evident', 'perceptible', and 'obvious' are synonyms.

2. BLEAK (1)
- A. Gloomy B. ✓ **Bright**
C. Chilly D. Dismal

Answer: B

The word 'bleak' means dreary, cold, or gloomy. 'Bright' is its direct antonym, whereas 'gloomy', 'chilly', and 'dismal' are closely related synonyms.

3. CONVERT (1)
- A. Transform B. Transmute
C. Change D. ✓ **Persist**

Answer: D

To 'convert' is to change, transform, or transmute. 'Persist' means to continue in the same state or opinion without changing, making it the opposite of convert.

4. CONVENIENT (1)
- A. Suited B. Handy
C. Comfortable D. ✓ **Unsuitable**

Answer: D

The word 'convenient' means suitable or handy for a purpose. 'Unsuitable' is the direct antonym, whereas 'suited', 'handy', and 'comfortable' are synonyms.

5. DISASTER (1)
- A. Mishap B. Calamity
C. ✓ **Prosperity** D. Misfortune

Answer: C

A 'disaster' is a catastrophic event or misfortune (similar to mishap and calamity). 'Prosperity' means a state of flourishing, good fortune, or success, which serves as the antonym.

6. DISDAIN (1)

- A. Like
B. ✓ **Approve**
C. Despise
D. Detest

Answer: B

To 'disdain' means to reject with contempt or look down upon. 'Approve' is the most suitable antonym in a formal context as it means to agree to or think favorably of, while 'despise' and 'detest' are synonyms.

7. DEPRIVE (1)

- A. Despoil
B. Dispossess
C. Direst
D. ✓ **Restore**

Answer: D

To 'deprive' means to take away or dispossess someone of something. 'Restore' means to return or give back, which is the exact antonym of deprive.

8. PRINCIPLE: DOCTRINE (1)

- A. Myopic: Farsighted
B. Experience: Knowledge
C. Living: Dead
D. ✓ **Climb: Ascent**

Answer: D

'Principle' and 'doctrine' are synonyms representing a set of beliefs. Similarly, 'climb' and 'ascent' are synonyms representing the act of going upward.

9. EXERCISE: MANEUVER (1)

- A. Implement: Propose
B. Prepare: Criticize
C. ✓ **Alphabetical: Sequential**
D. Tacit: Superior

Answer: C

A maneuver is a specific type of exercise, just as alphabetical is a specific type of sequential order. The other options do not share this classification relationship.

10. MONARCH: KING (1)

- A. Lion: Charismatic
B. Donkey: Load
C. Cobra: Venom
D. ✓ **Butterfly: Insect**

Answer: D

A king is a specific type of monarch, and a butterfly is a specific type of insect. This represents a categorical (taxonomic) relationship, which is absent in the other options.

11. CONSTITUTION: LAW (1)

- A. Lawyer: Supervise
B. Judge: Advice
C. ✓ **Government: Rule**
D. Parliament: Administer

Answer: C

A constitution establishes the framework of law, just as a government establishes the framework of rule.

12. All planets revolve around the sun. Earth is a planet and revolves around the sun. DIV revolves around the sun. Therefore DIV (1)
- A. ✓ **could be a planet.** B. is likely to be a man made satellite.
C. does not appear to be a planet. D. is unlikely to be a planet.

Answer: A

Although all planets revolve around the sun, other celestial and man-made objects do as well; therefore, knowing only that DIV revolves around the sun means it 'could be' a planet, but not necessarily.

13. Find the two statements that together prove that " Abeba has black hair." Abeba has long hair. Almaz has black hair. Almaz is ten years old. Abeba's hair is the same color as Almaz's. Almaz has short hair (1)
- A. 1 & 5 B. 2 & 3
C. 1 & 2 D. ✓ **2 & 4**

Answer: D

Statement 2 asserts that Almaz has black hair, and Statement 4 states that Abeba's hair is the same color as Almaz's. Together, they logically prove that Abeba has black hair.

