CUET 2026 Physical Education May 29 Shift 1

Question Paper (Memory-Based) with Solutions

Conducted by National Testing Agency (NTA)

General Instructions

(i) The examination will be conducted in Computer-Based Test (CBT) mode.

(ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.

(iii) The total number of questions are 50.

(iv) Duration of the exam is 1 hour (60 minutes).

1. A student has a resting heart rate of 72 beats per minute and a maximum heart rate of 196 beats per minute. According to the Karvonen Formula, what will be the target heart rate at 70% intensity?

(A) 146.8 bpm
(B) 158.8 bpm
(C) 164.2 bpm
(D) 172.4 bpm

Correct Answer: (B) 158.8 bpm

Solution:

Step 1: Understanding the Question:
This question asks us to calculate the target heart rate (THR) of an individual using the Karvonen formula.
The Karvonen formula is a highly reliable method for establishing personalized exercise intensity zones.
Unlike simpler methods that rely solely on age-predicted maximum heart rate, this formula

incorporates the individual's resting heart rate (RHR).

By including the resting heart rate, the formula calculates the heart rate reserve, making the target heart rate zone far more personalized and accurate for training purposes.

Step 2: Key Formula or Approach:

The Karvonen formula relies on the following mathematical steps and equations:

1. Compute the Heart Rate Reserve (HRR):

$$\text{HRR} = \text{Maximum Heart Rate (MHR)} - \text{Resting Heart Rate (RHR)}$$

2. Compute the Target Heart Rate (THR) at a specified intensity:

$$\text{THR} = (\text{HRR} \times \text{Intensity}) + \text{RHR}$$

Given parameters:

Resting Heart Rate (RHR) = 72 bpm.

Maximum Heart Rate (MHR) = 196 bpm.

Exercise Intensity = 70% = 0.70.

Step 3: Detailed Explanation:

1. First, we identify the variables provided in the problem statement.
2. The student's resting metabolic state yields a resting heart rate (RHR) of 72 bpm.
3. The maximal exercise capacity of the student corresponds to a maximum heart rate (MHR) of 196 bpm.
4. Next, we determine the Heart Rate Reserve (HRR) by calculating the difference between MHR and RHR:

$$\text{HRR} = 196 - 72 = 124 \text{ bpm}$$

5. The value of 124 bpm represents the range of heartbeats available for physical exertion.
6. Now, we apply the training intensity percentage to the calculated reserve:

$$124 \times 0.70 = 86.8 \text{ bpm}$$

7. This intermediate value represents the heart rate increase required to maintain a 70% intensity level.
8. Finally, we add this increase to the base resting heart rate to establish the absolute target rate:

$$\text{THR} = 86.8 + 72 = 158.8 \text{ bpm}$$

9. This absolute value of 158.8 bpm is the optimal training rate for the student.

Step 4: Final Answer:

The calculated target heart rate at 70% intensity is 158.8 bpm, which corresponds directly to Option (B).

Quick Tip: Always remember to calculate the Heart Rate Reserve (HRR) first by subtracting RHR from MHR.

A common mistake is directly multiplying the intensity percentage by the maximum heart rate.

Ensure you always add the resting heart rate back at the final step of the calculation.

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2. Match the following sports injuries with their most appropriate description:

List I	List II
(a) Sprain	(i) Injury to muscle fibres
(b) Strain	(ii) Injury to ligament
(c) Dislocation	(iii) Bone displacement from joint
(d) Fracture	(iv) Break in bone continuity

Choose the correct option:

(A) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

(B) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

(C) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

(D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

Correct Answer: (A) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

Solution:

Step 1: Understanding the Question:

This question requires matching different categories of sports-related injuries with their standard medical or physical definitions.

Injuries in sports are categorized into soft tissue injuries (such as sprains and strains) and hard tissue or joint injuries (such as dislocations and fractures).

Understanding these precise definitions is essential for immediate first aid, diagnosis, and rehabilitation planning in sports medicine.

