

COMPETISHUN PHYSICAL EDUCATION · 048**CBSE Class XII — Sample Paper: Questions and Solutions****Session 2026-27****Time Allowed: 3 Hours****Maximum Marks: 70**

General Instructions: 1. The question paper consists of 5 sections and 37 questions. 2. Section A consists of questions 1-18 carrying 1 mark each and is multiple choice questions. All questions are compulsory. 3. Section B consists of questions 19-24 carrying 2 marks each and are very short answer types and should not exceed 60-90 words. Attempt any 5. 4. Section C consists of questions 25-30 carrying 3 marks each and are short answer types and should not exceed 100-150 words. Attempt any 5. 5. Section D consists of questions 31-33 carrying 4 marks each and are case studies. There is an internal choice available. 6. Section E consists of questions 34-37 carrying 5 marks each and are long answer types and should not exceed 200-300 words. Attempt any 3.

SECTION A — MULTIPLE CHOICE QUESTIONS (18 × 1 = 18)**Question 1****1 Mark**

Rules and regulations of a sports tournament are the responsibility of _____ committee.

- (a) Technical
- (b) Logistics
- (c) Marketing
- (d) Finance

Answer and Solution (a) Technical Committee

The technical committee frames and enforces the rules, decides the format of play and appoints officials. Logistics handles transport and accommodation, marketing handles publicity, and finance handles the budget.

MARKING SCHEME Correct option — 1

Question 2**1 Mark**

Given below are two statements labelled Assertion (A) and Reason (R).

Assertion (A): In this type of tournament, a team once defeated gets eliminated; only the winners continue in the competition.

Reason (R): A good team once lost cannot make a comeback.

In context of the above two statements, which one of the following is correct?

- (a) A is true, but R is false
- (b) A is false, but R is true
- (c) Both A and R are true and R is the correct explanation of A
- (d) Both A and R are true, but R is not the correct explanation of A

Answer and Solution (c) Both A and R are true and R is the correct explanation of A

The assertion describes a knockout tournament, in which a single defeat eliminates a team. Precisely because elimination is immediate, a strong team that loses once cannot return — so R explains A.

MARKING SCHEME Correct option — 1

Question 3**1 Mark**

Match the following:

- | | |
|------------------------------------|--|
| (a) Knock knee | (i) Increase exaggeration of backward curve |
| (b) Kyphosis | (ii) Wide gap between the knees when standing with feet together |
| (c) Lordosis | (iii) Knees touch each other in normal standing position |
| (d) Bow legs | (iv) Inward curvature of the spine |
| (a) A-(iii), B-(i), C-(iv), D-(ii) | |
| (b) A-(i), B-(iii), C-(iv), D-(ii) | |



(c) A-(iv), B-(ii), C-(i), D-(iii)

(d) A-(iii), B-(i), C-(iv), D-(ii)

Answer and Solution (a) A-(iii), B-(i), C-(iv), D-(ii)

Knock knee — knees touch in normal standing; Kyphosis — exaggerated backward curve of the upper spine; Lordosis — inward curvature of the lumbar spine; Bow legs — wide gap between the knees.

MARKING SCHEME Correct option — 1**Question 4****1 Mark**

How much carbohydrate is required for strength dominant sports?

(a) 40%

(b) 55%

(c) 70%

(d) 80%

Answer and Solution (b) 55 %

Strength-dominant athletes need a comparatively higher share of protein, so carbohydrate is kept near 55% of total energy intake, against about 70% for endurance-dominant sports.

MARKING SCHEME Correct option — 1**Question 5****1 Mark**

Identify the yoga asana shown below.



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(a) Vakrasana

(b) Tadasana

(c) Vajrasana

(d) Ardha Matsyendrasana

Answer and Solution (a) Vakrasana

Vakrasana is a seated spinal twist performed with the legs extended and one knee bent, the trunk turning to one side. Tadasana is a standing pose and Vajrasana is a kneeling pose.

