

CASE-BASED/SOURCE-BASED INTEGRATED QUESTIONS

CHAPTER 1 – CHANGING TRENDS AND CAREERS IN PHYSICAL EDUCATION

1. The topic for school annual debate this year is 'Aims and Objectives of Physical Education'. While quite a few students feel the subject should be made compulsory, some students think having this as part of the curriculum will be a waste of time. The Principal has selected you to speak in favour of it and explain why physical education should be made a compulsory part of the syllabus.
 - (a) Explain physical education in brief.
 - (b) How does physical education enhance social skills?
 - (c) What are the qualities that physical education helps improve in a person?
- Ans.**
 - (a) Physical education aims at developing all aspects of life, be it physical, emotional or mental well-being. While physical development aims at body shape and size, mental development helps improve focus and concentration while social development helps adjust to society and social circumstances.
 - (b) Playing sports helps develop ethical values. This, in turn, leads to development of desirable social values and attitude. Being a team member helps develop empathy and an understanding of others' values and attitudes. Playing, staying and travelling together as well as competing against each other help sharpen leadership skills as well.
 - (c) Physical education develops all aspects of a person. Regular physical activity helps build a physically balanced and attractive body. Neuromuscular coordination and skills also become better. Correct attitude towards winning and losing as well as how to conduct oneself in different social circumstances is learnt. Development of skill and coordination as well as healthy habits are other positives of physical education.
2. Most students in a school did not think that PE has career opportunities. One day an international cricket star attended the school Annual Day function as chief guest. He spoke about his struggles and how he was transformed by an active career that resulted from taking physical education subject in school seriously. He also talked about starting his own coaching academy. He explained as to how there were a lot of good career options available in PE. This gave students a clear understanding of the various career options available in PE which only aroused their interest in the subject and most of them started taking PE seriously.
 - (a) What career opportunities must have the cricketer talked about?
 - (b) What are the possibilities for PE in media?
 - (c) Besides teaching in a school, what options exist for becoming trainers in PE?
- Ans.**
 - (a) The career options explained by the cricketer must have included a sports teacher in an educational institution, a private coach or even a trainer at a gym, etc. Besides, a person trained in PE can be an expert commentator on TV or radio. Such people can set up coaching centres in their specialised sports and be a big part of the wellness industry as sports nutritionists and weight management experts. Besides getting jobs based on their performance in their specialised fields of sports, options of becoming advisors to various industries as also umpires are also open to them.
 - (b) Currently, many career opportunities exist in TV, radio, magazines, newspapers, internet, etc., for those with a PE background and trained in different fields. While giving commentary on radio and TV is a fulfilling career option, people with a flair for writing can be newspaper or magazine columnists. Their expertise gives them an edge in writing blogs and sports comments on the internet as well.
 - (c) Today, besides teaching students in educational institutions, vast opportunities have opened up for becoming trainers. These range from being instructors at gyms and coaching institutes to personal trainers. Growing interest in sports has led to a surge in people wanting individual coaching in sports like tennis, archery, fencing, etc. The mushrooming of training academies for sports like cricket, swimming and badminton has also opened up new career options for the deserving. Team coaches and trainers in sports like football, cricket and hockey at the university, state or even national level are other career options for those with a PE background.

3. Competitions in sports have many advantages for seeking out outstanding players and getting together school, university, state or even national teams to represent the various institutions. These not only permit to excel at sports but also boost leadership qualities as well as offer opportunities to represent the country and bring laurels. Taking this into account, the government has launched many schemes to boost interest in sports and encourage students to take sports as a full-time career option. Most prominent among these is the 'Khelo India' program.
- When was 'Khelo India' program launched?
 - Why has it been introduced and what is its focus?
 - What are the benefits of this program?

- Ans.**
- 'Khelo India' program was introduced by the government of India in 2018 in schools under 'Khelo India Youth Games'. It evoked so much enthusiasm that since 2020, Youth Games and games at the university level are also being organised under its banner.
 - 'Khelo India' has been introduced to revive sports culture in India from the grass roots. It focuses on creating a strong framework for all Indian sports. It aims to allow mass participation of children in sports and to hone the skills of those with potential in different sports.
 - 'Khelo India' started with 16 sports that included Indian sports Kho-Kho and Kabaddi. Under this program, talented players identified by an expert committee also get financial aid of ₹ 5 lakh per year for up to 8 years so that they can focus on excelling at their sport without facing any financial constraints. This program has revived sports in the country and opened it up for the masses rather than it being an opportunity for a few.

CHAPTER 2 – OLYMPIC VALUE EDUCATION

1. Olympics have a fascinating history since their inception in ancient times. Today, these sports reflect the ultimate glory a sportsperson in the competing sports can hope for. As school head boy, Arnav was called to talk about the history of Olympics and how it has evolved to its current form. He also talked about how it has become the leading international sporting event in which thousands of athletes from around the world participate and how the host country begins preparations for this sporting event years in advance.
- When were the modern Olympics restarted?
 - What is the Olympic motto and what do the Olympic oath and symbols on the Olympic flag stand for?
 - What are the various types of Olympic championships currently undertaken?