Step 2: Detailed Explanation:

1. Let us analyze each injury from List I and link it to its corresponding description in List II.
2. (a) Sprain: A sprain is a soft tissue injury that involves the stretching, twisting, or tearing of ligaments.
3. Ligaments are tough bands of fibrous connective tissue that connect bone to bone at joints, providing stability.
4. Therefore, Sprain matches with (ii) Injury to ligament.
5. (b) Strain: A strain is a soft tissue injury involving muscles or tendons, which connect muscles to bones.
6. It occurs when muscle fibers stretch or tear due to overexertion or sudden movement.
7. Therefore, Strain matches with (i) Injury to muscle fibres.
8. (c) Dislocation: This joint injury occurs when the bones forming a joint are forced out of their normal alignment.
9. It causes severe pain and temporary joint deformity, requiring immediate professional reset.
10. Therefore, Dislocation matches with (iii) Bone displacement from joint.
11. (d) Fracture: A fracture is a hard tissue injury defined as a partial or complete break in the continuity of a bone.

12. This can range from hairline cracks to complex, compound breaks.
13. Therefore, Fracture matches with (iv) Break in bone continuity.
14. Combining these matches, we get: (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv).

Step 3: Final Answer:

The matched pairs align perfectly with Option (A).

Quick Tip: To easily differentiate between Sprain and Strain, use a simple alphabetical association. "Sprain" contains the letter "p" which does not appear in tendon or muscle, but "Strain" contains the letter "t" which stands for "Tendon".

This makes it simple to remember that Strains affect Tendons and muscles, while Sprains affect Ligaments.

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3. In a knockout tournament involving 27 teams: Total number of matches to be played is, and Number of byes in the first round is

(A) 25 matches, 5 byes
(B) 26 matches, 5 byes
(C) 26 matches, 3 byes
(D) 27 matches, 5 byes

Correct Answer: (B) 26 matches, 5 byes

Solution:

Step 1: Understanding the Question:

This question asks for the total matches and the count of first-round byes in a single knockout tournament with 27 teams.

In a knockout tournament, any team that loses a match is immediately eliminated.

Byes are given in the first round to ensure that the number of teams remaining in the second

round is a power of 2, allowing a balanced tournament bracket.

Step 2: Key Formula or Approach:

To solve tournament structure questions, we apply two standard mathematical formulas:

1. Total number of matches (M) in a knockout tournament with N teams:

$$M = N - 1$$

2. Total number of byes (B) given in the first round:

$$B = 2^x - N$$

Where 2^x is the next power of 2 greater than or equal to the total number of teams N.

Step 3: Detailed Explanation:

1. We start with the total number of teams, given as $N = 27$.
2. We calculate the total number of matches to find the tournament winner:

$$\text{Matches} = 27 - 1 = 26 \text{ matches}$$

3. In a knockout format, each match eliminates exactly one team.
4. To eliminate 26 teams and leave 1 champion, we must play exactly 26 matches.
5. Next, we determine the number of byes for the first round of play.
6. We find the powers of 2: $2, 4, 8, 16, 32, 64$, and so on.
7. The next power of 2 immediately greater than 27 is 32 (which is 2^5).
8. Now, we calculate the number of byes using the formula:

$$\text{Byes} = 32 - 27 = 5 \text{ byes}$$

9. These 5 teams will not play in the first round and will advance directly to the second round.
10. This configuration results in exactly 26 matches and 5 byes.

Step 4: Final Answer:

The calculations show there are 26 matches and 5 byes, which matches Option (B).

Quick Tip: For any knockout tournament, the number of matches is always $N-1$ regardless of whether N is odd or even.
To find byes, list your powers of 2 (2, 4, 8, 16, 32, 64...) and choose the first value greater than the team count.
Subtracting the team count from this power of 2 gives you the correct number of byes immediately.

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4. Which of the following correctly represents the sequence of energy systems used during a 400 m sprint race?

(A) Aerobic → ATP-PC → Lactic Acid
(B) ATP-PC → Lactic Acid → Aerobic
(C) Lactic Acid → ATP-PC → Aerobic
(D) Aerobic → Lactic Acid → ATP-PC

Correct Answer: (B) ATP-PC → Lactic Acid → Aerobic

Solution:

Step 1: Understanding the Question:
This question tests our understanding of human bioenergetics and the transition of energy pathways during exercise.
A 400 m sprint is a high-intensity, maximal-effort running event lasting approximately 43 to 60 seconds.
During this brief, intense performance, the human body transitions through various energy pathways to meet demands.

Step 2: Detailed Explanation:
1. When an athlete starts a 400 m sprint, the body requires immediate, explosive energy.