MARKING SCHEME Correct option — 1**Question 6****1 Mark**

Which asana is a preparatory asana for Pawanmuktasana?

(a) Vajrasana

(b) Bhujangasana

(c) Matsyendrasana

(d) Naukasana

Answer and Solution (c) Matsyendrasana

The seated spinal twist mobilises the lower back and abdomen, preparing the body for the knee-to-chest compression of Pawanmuktasana.

MARKING SCHEME Correct option — 1**Question 7****1 Mark**

Who is known as the father of the Paralympic Games?

(a) Dr. Ludwig Guttmann

(b) George Iser

(c) Pierre de Coubertin



(d) Jacques Rogge

Answer and Solution (a) Dr. Ludwig Guttmann

He organised the Stoke Mandeville Games in 1948 for wheelchair athletes, which grew into the Paralympic Games. Pierre de Coubertin founded the modern Olympic Games.

MARKING SCHEME Correct option — 1

Question 8

1 Mark

Deficiency of which of the following nutrients leads to osteoporosis?

- (a) Iron
- (b) Iodine
- (c) Calcium
- (d) Sulphur

Answer and Solution (c) Calcium

Calcium, with vitamin D, maintains bone mineral density. Its prolonged deficiency makes bones porous and brittle. Iron deficiency causes anaemia and iodine deficiency causes goitre.

MARKING SCHEME Correct option — 1

Question 9

1 Mark

From the following, find the water soluble vitamins.

- (a) A, D
- (b) E, K
- (c) C, A
- (d) B, C

Answer and Solution (d) B, C

Vitamins B-complex and C dissolve in water and are not stored in the body, so they must be supplied daily. Vitamins A, D, E and K are fat soluble.

MARKING SCHEME Correct option — 1

Question 10

1 Mark

Which of the following is an aerobic endurance test?

- (a) Rockport
- (b) Harvard
- (c) 6 min walk
- (d) 100 m run

Answer and Solution (b) Harvard Step Test

The Harvard Step Test measures cardiovascular endurance from the recovery pulse after stepping. The 100 m run is a test of speed, not aerobic endurance.

MARKING SCHEME Correct option — 1

Question 11

1 Mark

Which of the following is an effect of exercise on the muscular system?

- (a) Cardiac output
- (b) Hypertrophy of muscles
- (c) Tidal volume
- (d) I.R.V.

Answer and Solution (b) Hypertrophy of muscles

Regular resistance training increases the size of muscle fibres. Cardiac output is a circulatory effect, while tidal volume and inspiratory reserve volume are respiratory effects.

MARKING SCHEME Correct option — 1

Question 12**1 Mark**

Overstretching of the ligaments near the joints is known as _____.

- (a) Contusion
- (b) Sprain
- (c) Laceration
- (d) Fracture

Answer and Solution (b) Sprain

A sprain is an injury to a ligament. A strain affects muscle or tendon, a contusion is a bruise, a laceration is a tear in the skin, and a fracture is a break in a bone.

MARKING SCHEME Correct option — 1

Question 13**1 Mark**

_____ refers to the resistance to the motion at the contact of two surfaces.

- (a) Attraction
- (b) Friction
- (c) Reaction
- (d) Acceleration

Answer and Solution (b) Friction

Friction is defined as the force that opposes relative motion between two surfaces in contact. Reaction is the equal and opposite force of Newton's third law and acts perpendicular to the surface, not against the motion along it.

MARKING SCHEME Correct option — 1

Question 14**1 Mark**

Biomechanics deals with which of the following?

- (a) Muscles involved in movement
- (b) Effect of force on different movements done by the human body
- (c) To understand the physiology of the body
- (d) To understand time and distance concept of various biomechanics

Answer and Solution (b) Effect of force on different movements done by the human body

Biomechanics applies the laws of mechanics to human motion, studying how internal and external forces produce and modify movement.

MARKING SCHEME Correct option — 1

Question 15**1 Mark**

Psychology deals with _____.