14. Any meat contains a lot of protein. Any protein can cause uric acid. Abebe eats a lot of meat. We can say that (1)
- A. Abebe does not need to have medical checkup for uric acid.
B. Uric acid does not cause serious illness.
C. Abebe suffers from uric acid related illness
D. ✓ **Abebe is likely to have uric acid related illness.**

Answer: D

Since meat contains protein and protein can cause uric acid, eating a lot of meat increases the likelihood of uric acid accumulation. Thus, Abebe is likely to have a related illness, but we cannot definitively assert he already 'suffers' from it.

15. Find the two statements that together prove: "Helen is a country music singer." Helen sings in a band. Helen likes country music the best. Difficult music such as country and classical require a strongly trained voice. Helen's band plays country songs. Helen has attended singing lessons for many years. (1)
- A. 3 & 5 B. ✓ **1 & 4**
C. 1 & 3 D. 2 & 5

Answer: B

Statement 1 ('Helen sings in a band') combined with Statement 4 ('Helen's band plays country songs') directly proves that Helen sings country music, making her a country music singer.

16. Five planes leave the airport at the same time. Plane B arrives at the destination before planes A & D, but after plane C. Plane E arrives before plane D but after plane A. Which plane is the last to arrive at the destination? (1)
- A. plane C B. ✓ **plane D**
C. plane A D. plane B

Answer: B

By analyzing the arrival order: plane C arrives first, followed by plane B. Then, since E arrives after A but before D, and B arrives before A and D, the order is C < B < A < E < D. Thus, plane D is the last to arrive.

17. Assume that: All JUNS are TIFS Some UMIS are HUNS All DAES are HUNS All TIES are DAES Which of the following is correct? (1)

- A. All HUNS are HYNS
- B. All JUNS are HYNS
- C. ✓ All DAES are HUNS
- D. All JUNS are DAES

Answer: C

The statement 'All DAES are HUNS' is directly given as one of the premises in the question, making it absolutely correct.

18. All wild animals contribute to the wellbeing of the ecosystem of our planet. All wild animals are endangered. Carnivorous animals are more endangered. A lion is a carnivorous animal and symbolizes charisma and courage. People love to see it. A lion someday would disappear from the Earth. Therefore (1)

- A. life is the survival of the fittest and this works for wild animals too;
- B. wild animals cause harm and we do not need to worry about them.
- C. we should particularly take care of lions.
- D. ✓ we should protect all wild animals with emphasis on endangered animals.

Answer: D

Since all wild animals contribute to the ecosystem but are endangered (with carnivorous animals like lions being even more endangered), the most logical conclusion is that we must protect all wild animals with a special focus on those that are endangered.

19. The black rhinoceros lives on the plains of Africa. It has very poor eyesight and a very bad temper! The black rhino is powerful and can be dangerous. It is a very endangered animal. Hunters kill it for its valuable horns. It can be said that (1)

- A. ✓ The black rhino could be dangerous to people.
- B. It is not relevant to talk about wild animals while people are killing each other.
- C. Human beings are endangered animals.
- D. Wild animals are created to serve the interests of man.

Answer: A

The passage explicitly states that the black rhino has 'a very bad temper', is 'powerful and can be dangerous', directly supporting the statement that it could be dangerous to people.

20. According to the passage (1)

- A. Governments are committed to keep warming below 1.5°C.
- B. ✓ Some people have already started to suffer from climate change
- C. The effect of climate change is not felt now.
- D. The effect of climate change will be serious by 2030.

Answer: B

Standard passages on climate change emphasize that its impacts are already being felt globally, meaning some people have already started to suffer from its consequences.

21. According to paragraph one, which of the following is not directly related to climate change? (1)

- A. ✓ Fuel energy
- B. Protracted droughts
- C. Displacement of people
- D. Deteriorating health conditions

Answer: A

Droughts, displacement, and deteriorating health are direct impacts (effects) of climate change mentioned in the introductory paragraph, whereas fuel energy is a cause, not a direct impact of climate change.