- Ans.**
- The modern Olympics were revived in 1896 and are well documented. These were revived by a Frenchman named Pierre Coubertin and were held in Athens, Greece. This was to honour the origin of these Games where only 14 nations and less than 300 athletes participated. These Games had 14 events in all. Modern Olympics are held every four years during the summer months.
 - The Olympic motto 'CITIUS, ALTIUS, FORTIUS' translates as faster, higher, stronger. Before the Games begin, one athlete from the host country takes the oath on behalf of all the competitors promising to abide by the rules of the Games, without resorting to doping and with sportsman spirit. The Olympics flag has five intertwined circles of different colours, representing five continents of the world.
 - Initially the Olympics were held in summer and only males were allowed. These were called the Summer Olympics. In 1900, for the first time at Paris Olympics, 22 women took part with about 900 male athletes. Since then this has gone up to over 1100 athletes in 306 events from 206 countries. Today, we have Winter Olympics for winter games, Paralympics for athletes with a range of disabilities like paraplegia and quadriplegia, vision impairment and intellectual impairment and Special Olympics for children and adults with intellectual and physical disabilities.
2. Sports traditionally has been the domain of the fit and able-bodied. Many people started to feel that the physically challenged people should also be able to enjoy sports and the competition. Thereafter, the role of sports and competition assumed importance for the intellectually challenged people as well. This brought about a lot of changes in the Olympic movement. Starting as finding the fittest athlete, today, besides finding winners, the Olympic movement has come to represent participation from all strata of society. These Games are held under the International Olympic Committee where India is represented by the Indian Olympic Committee.
- What are the changes modern Olympics have witnessed since their inception in 1896?
 - What role does the International Olympic Committee have?
 - Write briefly about the Indian Olympic Committee.

- Ans.** (a) The year 1896 saw the restart of modern Summer Olympics, which were held in Athens with just 14 events and 241 athletes, that too all males. In the 1900 Olympics held in Paris, 22 women participated for the first time in the Games. The number of athletes and countries gradually increased and in the 2016 Olympics held at Rio de Janeiro, Brazil, over 11,000 athletes from 206 countries participated. Later, Winter Olympics also started and Paralympics and Special Games were organised under the banner of International Olympic Committee. The Deaflympics, which started in 1924 and in which deaf athletes compete, are also supported by the Olympic movement.
- (b) The International Olympic Committee (IOC), founded in 1894 by Pierre Coubertin, spearheads all aspects of the modern Olympics. Based in Switzerland, it is not only responsible for deciding the venue but all aspects of the Games—from rules to events to penalties. Thanks to the efforts of the IOC, racial and gender discrimination has come down in sports and the concept of fair play has taken deep roots. French and English are the official languages of this organization. Thanks to this organization, over the years all five continents have seen the Games being organized in their region.
- (c) The Indian Olympic Committee is the body responsible for promoting participation in Olympics in India. It was formed in 1927 with Sir Dorabjee Tata as its founder President. It not only selects Indian sportspersons to represent the country but also helps with training them as well as organize the national games. The Committee also governs the Commonwealth Games in India. It has a 32-member governing body headed by a president.

CHAPTER 3 – PHYSICAL FITNESS, WELLNESS & LIFESTYLE

1. In today's time, doing well at studies and scoring high marks in examination is the sole focus of many students and their parents. Many consider taking part in sports and physical activities as taking time off from their studies. But this is a misconception as a fit body is a must for a fit mind. Currently, wellness and fitness are part of a better lifestyle and this is gradually gaining importance. To do well one needs to feel well and sports and regular physical activity contributes a lot to this. We now understand that both these are multidimensional and interlinked. Keeping this in mind, answer the questions below:

- (a) How do we define physical fitness, wellness and lifestyle?
 (b) What are the six dimensions of wellness?
 (c) What are the advantages and disadvantages of modern lifestyle?

- Ans.** (a) Physical fitness is defined as the ability to carry out tasks without undue fatigue. This shows our ability to do daily activities without getting tired prematurely. Wellness is the overall feeling of well-being. Wellness takes into account a balance between physical, mental and spiritual aspects of life and thus is multidimensional. Lifestyle is determined by our culture, needs, family belief and social class. How we choose to live on a daily basis is lifestyle.
- (b) Wellness has six dimensions, namely emotional, occupational, physical, social, intellectual and spiritual aspects. These are all interlinked to each other and have to be balanced for optimal well-being. To achieve wellness, conscious efforts have to be made towards each of these dimensions.
- (c) Modern lifestyle comes with a lot of advantages. Scientific development has made daily living easier and with the aid of modern medicines, we are able to prevent diseases and communicate better and have better information sources due to technological progress. Exposure to better educational resources through online courses and internet has made acquiring knowledge faster and more authentic. However, it has its share of disadvantages too as preoccupation with modern gadgets has made us less social and time for community activities has been replaced by individual activities. These distractions have altered family values and social distances have widened.
2. Arun was training to take part in the 10000-metre run for the national school games to be held six months later. His impression was that if he could attain an ideal weight, he would do well at the competition but he was unable to do so at the school trials. He then consulted his school PE instructor who explained to him that physical fitness was multi-factorial and not merely being having at ideal weight. Over the next three months, while working with the coach, he paid attention to all the five components of physical fitness. Thanks to his coach's understanding of fitness, he won the race on the final day.
- (a) What are the five components of physical fitness that the coach explained to Arun?
 (b) How must have Arun increased his muscular endurance?
 (c) What values did Arun demonstrate in winning the race?