- (a) Function of body
- (b) Activity of air
- (c) Anatomy
- (d) Behaviour

Answer and Solution (d) Behaviour

Psychology is the scientific study of behaviour and mental processes. The functioning of the body is physiology and the structure of the body is anatomy.

MARKING SCHEME Correct option — 1

Question 16**1 Mark**

Given below are two statements labelled Assertion (A) and Reason (R).

Assertion (A): Introverts are more comfortable living alone and being by themselves.

Reason (R): They are actively involved in the world of people and things.

In context of the above two statements, which one of the following is correct?

- (a) (A) is false, but (R) is true.
 (b) (A) is true, but (R) is false.
 (c) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

Answer and Solution (b) (A) is true, but (R) is false.

Introverts are indeed reserved and prefer their own company, so A is true. Active involvement in the world of people and things describes extroverts, so R is false.

MARKING SCHEME Correct option — 1

Question 17

1 Mark

Two major components of load are _____.

- (a) Specificity and volume
 (b) Intensity and volume
 (c) Intensity and progression
 (d) Continuity and recovery

Answer and Solution (b) Intensity and volume

Intensity is the quality or degree of effort in a stimulus and volume is its quantity or duration. Specificity, progression and continuity are principles of training, not components of load.

MARKING SCHEME Correct option — 1

Question 18

1 Mark

The ability of your muscles to overcome resistance is called _____.

- (a) Strength
 (b) Speed
 (c) Balance
 (d) Explosive strength

Answer and Solution (a) Strength

Strength is the ability of muscles to overcome or act against resistance. Explosive strength is a sub-type, combining strength with speed, so the general term is the correct choice.

MARKING SCHEME Correct option — 1

SECTION B — VERY SHORT ANSWER (ATTEMPT ANY 5) (5 × 2 = 10)

Question 19

1 + 1 = 2

What is osteoporosis? Mention the factors responsible for it in women.

Answer and Solution

Osteoporosis is a bone disorder in which bone density decreases, causing bones to become weak and fragile.

Factors responsible in women:

- Especially after menopause, due to reduced oestrogen levels that accelerate bone loss.
- Hormonal imbalance, and deficiency of calcium and vitamin D.
- Lack of physical activity and ageing.
- Poor nutrition and smoking.

MARKING SCHEME Meaning — 1 · Factors — 1 = 2

Question 20

1 + 1 = 2

What do you mean by roughage? Mention its importance also.

Answer and Solution

Roughage is the indigestible part of food, also called dietary fibre.

Importance (any one):

- Roughage holds water and improves intestinal function by adding bulk to food.
- It helps correct disorders of the large intestine.
- It prevents constipation.
- Soluble roughage reduces blood sugar level.
- Insoluble roughage is a good stool softener.

MARKING SCHEME Meaning — 1 · Any one point of importance — 1 = 2

Question 21

1 + 1 = 2

What changes come in our senses with advancing age?

Answer and Solution

With advancing age the efficiency of the sensory organs gradually decreases.

- Vision becomes weaker due to reduced elasticity of the eye lens.
- Hearing ability declines, making it difficult to hear high-frequency sounds.
- The sense of taste and smell also reduces, affecting appetite.
- Reaction time becomes slower, which may affect balance, coordination and overall physical performance.

MARKING SCHEME Any two changes, explained — 1 + 1 = 2

Question 22

2 Marks

What is PRICE?

Answer and Solution

PRICE is the standard first-aid procedure for soft tissue injuries such as a sprain or strain:

- P — Protection
- R — Rest
- I — Ice
- C — Compression
- E — Elevation

MARKING SCHEME All five components correctly expanded — 2

Question 23

2 Marks

How can extrinsic motivation sometimes kill intrinsic motivation?

Answer and Solution

- Over-dependence on rewards reduces self-interest in the activity.
- External pressure decreases internal enjoyment.
- Rewards shift the focus from learning to winning prizes.
- Loss of self-satisfaction, as the activity is no longer performed for its own sake.

MARKING SCHEME Any two valid points — 1 + 1 = 2

Question 24

1 + 1 = 2

Suggest any two isometric exercises for the shoulder region.