22. According to the passage, which of the following contributes to climate change? (1)

- A. Solar energy
- B. Wind energy
- C. ✓ **Coal energy**
- D. hydroelectric energy

Answer: C

Coal is a fossil fuel whose combustion releases greenhouse gases, contributing to climate change, unlike solar, wind, and hydroelectric energy which are renewable and clean.

23. Fossil fuel production must decline by roughly 6 per cent per year between 2020 and 2030' means (1)

- A. ✓ **It is not possible to fully avoid fuel energy by 2030**
- B. Climate change is caused by natural processes.
- C. The world has to completely depend on renewable energy
- D. It is not possible to keep warming below 1.5°C.

Answer: A

A decline of 6% per year between 2020 and 2030 means fossil fuels are being phased down gradually rather than eliminated overnight, indicating that it is not possible to fully avoid fossil fuel energy by 2030.

24. The man's _____ driving resulted in a death of a young man. (1)

- A. exceptional
- B. ✓ **negligent**
- C. burdensome
- D. charismatic

Answer: B

The word 'negligent' means failing to take proper care, which directly explains why the reckless driving led to a fatal accident. 'Exceptional' and 'charismatic' have positive connotations, while 'burdensome' does not fit grammatically.

25. Many young Ethiopian soldiers lost their lives and are _____ of their country. (1)

- A. nonconformists
- B. ✓ **heroes**
- C. reactionaries
- D. compatriots

Answer: B

Soldiers who sacrifice their lives in service of their nation are conventionally honored as 'heroes' of their country. 'Compatriots' refers to fellow citizens, which is redundant and contextually inappropriate here.

26. If a constitution of a country is not implemented; it is _____. (1)

- A. existential
- B. bountiful
- C. ✓ **nominal**
- D. judgmental

Answer: C

A 'nominal' constitution exists in name only and is not implemented or followed in practice.

27. Searching frantically to find the hidden jewels, the thieves proceeded to _____ the entire house. (1)

- A. amplify
- B. ✓ **ransack**
- C. justify
- D. darken

Answer: B

To 'ransack' means to search through a place thoroughly, often in a messy or destructive way to steal something, which fits the context of thieves searching for hidden jewels.

28. It is said that there is no _____ in the absence of a criminal law (1)
- A. bribe
B. ✓ crime
C. raping
D. theft

Answer: B

This statement refers to the fundamental legal principle 'nullum crimen sine lege' (no crime without law), which asserts that there can be no crime in the absence of criminal law.

29. On one Sunday 2400 male and female students attended a certain event. The ratio of male to female was 3 to 5. (1)
How many females attended the event?
- A. 1400
B. ✓ 1500
C. 800
D. 900

Answer: B

The total number of parts in the ratio is $3 + 5 = 8$. The number of females is $(5/8)$ of the total students: $(5 / 8) * 2400 = 1500$.

30. If $2x+3y=7$ and $3x-5y=1$, what is the value of $3x-3y$? (1)
- A. 2
B. 1
C. 4
D. ✓ 3

Answer: D

Solving the system $2x + 3y = 7$ and $3x - 5y = 1$ gives $x = 2$ and $y = 1$. Substituting these into $3x - 3y$ yields $3(2) - 3(1) = 3$.

31. Consider the system of linear inequalities $4x-3y \leq 12$ and $x + 2y > 6$. Which one of the following belongs to the solution set of the given system of linear inequalities? (1)
- A. ✓ (1, 4)
B. (1, 1)
C. (0,1)
D. (0,3)

Answer: A

Substituting the point (1, 4) into the system gives $4(1) - 3(4) = -8 \leq 12$ and $1 + 2(4) = 9 > 6$, both of which are true. Thus, (1, 4) belongs to the solution set.

32. If $f(x) = 2x-6$ and $g(x) = x^3 + x^2 - 12x$, which one of the following is equal to $(x^2 + 4x)f(x) - 2g(x)$? (1)
- A. ✓ 0
B. 48
C. -24
D. 24

Answer: A

Expanding $(x^2 + 4x)(2x - 6)$ gives $2x^3 + 2x^2 - 24x$. Subtracting $2g(x) = 2x^3 + 2x^2 - 24x$ yields 0.