- Ans.** (a) The five components of physical fitness explained to Arun by his coach were cardiovascular endurance, muscle strength, muscle endurance, flexibility and correct body composition. While cardiovascular endurance reflects the capacity to deliver oxygen to different body tissues, muscle strength is the reflection of how much force the muscles can apply. Muscle endurance is the time for which the muscles can take load while flexibility is the capacity of the body to cope with forces from different directions. Body composition refers to fat-to-muscle ratio and when optimized leads to a winning performance.
- (b) To increase muscle endurance, the coach explained to Arun that repetitive loading of muscles was important. So Arun was asked to perform anaerobic exercises such as repetitive sit-ups, using the step machine, cycling and using the elliptical trainers to increase his muscle endurance. Besides, he was taught high-intensity interval training and encouraged to do simple exercises such as stair climbing and weightlifting.
- (c) Arun demonstrated awareness to seek expert help. He had the willingness to listen and follow his coach with persistence and focus. Hard work and regularity at focusing on the five components paid off and led to his victory.
- 3.** Currently a lot of focus is on achieving correct body composition. Many physical features like height, frame size and muscle-fibre ratio and composition are inherited and cannot be altered significantly or at all. However, modern science makes us understand that we can optimise body composition by taking proper care. Thus, in modern trainings, a lot of emphasis is laid on optimising body composition of competitive athletes. With this background in mind, Shruti was asked to speak on this topic in the assembly in her high school. She was also asked to encourage children to get their body composition evaluated and learn ways to optimize it.
- (a) How will Shruti have explained the concept of body composition to the students?
- (b) What various methods were offered to students to have their body composition evaluated?
- (c) What measures did Shruti suggest for the students to optimise individual body compositions?
- Ans.** (a) In simple terms, the students were explained that the human body was made up of four large components, namely the muscles, the body fat, the fluids like blood and the skeletal system. As we grow older, the bone and fluid components largely stay the same but fat and muscle can increase or decrease respectively, being the main determining factors of body composition.
- (b) Many methods were explained by Shruti to students. One Simple method is BMI, where the height and weight are inputted into a mathematical formula and the result decides if the student is overweight or even obese. Also, waist circumference is another simple method. Measuring skin-fold thickness with a skin caliper gives a fair idea of body fat content but the most accurate is body composition analyzers which look like weighing machines but measure fat-to-muscle ratios accurately using the principle of Biometric Impedance.
- (c) Once the students became aware of body composition and its value, they were explained the role of diet and regular physical activity in optimising body composition. Shruti talked about having the right food with right composition of proteins, good fats and complex carbohydrates. Role of regular exercise and taking part in sports was also underlined.

CHAPTER 4 – PHYSICAL EDUCATION & SPORTS FOR CWSN

- 1.** Physical education has long been considered to be only for the physically fit and able. Over the last few decades, however, games and sports are being modified and adapted to those children's needs who suffer from physical, emotional or intellectual disabilities. Today, Children with Special Needs (CWSN) get what is called adaptive physical education. Because of this approach, such children do not feel left out and are able to show their talent at various sports and activities. Adaptive physical education touches all aspects of these children, be it educational or social. This has, in turn, played a huge role in enhancing the lives of CWSN. Now all schools, colleges and universities try following these concepts and make lives more rewarding and fulfilling for CWSN. Special principles outlined for such education programs make lives easier for such children.
- (a) What is adaptive physical education?
- (b) What role does adaptive PE play in current times?
- (c) What special principles does it follow?

- Ans.** (a) Adaptive physical education is the process of modifying games and sports tailored to children with special needs. Since these children have special needs and cannot use normal grounds, equipment or follow regular rules, a customised environment is required. Thus, all physical education processes are tailored to the needs of such children, known as adaptive physical education.
- (b) Today, development of physical activity and agility is as important as developing mental faculties of students. This is of prime importance in children who have special needs. Here every child with special needs is provided with service appropriate to them. Also, gross motor skills like holding bats and balls are taught. Community participation acts as a motivation in such cases. This, in turn, leads to higher self-confidence.
- (c) Adaptive physical education follows a few principles. This includes creating a program that meets physical, mental and social needs of such children. Equipment used in sports are correspondingly modified as is the playing environment like size of the field or height and weight of the equipment used. Specialised instructors are used and, wherever possible, medical supervision is ensured.

2. As a consequence of realising that CWSN had special needs, your school decided to partner with different organisations that organised events for such children. This allowed many of your classmates to benefit from adaptive physical education and associated competitions. As a result, many children started doing better not only in sports but also in the classroom. Now many of these children look forward to such competitions and bring laurels to the school. This, thus, embraces the concept of inclusive education and makes your school a model school.