Answer and Solution

Any two of the following:

- Plank
- Wall push
- Static shoulder press
- Holding dumbbells without movement
- Isometric push-up hold

MARKING SCHEME Any two correct exercises — $1 + 1 = 2$ **SECTION C — SHORT ANSWER (ATTEMPT ANY 5) ($5 \times 3 = 15$)****Question 25****2 + 1 = 3**

Discuss how a league tournament is a better way to judge the best team of any tournament. Also explain one of its methods to declare the winner.

Answer and Solution

- A league tournament is considered the best method to judge the strongest team because every team gets an equal opportunity to play against all the other teams.
- It eliminates the factor of luck, as no team is eliminated after a single loss.
- This format provides fair competition and accurate ranking.
- Teams can improve their performance match by match.

Method to declare the winner — British Method (point system):

Generally a team gets 2 points for a win, 1 point for a draw and 0 points for a loss. The team with the maximum points is declared the winner.

MARKING SCHEME Why it judges the best team — 2 · Method of declaring the winner — 1 = 3**Question 26****1 + 2 = 3**

What is scoliosis? What are the causes of scoliosis?

Answer and Solution

Scoliosis is a postural deformity in which the spine is tilted to either side of the body. It is a lateral or sideways curvature of the spine.

Causes:

- Birth defect.
- Lifting of weight towards one side in routine.
- Arthritis, paralysis or rickets.
- Cerebral palsy and muscular dystrophy.

MARKING SCHEME Meaning — 1 · Any two causes — 2 = 3**Question 27****1 + 2 = 3**

What do you understand by the term inclusion? Explain its need and implementation.

Answer and Solution

Meaning: Inclusion means the participation of all learners, including Children With Special Needs (CWSN), in the same activities and the same environment as their peers.

Need:

- It ensures equality of opportunity for every child.
- It promotes social integration, acceptance and self-respect.

Implementation:

- Modified rules suited to the ability of the participant.
- Adapted equipment.
- Inclusive programmes planned for mixed-ability groups.

MARKING SCHEME Meaning — 1 · Need and implementation — 2 = 3**Question 28****1 + 2 = 3**

What are proteins? Write their functions along with their daily requirement.

Answer and Solution

Proteins are body-building nutrients made up of amino acids.

Functions (any two):

- Growth and repair of body tissues.
- Muscle development.
- Formation of enzymes and hormones.

Daily requirement: approximately 1 g per kg of body weight.

MARKING SCHEME Meaning — 1 · Any two functions and the daily requirement — 2 = 3

Question 29

1 + 1 + 1 = 3

List down any three advantages of friction.

Answer and Solution

Any three of the following:

- Gymnastics — friction between the bar and the hands lets the gymnast grip firmly without slipping.
- Weightlifting — the lifter needs friction between the feet and the floor to prevent slipping while lifting heavy weights.
- Badminton — the grip wound on the racket handle increases friction with the player's hand so that the racket does not slip.
- Running and jumping — friction between the spikes and the track provides the grip needed to push off.

MARKING SCHEME Any three advantages — 1 + 1 + 1 = 3

Question 30

1 + 2 = 3

What is self-esteem? How does participation in physical activities enhance self-esteem among children?

Answer and Solution

Self-esteem: the feeling of self-worth, that is, how a person values and regards himself or herself.

How physical activity enhances it:

- Success in sports gives a sense of achievement.
- Social interaction with team-mates develops a feeling of belonging.
- Regular improvement in skill and fitness builds confidence.
- Peer recognition and appreciation raise self-worth.