2. The primary source for this explosive start is the ATP-PC (Adenosine Triphosphate-Phosphocreatine) system.
3. This system operates anaerobically (without oxygen) and provides maximum energy for the first 8 to 10 seconds of sprinting.
4. As the phosphocreatine stores in muscles deplete rapidly, the body must transition to another energy pathway.
5. Around the 10-second mark, the Lactic Acid system (also called anaerobic glycolysis) becomes the dominant pathway.
6. This system breaks down stored glycogen to produce ATP, generating lactic acid as a metabolic byproduct.
7. The Lactic Acid system supplies energy for high-intensity work lasting up to 60 to 90 seconds.
8. As the runner nears the end of the race and transitions to recovery, the Aerobic system increases its contribution.
9. Although slow to respond, the Aerobic system utilizes oxygen to help clear lactate and restore metabolic balance.
10. Therefore, the sequence of metabolic system dominance is ATP-PC, followed by Lactic Acid, and then Aerobic.

Step 3: Final Answer:

This progression of metabolic pathways corresponds to Option (B).

Quick Tip: Remember that all three energy pathways contribute to some degree at all times during exercise.
However, the dominant system changes based on the duration and intensity of the activity.
For short, explosive, high-intensity events, the sequence always begins with the rapid ATP-PC system.

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5. A person consumes 3200 kcal in a day. If carbohydrates contribute 55% of total calories, approximately how many grams of carbohydrates are consumed?

(A) 320 g

(B) 400 g

(C) 440 g

(D) 520 g

Correct Answer: (C) 440 g

Solution:

Step 1: Understanding the Question:

The objective of this question is to determine the macronutrient composition of an individual's diet in grams.

We are given the total daily caloric intake and the percentage of those calories that must come from carbohydrates.

We will calculate the total calories from carbohydrates and then convert those calories into grams.

Step 2: Key Formula or Approach:

To solve this question, we use two calculations:

1. Calculate the total calories contributed by carbohydrates:

$$\text{Carbohydrate Calories} = \text{Total Calories} \times \left(\frac{\text{Carbohydrate Percentage}}{100} \right)$$

2. Convert carbohydrate calories into grams using the physiological fuel factor:

$$\text{Grams of Carbohydrates} = \frac{\text{Carbohydrate Calories}}{\text{Energy Value per Gram}}$$

Where 1 gram of carbohydrate yields approximately 4 kcal of energy.

Step 3: Detailed Explanation:

1. First, identify the total daily energy intake, which is 3200 kcal.
2. The percentage of daily energy that should come from carbohydrates is specified as 55%.
3. Next, calculate the exact amount of energy in kilocalories derived from carbohydrate intake:

$$\text{Carbohydrate Calories} = 3200 \times \frac{55}{100} = 3200 \times 0.55 = 1760 \text{ kcal}$$

4. This calculation shows that 1760 kcal of the daily energy budget is provided by carbohydrates.
5. Now, we convert this energy value into grams of carbohydrates.
6. Nutrition science establishes that 1 gram of carbohydrate provides 4 kcal of metabolizable energy.
7. Divide the total carbohydrate calories by this energy factor to find the weight in grams:

$$\text{Grams of Carbohydrates} = \frac{1760 \text{ kcal}}{4 \text{ kcal/g}} = 440 \text{ g}$$

8. This indicates that the person must consume exactly 440 grams of carbohydrates.

Step 4: Final Answer:

The resulting weight of carbohydrate consumption is 440 g, which corresponds to Option (C).

Quick Tip: Keep the standard energy yields of major macronutrients in mind:
Carbohydrates provide 4 kcal per gram, Proteins provide 4 kcal per gram, and Fats provide 9 kcal per gram.
Remembering these energy constants is key to quickly solving sports nutrition math problems.

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6. Which of the following is NOT correctly matched?

(A) Kraus-Weber Test — Minimum muscular fitness
(B) Harvard Step Test — Cardiovascular endurance
(C) Sit and Reach Test — Agility
(D) Rikli and Jones Test — Senior citizen fitness

Correct Answer: (C) Sit and Reach Test — Agility

Solution:

Step 1: Understanding the Question:

This question tests our knowledge of standard physical education and fitness tests.

We need to evaluate each option to identify which pairing of test and fitness component is incorrect.

Each of these tests is designed to measure a specific component of physical fitness.