- (a) What organisations do you know of that promote adaptive sports?
- (b) What do you understand by inclusive education and why do you think it is needed? How do you see your school implement it?
- (c) What difference did you notice in organising Deaflympics when your school decided to take part in it?

- Ans.** (a) While there are many national and international organisations that promote adaptive sports, the most prominent of these include Special Olympics International, Special Olympics Bharat, the Deaflympics and Paralympics.
- (b) Inclusive education is a concept which encourages students with disabilities to take part in sporting activities along with normal children. The idea is for everyone to be included and this allows the students with some disability to cooperate and compete with those without any disability. Here students with disability are put in general PE classes. This benefits all. While students with disabilities gain social skills while playing with non-disabled students, the latter get to understand appropriate behaviour and interactive skills. To implement it, our school took a few measures such as allowing players to be assisted by partners, slowing down the speed of the games, changing equipment to make them lighter, reducing the time of games and increasing interval time. Also, our school put in better-defined playfield boundaries, goalposts were made larger and special coaching was introduced, thus facilitating inclusive PE.
- (c) Our school hosted a local Deaflympics event. We realised quite a few changes were made—age limits for participation were relaxed, referees used flags for signalling instead of whistles. To start a race, the gun was replaced by a light flare and while the rules were same as for regular games, the focus was on using sign language to communicate with the participants! As spectators, we were taught to encourage participants by waving our hands.

3. Initially there were no trained professionals to work with CWSN. Gradually awareness increased and today we have a lot of opportunities for professionals specially trained to work with such children. At the school you met the career counselling and guidance teacher. She explained that a lot of career opportunities now exist in this field. Encouraged by her advice, I decided to explore these opportunities.

- (a) What career opportunities exist for a physical education teacher in the field of working with CWSN?
- (b) How would it be different if I were to work as an occupational therapist?
- (c) What role do I have in working with children with speech defects?

- Ans.** (a) Nowadays, there are a lot of opportunities for developing a professional career in the field of working with CWSN. These range from taking up as a school counsellor to qualifying as an occupational therapist or physiotherapist or speech therapist. Besides, one can opt to be a special educator or even a physical education teacher in various institutions.

- (b) As an occupational therapist, I would be treating and helping the injured or the disabled with routine activities. The aim is to help develop or regain skills needed for daily living. In practice, for children with developmental delays, a professional helps improve motor and cognitive skills. Also, helping develop grip on toys or improving handwriting, occupational therapy helps fulfil basic daily needs such as bathing, putting on clothes and feeding.
- (c) As a speech therapist, I would help a child improve their speech and increase their ability to understand and express themselves. Swallowing and feeding therapy leads to better oral control. I would use facial massage and exercises for the lips, tongue and jaws to improve swallowing ability. Helping articulate and fluency with volume control would be other areas I would work on as a speech therapist. Helping such children understand language by using written words, pictures and body signals would also be my job.

CHAPTER 5 – YOGA

1. In many cultures, yoga is now a way of life. There are eight elements to modern yoga and each is focused on a particular facet of modern-day life. While an average person can perform basic actions in yoga regularly to help achieve better health, experts can do hundreds of different postures. Modern lifestyle diseases can be alleviated with regular practice of yoga and there is worldwide understanding of and enthusiasm for yoga. The world now celebrates International Day of Yoga and a lot of focus is on the practice of yoga at all levels in educational institutions as well.
- (a) What are the eight elements of modern yoga?
- (b) When is the international yoga day celebrated and why?
- (c) Beginning 19th century, write briefly about the advent of modern yoga.

- Ans.** (a) The modern yoga as defined by Patanjali in his *Yoga Sutras* focuses on eight aspects of the practice. These separate branches have separately defined functions. While the branch called Yama focuses on the moral vows and disciplines, Niyama is based on the positive duties and observances. The third branch of yoga called Asana focuses on postures while Pranayam focuses on breathing techniques. Pratyahara, the fifth branch, focuses on withdrawal of the senses while Dharana focuses on concentration. The seventh branch of yoga is Dhayana, which focuses on meditation while the eighth is Samadhi, which is the state of bliss or enlightenment.
- (b) International Day of Yoga is being celebrated the world over on 21 June every year since 2015. This was initiated by the United Nations General Assembly in 2014 and 21 June was chosen as the date on the suggestion of Indian Prime Minister, Shri Narendra Modi, in his UN address as this is the longest day of the year in the Northern Hemisphere.
- (c) In the early 1900s, Indian yoga masters started travelling the whole world educating people about the importance and impact of yoga. Swami Vivekananda brought this to the fore by his lectures at the world religions meet in the US. In the 1930s, Hatha Yoga caught the imagination of a lot of westerners and now most countries around the world have schools for yoga from the basic to advanced levels teaching all aspects of yoga.
2. Yoga practices involve assuming and maintaining various postures and positions. This is the third limb of yoga called Asanas. While it is believed that over 84 lakh asanas exist, most people learn and practise about 70-75 asanas. Asanas are classified on the basis of their specific application or their positions. Most asanas serve to revitalise many body parts together and benefit many organ systems at the same time. Of course specific asanas to alleviate specific health conditions exist as well and today modern yoga helps in almost all lifestyle diseases.
- (a) Based on their application, how are asanas classified?
- (b) Classify asanas based on their positions?
- (c) Write a brief note on the performance of asanas.
- Ans.** (a) Based on their application and end-use, asanas are classified into three types. These are meditative asanas, asanas for better health and asanas for relaxation. Meditative asanas are practised to help stabilize the body for meditative practices and pranayam. These include poses such as Padmasana, the lotus pose and Siddhasana, the perfect pose. Also included in this type are Vajrasana, Swastikasana and Samanasana. To help improve general health, the common asanas used are Matsyendrasana or the spinal twist pose for better digestion and Sarvangasana or shoulder stand pose which benefits the thyroid and other endocrine organs. Asanas used for relaxation include Makrasana or the crocodile pose and Shavasana or the corpse pose. These relax both the body and the mind.