MARKING SCHEME Meaning — 1 · Any two ways of enhancement — 2 = 3

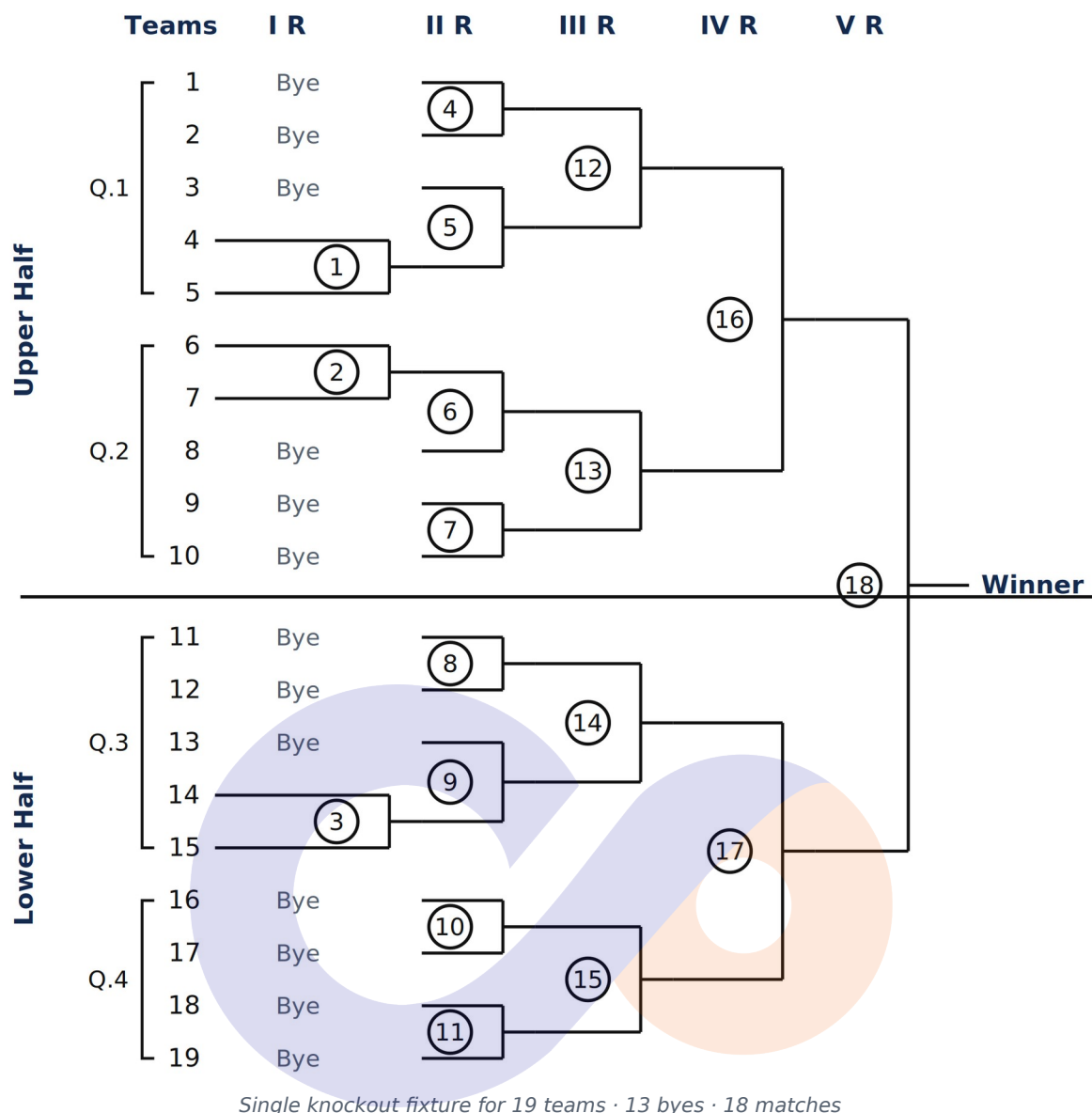
SECTION D — CASE STUDY BASED (3 × 4 = 12)

An internal choice is available in Questions 31 and 33.