Step 2: Detailed Explanation:

1. Let us analyze each option to determine if the test matches its stated fitness component.
2. Option (A) pairs the Kraus-Weber Test with Minimum muscular fitness.
3. The Kraus-Weber Test consists of six simple items that assess the minimum muscular strength and flexibility of the core muscles.
4. This test is widely used to evaluate basic fitness levels, so this pairing is correct.
5. Option (B) pairs the Harvard Step Test with Cardiovascular endurance.
6. This test measures aerobic fitness by monitoring heart rate recovery after three to five minutes of stepping exercise.
7. It is a standard measure of cardiovascular endurance, so this pairing is correct.
8. Option (C) pairs the Sit and Reach Test with Agility.
9. The Sit and Reach Test measures the flexibility of the lower back and hamstring muscles, not agility.
10. Agility is the ability to change direction quickly and is measured by tests like the Shuttle Run.
11. Therefore, this pairing is incorrect and is the mismatch we are looking for.
12. Option (D) pairs the Rikli and Jones Test with Senior citizen fitness.
13. This battery of functional fitness tests is specifically designed to assess physical capacity in older adults, so this pairing is correct.

Step 3: Final Answer:

The incorrect pairing is Option (C).

Quick Tip: Be sure to read questions carefully for negative words like "NOT".
The Sit and Reach Test is universally known as the standard measure for hamstring and lower back flexibility.
Knowing this association helps you quickly identify the incorrect option under exam conditions.

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7. According to Newton's Laws of Motion in sports, a football lying stationary on the ground moves only after being kicked because of:

(A) Law of Gravitation
(B) Newton's First Law
(C) Newton's Second Law
(D) Newton's Third Law

Correct Answer: (B) Newton's First Law

Solution:

Step 1: Understanding the Question:
This question asks us to identify the physics principle that explains why a resting object only moves when acted on by an external force.
Newton's laws of motion are fundamental to understanding biomechanics in physical education and sports.
We must identify which of the laws explains this specific behavior of a stationary football.

Step 2: Detailed Explanation:
1. Newton's First Law of Motion is commonly known as the Law of Inertia.
2. Inertia is the natural resistance of any object to a change in its state of rest or motion.
3. The law states that an object at rest will remain at rest, and an object in motion will continue moving at a constant speed in a straight line, unless acted on by a net external force.
4. In this scenario, the football is resting stationary on the field.
5. It possesses inertia of rest, meaning it will remain completely stationary on its own.
6. The ball cannot alter its state of rest without an external force acting on it.

7. When a player kicks the ball, the leg applies an external force that overcomes the ball's inertia.
8. This external force causes the football to change its state from rest to motion.
9. This behavior is a direct demonstration of Newton's First Law of Motion.

Step 3: Final Answer:

The law that explains this physical behavior is Newton's First Law, which corresponds to Option (B).

Quick Tip: Remember the primary focus of each law of motion to easily differentiate them:
Newton's First Law focuses on inertia and resisting changes in state.
Newton's Second Law focuses on force and acceleration ($F = ma$).
Newton's Third Law focuses on equal and opposite action-reaction force pairs.

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8. A balanced diet for endurance athletes should primarily emphasize:

(A) High fats and low carbohydrates
(B) High proteins and low vitamins
(C) High carbohydrates with adequate proteins and fats
(D) High minerals only

Correct Answer: (C) High carbohydrates with adequate proteins and fats

Solution:

Step 1: Understanding the Question:

This question asks about the ideal dietary balance for endurance athletes, such as marathon runners or long-distance cyclists.
Endurance athletes perform prolonged physical activity that requires a steady, efficient supply of energy.

The nutritional plan must support continuous aerobic energy production and promote effective muscle recovery.

Step 2: Detailed Explanation:

1. Endurance athletes engage in long-duration exercise that relies heavily on aerobic energy production.
2. Glycogen stored in muscles and the liver is the primary and most efficient fuel source during aerobic exercise.
3. Carbohydrates are the body's primary source of glycogen, making a high-carbohydrate diet essential for these athletes.
4. Maintaining high carbohydrate intake keeps glycogen stores full, which helps delay fatigue and prevent "hitting the wall."
5. However, focusing solely on carbohydrates is not enough for a balanced athletic diet.
6. Adequate protein intake is also necessary to repair muscle fibers and support recovery after long training sessions.
7. In addition, healthy dietary fats serve as an important secondary energy source during lower-intensity training.
8. Therefore, an optimal diet for an endurance athlete should prioritize carbohydrates while including sufficient amounts of protein and fat.
9. A diet low in carbohydrates would quickly lead to depleted energy stores and decreased endurance performance.