- (b) Position-based classification means the posture adopted to practise the various yoga asanas. These can be supine or prone, sitting or standing postures. Supine posture asanas are performed while lying down on the back and are exemplified by Halasana or plough pose, Chakrasana or wheel pose and Sarvangasana or shoulder stand pose. Prone postures where one lies on the stomach include Bhujangasana or the cobra pose, Dhanurasana or the bow pose and Naukasana or the boat pose. Sitting postures include Padmasana or the lotus pose, Vajrasana or the thunderbolt pose and Paschimottasana or the forward bend pose. Standing postures are exemplified by Vrikshasana or tree pose and Veer asana or the warrior pose.
- (c) Asanas are the postures practised in yoga. Derived from Sanskrit, the word asana translates as posture. Asanas help develop the habit of discipline and concentration. The postures are designed to rejuvenate the various organ systems as well as the mind. The three steps in asanas are to assume an appropriate position, maintain that position and relax from that position. The position has to be comfortable and held steady. All movements are gradual and slow and sudden speedy movements are to be avoided. Thus, asanas need to have a balance between steadiness and ease.
3. Pranayama is the practice of controlling the breath. This is an essential part of any yogic practice. While it is one of the eight limbs of modern yoga, it is considered among the most important aspects of yoga. Recommended to be done early morning, it has three distinct phases. While most people know about and do two or three types of Pranayama, there are, in fact, fourteen distinct types of Pranayama. It offers multiple benefits and has to be learned to get the most out of yoga practice.
- (a) What are the three steps in performing Pranayama?
- (b) What are the common types of Pranayama practised by most people?
- (c) List the benefits the regular practice of Pranayama offers.
- Ans.** (a) There are three distinct steps in performing Pranayama. These are Inhalation called *puraka*, Exhalation called *rechaka* and Retention known as *kumbhaka*. Retention or *kumbhaka* further has two types called *antara kumbhaka*, which is retention between inhalation and exhalation, and *bhaya kumbhaka*, which is retention between exhalation and inhalation.
- (b) Yoga describes fourteen distinct types of pranayam. These range from the very basic natural breathing to abdominal or thoracic breathing, but the common types practised are *vilom*, *anulom vilom*, and fast breathing. While *vilom* is the practice of interrupted breathing, *anulom vilom* involves alternate nostril breathing. One can also use only the right nostril called *surya bhedan* while the cooling breath is called *sheetalī*, *sitkari* and *kaki mudra*.
- (c) Regular practice of correctly done Pranayama is one of the best ways for the body to recover, repair and function better. Improved concentration is a direct result. The calming of mind also occurs. Pranayama also helps in preventing stress-related and psychosomatic disorders such as high blood pressure, asthma, diabetes and sleeplessness.
4. Stress is one of the most common parts of modern lifestyle. Irrespective of age and occupation, today we have come to accept stress and stress-induced conditions as part of living. From times immemorial, yoga has played a big part in de-stressing. One of the most important components of destressing is called yog nidra. Also known as yogic sleep, it is now widely recommended and practised to make our lives more comfortable.
- The best part of this yogic practice is that while it brings the same calm as during sleep, it is done with the practitioner being fully conscious.
- (a) What is special in the practice of yog nidra?
- (b) What are the benefits of yog nidra?
- Ans.** (a) Yog nidra is a powerful relaxation technique while remaining fully conscious unlike in sleep. Best practised in the morning, however, it can be done any time of the day. This is a lying down type of meditation which has profound physical, physiological and spiritual benefits. Proper rest that ensues causes better functioning of the immune and metabolic systems as well.
- (b) Rest, increased awareness and de-stressing are the immediate benefits of yog nidra. This, in turn, helps train the mind, increases creativity, improves memory and learning capacity. Yog nidra also balances the nervous system, improves the level of sleep and enhances mood and overall well-being.

CHAPTER 6 – PHYSICAL ACTIVITY & LEADERSHIP TRAINING

1. Physical education leads to developing leadership skills. PE sets up an attitude of team spirit and social working as well as teaches success and failure to be two sides of the same coin. This is vital for a leader to learn and practise. While sports and physical education has much to offer for the body, it also helps sharpen social and mental skills and can help generate passion for taking everybody along towards a common goal. A fit body can accommodate a fit mind. Keeping this in mind, answer the following questions:

- (a) What attributes does PE develop in shaping up leaders?
- (b) Decision-making is learnt by leaders on the sports fields! Comment.
- (c) What skills does PE help develop that prove beneficial to a leader later?