Question 31

4 Marks

Based on the given fixture, answer the following questions:



- (i) Which method is followed in drawing the fixture given above?
 (A) Single knockout (B) Double knockout (C) Consolation (D) Ladder
- (ii) The formula for the number of matches played in the above tournament is —
 (A) $N(N-1)$ (B) $N-1$ (C) $N+1$ (D) $N \times 2$
- (iii) If 7 teams participate in a double league tournament such as in the IPL, how many matches will be conducted in the first phase of the league?
 (A) 42 (B) 45 (C) 54 (D) 58
- (iv) In this type of tournament, a team once defeated gets —
 (A) Rematch (B) Consolation award (C) Elimination (D) Bye

OR

Which number of team in the above given fixture will be given the 7th bye?
 (A) 2 (B) 5 (C) 12 (D) 18

For visually impaired students

The sports captain of XYZ school organised a basketball tournament on a knockout basis. He found that spectators were losing interest in the tournament because the best 2 teams got knocked out in the beginning. Answer the following questions —

- (i) Which provision could have avoided this kind of situation?

(A) Bye (B) Pool (C) Seeding (D) Halves

(ii) If the number of teams is 58, how many byes will be given?

(A) 6 (B) 12 (C) 7 (D) 9

(iii) In a knockout tournament, if byes are in odd number, then the number of byes in the lower half are calculated by —

(A) $(NB+1)/2$ (B) $(NB-1)/2$ (C) $NB/2$ (D) $NB-1$

(iv) Which of the following tournaments is the most economical?

(A) Knockout Tournament (B) League Tournament (C) Combination Tournament (D) Challenge Tournament

OR

A league tournament is also known as —

(A) Combination Tournament (B) League cum League Tournament (C) Round Robin Tournament (D) Consolation Tournament

Answer and Solution

(i) (A) Single Knockout — each team that loses a match is eliminated, and the draw reduces by halves to a single winner.

(ii) (B) $N - 1$ — every match eliminates exactly one team, so 19 teams require 18 matches, as numbered in the fixture.

(iii) (A) 42 — in a double league every team plays every other team twice, so the number of matches is $N(N - 1) = 7 \times 6 = 42$.

(iv) (C) Elimination — a single defeat removes the team from the tournament.

OR

(C) 12 — byes are allotted in the order: last team of the lower half, first team of the upper half, first team of the lower half, last team of the upper half, and so on moving inwards. This gives 19, 1, 11, 10, 18, 2 and then 12 as the seventh bye.

For Visually Impaired Candidates

(i) (C) Seeding — seeding places the strongest teams in different halves so that they cannot meet in the early rounds.

(ii) (A) 6 — the next higher power of 2 above 58 is 64, so the number of byes = $64 - 58 = 6$.

(iii) (A) $(NB+1)/2$ — when the number of byes is odd, the lower half receives one bye more than the upper half.

(iv) (A) Knockout Tournament — it needs the fewest matches, so it costs the least in time, money and facilities.

OR

(C) Round Robin Tournament — in it every team plays every other team.

MARKING SCHEME 1 mark for each of the four sub-parts = 4

Question 32

4 Marks

Read the given case study carefully and answer the questions that follow:

The International Paralympic Committee is the global governing body of the Paralympic Movement. Its purpose is to organise the summer and winter Paralympic Games and act as the International Federation for ten sports, supervising and coordinating World Championships and other competitions.

(a) IPC in sports stands for _____.

(b) What was the reason the Paralympic Games got their name?

(c) Which body governs the Paralympic Movement?

(d) When was the IPC formed?

Answer and Solution

(a) IPC stands for the International Paralympic Committee.

(b) The Games began as a competition for athletes with paraplegia (spinal cord injuries), so the prefix “Para” was joined to “Olympic” to give the name Paralympic.

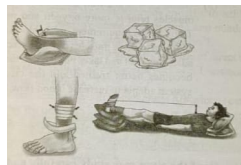
- (c) The Paralympic Movement is governed by the International Paralympic Committee (IPC).
 (d) The IPC was formed in 1989.