Step 3: Final Answer:

The correct dietary emphasis is high carbohydrates with adequate proteins and fats, which is Option (C).

Quick Tip: Endurance athletes should aim to get approximately 60% to 70% of their daily calories from complex carbohydrates.

This high carbohydrate intake is necessary to keep glycogen stores consistently full.

Do not make the mistake of choosing high-protein options, which are better suited for strength and power athletes.

9. Which of the following asanas is most effective for management of diabetes according to yoga therapy principles?

(A) Vajrasana
(B) Paschimottanasana
(C) Tadasana
(D) Chakrasana

Correct Answer: (B) Paschimottanasana

Solution:

Step 1: Understanding the Question:
This question is about using therapeutic yoga to manage lifestyle disorders, specifically diabetes mellitus.
Certain yoga postures help regulate blood sugar levels by stimulating abdominal organs, especially the pancreas.
We must identify which of the given postures is most effective for stimulating the pancreas.

Step 2: Detailed Explanation:
1. Paschimottanasana is a seated forward-bending posture.
2. Performing this posture involves bending forward from the hips and folding the torso over the legs.
3. This forward fold compresses the abdominal cavity and applies pressure to the internal organs.
4. This compression stimulates and massages the abdominal viscera, including the pancreas.
5. The pancreas is the endocrine gland responsible for producing and secreting insulin.
6. Stimulating the pancreas improves its function, helping to regulate insulin production and manage blood sugar levels.
7. While Vajrasana is excellent for digestion and Tadasana improves posture, they do not compress the abdomen as directly.
8. Chakrasana is a deep backward bend that stretches the abdomen but does not provide the

same compression as Paschimottanasana.

9. Therefore, Paschimottanasana is the most effective and targeted choice for managing diabetes.

Step 3: Final Answer:

The correct posture for diabetes management is Paschimottanasana, which matches Option (B).

Quick Tip: To identify asanas that help manage diabetes, look for postures that involve forward bending or deep abdominal twisting.

Postures like Paschimottanasana, Ardha Matsyendrasana, and Mandukasana compress the abdomen, which stimulates the pancreas.

These types of movements are excellent additions to a management plan for diabetes.

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10. Assertion (A): Circuit training improves both strength and endurance simultaneously.
Reason (R): Circuit training includes a series of exercises performed with minimal rest between stations.

(A) Both A and R are true, and R is the correct explanation of A.

(B) Both A and R are true, but R is not the correct explanation of A.

(C) A is true, but R is false.

(D) A is false, but R is true.

Correct Answer: (A) Both A and R are true, and R is the correct explanation of A.

Solution:

Step 1: Understanding the Question:

This question is in an Assertion-Reason format and evaluates our understanding of circuit training principles.

We must analyze the assertion and reason statements independently to determine if they are factually correct.
If both statements are true, we then determine if the reason logically explains the assertion.

Step 2: Detailed Explanation:

1. Let us first evaluate Assertion (A): "Circuit training improves both strength and endurance simultaneously."
2. Circuit training is an exercise method that moves participants through a series of stations targeting different muscle groups.
3. By combining resistance and cardiovascular exercises, it is designed to build strength and endurance at the same time.
4. This means Assertion (A) is factually correct.
5. Next, let us evaluate Reason (R): "Circuit training includes a series of exercises performed with minimal rest between stations."
6. In a standard circuit, exercises are performed one after another with very brief rest intervals of 15 to 30 seconds.
7. This structure of continuous physical work keeps the heart rate elevated, which builds cardiovascular endurance.
8. At the same time, the resistance exercises at each station challenge and build muscular strength.
9. This minimal rest structure is the exact mechanism that allows the system to build strength and endurance together.
10. Therefore, Reason (R) is true and provides the correct scientific explanation for Assertion (A).

Step 3: Final Answer:

Since both statements are true and the reason explains the assertion, the correct option is Option (A).

Quick Tip: To solve Assertion-Reason questions, read both statements independently to check if they are true.

If both are true, connect them using the word "BECAUSE" to see if the statement makes logical sense.

"Circuit training improves strength and endurance BECAUSE it features a series of exercises with minimal rest."

This logical connection helps you confidently choose Option (A).