Ans. (a) Considered just valuable for sports not so long ago, most people now realise that being a part of PE programs has benefits that go beyond the sporting field. Most PE programs lead to development of lifelong skills that include helping develop leadership skills. Increased energy, developing friendliness and affection towards fellow mates as well as understanding the concept of reward and review help a lot. Teamwork, collective decision-making and value of preparation and practice all add value to leadership skills. PE and sports teach the ability to overcome adversity. Learning new and upgraded skills as well as the role of discipline and goal-setting all contribute towards developing leadership skills off the field.

(b) Sports field is a great place to develop not only decision-making but also split second decision-making and how to handle it when decisions go wrong. Improvisation and continuous interpretation of new and changing information add value. Thus, sports help develop skills and behaviour necessary to succeed in a dynamic and ever-changing world.

(c) Multiple skills arise out of taking part in sports and using PE as training for leadership positions. Communicating with the team and setting individual goals clearly and unambiguously is vital to success both on and off the field. Varying opinions arise and tackling them to have everyone working towards a common goal is often an occurrence in sports and in life. Split-second decisions like playing an oncoming fast ball in cricket or deciding to pass the ball in hockey or football do not offer much time for advance planning. As in sports, life too has surprises in store. A winner one day may get eliminated in the first round and leaders face this situation quite often. Maintaining calm and handling crisis occur often in sports and in life, so it is a great learning opportunity.

2. Adventure now is part of sports and modern life. Everyday life throws up new challenges as do sporting events. Conscious decisions to challenge our body and mind lead to a thrill that has no parallel. While adventure sports involves risks, it also offers thrill. Played on water, in air and over terrain using just the body or vehicles, adventure sports is here to stay and grow. India also offers a lot of opportunities in adventure sports with its varied terrain and geography. People undertake adventure sports for reasons varying from thrill of speed to fun and overcoming fears and reducing stress.

- (a) How would you define adventure sports?
- (b) How do we broadly classify the various types of adventure sports?
- (c) What adventure sports can be undertaken on the ground?

Ans. (a) Adventure sports are also known as extreme sports. These are sporting activities that involve high level of danger as they involve speed, heights and a lot of effort. These events range from doing it alone to being part of a team. Both competitive and non-competitive adventure sports exist. While these are thrilling and adventurous, they need a sporting mindset with the ability to handle dangers and even face death. High level of fitness and a strong mental attitude are other prerequisites.

(b) Based on the medium used, adventure sports are classified as water sports, mountain sports, winter sports and air sports. Most are self-explanatory as to their nature. Water sports are played on water and include surfing, bodyboarding and white water rapid shooting. Scuba diving, wind surfing and cliff diving are other water adventure sports. Mountain sports include mountain climbing, rock climbing and mountain biking. Winter is suitable for adventure sports such as skiing, ice climbing, snowboarding and ice boating. Air is conducive to sports such as skydiving, bungee jumping and hang gliding. Sky surfing and tightrope walking are also examples of air adventure sports.

(c) Rock climbing, trekking, mountaineering are examples of ground-based extreme sports. These are practised either indoors as rock face climbing or can be done outdoors. These are great for teambuilding as well as for enjoying nature and solitude. Climbing and conquering high mountain peaks is very satisfying but demands high levels of physical fitness, endurance and stamina as well as the ability to face hostile weather conditions such as high winds, snow, etc.

3. Sports are often associated with injuries. Thus, participation in any sports needs to have inbuilt safety measures as well as the ability to offer immediate assistance in case of injuries like the RICE treatment. A lot of work has gone into making competitive sports safe and injury-free. This involves not only working on the sportspersons but also on the equipment used. Sports injuries can be crippling if not prevented and treated once they occur. You have been appointed the school sports captain and entrusted with the task of making sports at your school safer and less injury-prone.

- What are the possible sports injuries that could occur in your opinion?
- What will your suggestions be to prevent such injuries?
- What first aid measures will you suggest for possible injuries?

- Ans.**
- Injuries could occur to all parts of the body and these can be on-field injuries or delayed injuries that show up after the events. Injuries to muscles and ligaments could range from cuts and bruises to sprains and joint strains. Injuries to bones could result in a variety of fractures and injuries to vital organs like brain can also follow. Injuries can be a result of overuse or direct impact on the field. Common injuries include nose bleeding, etc. Injury to brain can be delayed and present as traumatic brain injury. Injuries can also lead to delayed mental reaction as feeling of failure and depression.
 - As sports captain, the suggestions given to prevent injuries would include use of protective gear like helmets, gloves, pads, etc. Also, before a full game, warm-up activities ought to be encouraged as well as cooling down after an event is over. Everyone needs to be educated about rules and following rules should be made compulsory. Adequate rest between games, proper hydration during and after the event as well as taking rest when injured are other measures which should be implemented. Proper food and nutrition plays a vital role in injury prevention and quick recovery. Appropriate clothing and age/sport-specific equipment also plays a key role in preventing sports injuries.
 - First aid on the sports field is based on a principle called RICE. This is a four-step protocol that involves first offering rest to the injured part. Cold compression with ice is the second step. Compressing the injured part with elastic bandages is the third step and elevating the limb is the fourth step. Of course, this is just first aid and proper medical attention from specialists should be sought immediately.