MARKING SCHEME 1 mark for each of the four sub-parts = 4

Question 33

4 Marks

In relation to the pictures, answer the following questions:



Source image reproduced from the sample paper

- (a) While playing in the school ground Aman got injured. The injury is stretching of ligaments. What should be the first step to provide him first aid?
 (b) What is the importance of Elevation?
 (c) What is the duration of application of ice?
 (d) First aid is focused on what are called the 3 'P's — Preserve life, Prevent deterioration and _____.

For visually impaired students

Ramesh is an athlete of a school. He takes part in the 100 m event for his school and works hard throughout the year to get his best performance. One day he got injured in the winter season due to improper warming-up. He was given first aid before being sent to hospital.

- Sprain is an injury of _____.
 (a) Ligament (b) Bone (c) Muscle (d) Joint
- In PRICE treatment, I stands for _____.
 (a) Icing (b) Incision (c) Incline (d) Irritation
- Abrasion is a _____.
 (a) Type of fracture (b) Soft tissue injury (c) Joint dislocation (d) Internal injury
- Why is warming up necessary?
 (a) To avoid injuries (b) To increase body temperature (c) To increase pulse rate (d) All of these

Answer and Solution

(a) Stretching of a ligament is a sprain, so the PRICE procedure should be started at once. The first step is Protection — stop the activity immediately and protect the joint from any further movement or load, followed by Rest.

(b) Elevation means raising the injured part above the level of the heart. It reduces the blood flow to the injured area and helps the fluid drain away, so swelling, internal bleeding and pain are controlled.

(c) Ice is applied for about 15 to 20 minutes at a time, repeated every 2 to 3 hours during the first 24 to 48 hours. It should never be placed directly on the skin, and must not be left on for longer, to avoid ice burn.

(d) Promote recovery. The 3 'P's of first aid are: Preserve life, Prevent deterioration and Promote recovery.

For Visually Impaired Candidates

- (a) Ligament — a sprain is the overstretching or tearing of a ligament at a joint.
- (a) Icing — in PRICE, I stands for Ice, which reduces swelling and pain.
- (b) Soft tissue injury — an abrasion is the scraping of the superficial layer of the skin.
- (d) All of these — warming up raises body temperature, increases pulse rate and blood supply, and thereby helps avoid injuries.

MARKING SCHEME 1 mark for each of the four sub-parts = 4

SECTION E — LONG ANSWER (ATTEMPT ANY 3) (3 × 5 = 15)**Question 34****2 + 1 + 2 = 5**

What is diabetes and its types? Draw a stick diagram of Gomukhasana and mention its benefits.

Answer and Solution**Diabetes**

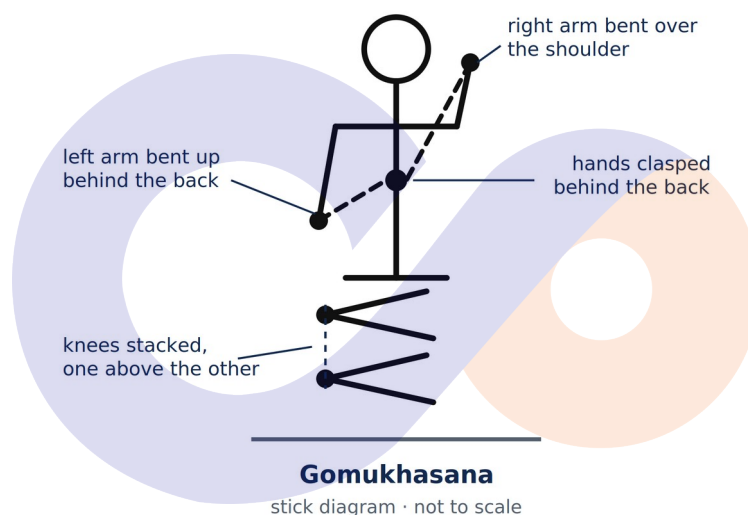
Diabetes mellitus is a chronic metabolic disorder in which the body is unable to regulate blood glucose (sugar) levels due to:

- insufficient production of insulin, or
- improper utilisation of insulin by the body.

As a result, the level of glucose in the blood becomes abnormally high (hyperglycaemia).