33. A carpenter wants to buy two types of nails, the first type costs 200 birr per kilogram and the second type costs 350 birr per kilogram. He needs at least 5 kilograms of the first type and at least 7 kilograms of the second type. The carpenter can spend at most 5000 birr. If x represents the amount of the first type of nail and y represents the second type of nail, which of the following system of linear inequalities represents the situation? (1)
- A. $x + y \geq 12$ $200x + 350y \geq 5000$
B. $x + y \leq 12$ $200x + 350y \geq 5000$
C. ✓ $x + y \geq 12$ $200x + 350y \leq 5000$
D. $x + y \leq 12$ $200x + 350y \leq 5000$

Answer: C

Since the carpenter can spend at most 5000 birr, we have $200x + 350y \leq 5000$. The conditions $x \geq 5$ and $y \geq 7$ imply that the total amount must satisfy $x + y \geq 12$, corresponding to option C.

34. A certain restaurant sells sandwich for 65 birr and soft-drink for 20 birr. On a certain day the restaurant collected 28360 birr after selling 300 sandwiches and a certain amount of soft-drinks. How many soft-drinks were sold on that day? (1)
- A. 400
B. 393
C. ✓ 443
D. 450

Answer: C

The total revenue from selling 300 sandwiches is $300 \times 65 = 19500$ birr. The remaining revenue from soft-drinks is $28360 - 19500 = 8860$ birr. Dividing this by the price per soft-drink (20 birr) gives 443 soft-drinks sold.

35. In a certain store, there was coffee from three different places; 35% of the total was from Jimma, 50% of the total from Harar, and 15% of the total from Sidama. If all the coffee from Harar is sold and no other coffee is added or sold, what percentage of the remaining coffee will be the coffee from Sidama? (1)
- A. 40%
B. 50%
C. 20%
D. ✓ 30%

Answer: D

After all the Harar coffee (50%) is sold, the remaining coffee comprises Jimma (35%) and Sidama (15%), which sums to 50% of the original total. Sidama coffee then makes up $15\% / 50\% = 30\%$ of this remaining coffee.

36. The first term of a sequence is -2 and every term after the first term is -3 times the preceding term. How many of the first 60 terms are less than 1? (1)
- A. ✓ 30
B. 20
C. 50
D. 40

Answer: A

The terms of the sequence alternate in sign: the first term is -2 , the second is 6, the third is -18 , etc. Only the odd-numbered terms are negative (and thus less than 1), while the even-numbered terms are positive and greater than 1. In the first 60 terms, there are exactly 30 odd-numbered terms.

37. If the 6 term of an arithmetic sequence is 18 and the 21 term of the sequence is 78, what is the 10th term of the sequence? (1)
- A. ✓ 34
B. 40
C. 36
D. 38

Answer: A

Using the formula for the n th term of an arithmetic sequence, $a_{21} - a_6 = 15d = 78 - 18 = 60$, which gives a common difference $d = 4$. Thus, the 10th term is $a_{10} = a_6 + 4d = 18 + 4(4) = 34$.

38. What is the quotient when the polynomial $x^3 + 512$ is divided by $x + 8$? (1)
- A. $x^2 + 64$
B. ✓ $x^2 - 8x + 64$
C. $x^2 + 8x + 64$
D. $x^2 - 64$

Answer: B

Using the sum of cubes factorization formula, $x^3 + 512 = x^3 + 8^3 = (x + 8)(x^2 - 8x + 64)$. Dividing this by $x + 8$ leaves the quotient $x^2 - 8x + 64$.

The height function $h(t) = -16t^2 + 96t + 112$ is a downward-opening parabola whose maximum height occurs at the vertex, $t = -b/(2a) = -96/(2 \cdot -16) = 3$ seconds. Substituting $t = 3$ into the function gives $h(3) = -16(9) + 96(3) + 112 = 256$ meters.

— END OF MARKING KEY —

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