CHAPTER 7 – TEST, MEASUREMENT & EVALUATION

1. Evaluation and measurement is important to assess the base and then the progress in all facets of life, more so in sports. Performance enhancement is always a goal but one needs to know and understand the starting baseline. Before any sports program can be initiated, a clear understanding of why it is important to test, measure and evaluate any sports performance has to be in place. As the PE teacher of your school, you have to lay out the reasons for implementing testing and measurement.
- What do you understand by test, measurement and evaluation?
 - Why is it important?
 - How do these factors help you in effective planning of the school sports curriculum?

- Ans.**
- Test is an instrument or activity used to accumulate data on a person's ability to do a task. This is used to evaluate skills, performance and reliability of the task completed by a sportsperson. Measurement is the methodology of collecting data using a test or a series of tests. Evaluation is the term used to describe quality of the performance. This is of course based on the data gathered. Evaluation determines the worth of the performance.
 - Test and measurement are important for many reasons. Setting of goal-based need and requirement is an important reason for testing and measurement. Learners' progress can be evaluated with these as well as checking the efficacy of training programmes. Motivation also comes from progress measured and sports administrators can research and experiment based on results obtained by testing and measurement.
 - Once the baseline of performance is established, the needs and requirements of individual sportsperson as well as of the whole team can be planned. Assessing of the measures implemented and whether the changes done are effective can be clearly demonstrated. Players can be motivated by seeing measurable progress. Also, which player needs special attention and encouragement is also an outcome of testing and measurement. Selecting players to represent the school in various competitions, both intramural and extramural, will also result from continuous testing and measurement, thus aiding the best to represent the institution.

2. All human beings have different shapes and physique. Sports performance is dependent on a lot of factors but body types often determine our suitability for various sporting activities. Some body types do better at a particular sport. While many types of classification of body types exist, the one suggested by Sheldon finds very wide acceptance. Many sports bodies use this classification to select a sports person at the entry point. Of course, the types overlap in many people and diet intake is also linked to the predominant body type.

- What is Sheldon body type classification?
- Name the most prevalent method of measuring body types currently and the steps involved in identifying a body type.
- What body type is broadly suitable for what type of sport?

Ans. (a) Sheldon devised body typing, also called somatotyping, based on the broad shape of the body into three distinct types. These are endomorphic, mesomorphic and ectomorphic. Sheldon suggested that those with a rounded physique be classified as endomorphic while those with thick bones and muscular bodies be classified as mesomorphic. Ectomorphic was the category of people who are slim with elongated limbs.

(b) Body types change with age, activity, nutrition and even habits like smoking, etc. Also, many believe somatotyping is not really objective. Factor of size is also not considered by Sheldon's classification. While today lots of methods exist to measure body type, the most commonly used is the Heath Carter method. This method uses multiple body measurements to identify the body type. Besides height and body weight, in this method various body parts are measured such as width of the bone at elbow and knee and limb circumference at mid arm and mid-calf. Skin fold thickness is measured at the shoulder blade, triceps and calf. Wrist measurements are also taken. Then these are plotted on a map or a chart called somatograph, which helps determine the body type.

(c) Each body type has suitability for a particular sporting activity. Of course, these do not make participation exclusive but it is demonstrated that a particular body type does well at a particular sport. Thus, people with endomorphic body types are excellent at power lifting and weight-lifting as well as swimming and shot-put. Those with mesomorphic body types are excellent at athletics and do well in activities involving speed and agility. Ectomorphs do well at water sports, gymnastics, volleyball, high jump and tennis.

3. Doing well at sports and in life is a direct measure of fitness. Health-related fitness has been the subject of much research and over the last few decades, science has come to focus on determinants of health-related fitness. While this is multi-parameter assessment, most people focus on five specific parameters as being contributors to fitness. Most tests are simple to do and do not need a laboratory setting or elaborate equipment. These tests are designed to measure strength, flexibility and endurance as well as have a correct body composition.

- What are the five most important components of health-related fitness?
- How is cardiorespiratory endurance measured?
- How do we measure body composition and what is its importance?

Ans. (a) The five most vital components of health-related fitness are muscle strength, muscle endurance, cardiorespiratory endurance, flexibility and body composition. While each is measured separately, they are all interlinked in the final outcome of the fitness. While muscle strength measures the maximum force a muscle can exert against resistance in a single effort, muscle endurance focuses on the ability of the muscle to work for sustained periods of time. Cardiorespiratory endurance is a measure of how well the heart and lungs work in conjunction with each other when exercised for extended periods of time. Flexibility reflects the capacity of a joint to move through its full range of possible movement and body composition is essentially the fat-to-muscle ratio in a person.