Types

- Type 1 Diabetes — the pancreas produces little or no insulin; it is insulin dependent and usually begins in childhood.
- Type 2 Diabetes — the body becomes resistant to insulin or does not produce enough; it is linked to obesity and an inactive lifestyle.

Stick diagram of Gomukhasana**Benefits of Gomukhasana (any four)**

- Helps to control diabetes.
- Improves digestion.
- Improves posture by opening the chest and shoulders.
- Strengthens the muscles of the back, arms and thighs.
- Reduces stress, anxiety and fatigue.

MARKING SCHEME Diabetes and its types — 2 · Diagram — 1 · Any four benefits — 2 = 5

Question 35**1 + 2 + 2 = 5**

Make a list of all the test items in the Johnson-Metheny Test of Motor Educability. Explain the procedure of jumping half turns and jumping full turns of the Johnson-Metheny educability test battery.

Answer and Solution**Test items of the Johnson-Metheny Test of Motor Educability**

- Forward Roll
- Backward Roll
- Jumping Half Turn
- Jumping Full Turn

(a) Jumping Half Turn

- The subject jumps vertically upward from both feet.
- While in the air, the performer turns the body through 180 degrees (half rotation).
- The performer lands on both feet, maintaining balance and control.
- The arms may be used freely to assist rotation and balance.

Purpose: it tests coordination, balance and motor control, and indicates the ability to learn and perform new motor skills.

(b) Jumping Full Turn

- The subject jumps upward from a standing position.
- During the jump, the performer rotates the body through 360 degrees (full turn) in the air.
- The performer lands safely on both feet without losing balance.
- Proper coordination of the arms, legs and trunk is required.

Purpose: it measures advanced coordination, agility and motor educability, and reflects the learner's capacity to acquire complex motor skills.

MARKING SCHEME List of test items — 1 · Jumping half turn — 2 · Jumping full turn — 2 = 5

Question 36**1 + 4 = 5**

What is a sports training cycle? Explain micro cycle, meso cycle and macro cycle.

Answer and Solution

The sports training cycle is a systematic and planned process of training, divided into different time phases, which aims at achieving the peak performance of an athlete at the right time of competition.

1. Micro Cycle

- The shortest unit of the training cycle.
- Usually lasts for one week (5-7 days).
- Includes daily training sessions, rest and recovery.
- Focuses on specific training objectives such as strength, speed or skill improvement.

2. Meso Cycle

- The medium-term training phase.
- Generally lasts for 3 to 6 weeks.
- Consists of several micro cycles combined together.
- Aims at the development of a particular fitness component, such as endurance or strength.

3. Macro Cycle

- The longest phase of the training cycle.
- Usually covers one full season or one year.
- Includes the pre-season, the competitive season and the transition period.
- Its main aim is to achieve peak performance during major competitions.

MARKING SCHEME Meaning of training cycle — 1 · Micro, meso and macro cycle — 4 = 5

Question 37**2 + 3 = 5**

What is a projectile? Discuss the factors affecting a projectile's trajectory.

Answer and Solution

A projectile is an object which is thrown or projected into the air and which, after leaving the hand or an implement, moves under the influence of gravity alone. Once released, no further propelling force acts on it except gravity (and air resistance). Examples are a shot put, a javelin, a discus and a football in flight.

Factors affecting the trajectory (explain any three)

- Angle of projection — for maximum horizontal distance in a vacuum the optimum angle is about 45°; a smaller or larger angle shortens the range.

- Velocity of projection — the greater the release velocity, the greater the distance and height covered by the projectile.
- Height of release — if the projectile is released above the landing level, as in the shot put, the range increases and the optimum angle becomes slightly less than 45° .
- Gravity — it acts downwards throughout the flight, giving the path its parabolic shape and bringing the projectile back to the ground.
- Air resistance — it opposes the motion and reduces both the speed and the range; its effect depends on the surface area, shape and spin of the object.

MARKING SCHEME Meaning of projectile — 2 · Any three factors explained — 3 = 5