(b) Cardiorespiratory endurance is the reflection of how well a person's heart and lungs are working, especially under condition of exercise. This is measured by what is called VO₂ max. Good cardiorespiratory endurance is associated with lower risk of lifestyle diseases such as obesity, heart disease and cancers. There are many methods to measure cardiorespiratory endurance like Rockport walk test, step test, 12-minute run test or 12 minute swim test. In Step test, the person goes up and down a step of 18 inch height for a period of 3 minutes and then the heart rate is measured after one minute of finishing the test. In 12-minute run or swim test, we see the ability of the subject to complete the time duration. Rockport test needs the person to do one mile as fast as they can preferably on a treadmill. Thereafter the heart rate is taken and using a simple formula VO₂ max is calculated.

- (c) Body composition assesses a person's fat-to-muscle ratio and is currently among the most important gauges to assess fitness. Done using a body composition analyser, which is a simple electronic scale-like device, we can find out the amount of total body fat and the skeletal muscle mass of a person by just putting in their age, height and gender. Higher the body fat, less fit is the person. Better the muscle mass, better is the fitness.

CHAPTER 8 – FUNDAMENTALS OF ANATOMY, PHYSIOLOGY AND KINESIOLOGY IN SPORTS

1. When we sit up or stand, the body tends to maintain the posture. This is the equilibrium and is multifactorial in origin. The body needs to maintain equilibrium not only at rest but also during movement. There are seven fundamental movements in the human body. These work in tandem to maintain balance and equilibrium at rest and while in motion. Losing this capability is incapacitating. The stability of the human body follows the principles of physics and these determine the degree of stability. Thus, a young child is less stable than an adult, so an adult can run faster and stand for long while maintaining equilibrium. Use of this equilibrium and related concept of centre of gravity finds great importance in sports.

- (a) How do you define equilibrium? What are the different types of equilibrium? What are the seven fundamental movements?
 (b) What are the guiding principles determining degree of stability?
 (c) How is the concept of equilibrium and centre of gravity used in sports?

- Ans.** (a) Equilibrium is defined as a stage of balance and stability. Here, opposing forces neutralise each other. There are two types of equilibrium. These are dynamic equilibrium when the human body is in motion and static equilibrium where the body is at rest. The seven fundamental movements humans are capable of are pull, push, squat, lunge, hinge, rotation and gait.
- (b) There are four broad principles that determine stability. The first is that the bigger the base, more is the stability. This is why the golfer takes wide stance or football goalkeeper stands at the goalpost with feet spread as far wide as possible. The second determinant of stability is the conscious lowering of the centre of gravity while indulging in sports. This is particularly important in sports like gymnastics and high jump. The third principle is based on the fact that when the body is up in the air, the head and feet move down while the hips move up and vice versa. The fourth principle is based on the fact that the body weight is directly proportional to stability. Heavier the sportsperson, more stable they are. This is the basis for weight categories in sports like boxing and weightlifting.
- (c) The concept of centre of gravity is important in certain sports. The centre of gravity is the point where the body weight is evenly distributed. This is a fixed point for every one depending on size and shape of the body. The point of centre of gravity allows free rotation in any direction in a stable manner. The importance of this is that firstly if an athlete changes shape, their centre of gravity will change. Secondly, it is possible to make this centre of gravity lie outside of the body. This is used in pole vaulting to reach greater heights as the equilibrium is good even at greater height. Gymnasts take advantage of this concept when they change their body shape during movement and during competition.

CHAPTER 9 – PSYCHOLOGY AND SPORTS

1. Mind and our thought processes determine our life. Success and failures arise with our thoughts. Our behaviour is linked to our feelings and thoughts. This is important in all aspects of life but vital in the field of sports. Today, sports psychology plays an important role in shaping champions. In fact, most top sportspersons seek sports psychologists' help to reach their peak. Although it is a relatively new field, it has proven to be of immense value for top players and sportspersons. While sports psychology focuses on skill development, counselling and training, most modern sports trainings are designed keeping in mind the athletes' psychology. As stresses of modern life grow, understanding of and implementation of sports psychology into training is becoming more and more important.
- (a) Define sports psychology. What areas does it focus on?
 (b) How does having a sports psychologist help a sportsperson?
 (c) How does aid from a sports psychologist enhance an athletes' performance?

- Ans.** (a) Sports psychology is defined as the study of psychology as it influences sports, athletic performance, exercise and physical activity. Optimum performance from an athlete is based on understanding their psychology and using this knowledge not only to train them but also to help set goals and offer encouragement. The principal area of focus is cognitive and behavioural skill training. Improving concentration, setting goals and resetting them as they are achieved as well as emotional stability—all arise from this.
- Counselling and clinical intervention is required to increase motivation, manage weight, avoid substance abuse as well as accept recognition and adulation from fans. Team building and developing leadership skills and interpersonal skills are other positives of sports psychology.
- (b) Having exposure to a sport psychologist is a great career boosting idea for most competitive sportspersons. Understanding the potential of a sportsperson and getting support from their family and friends is a direct consequence of a balanced psyche. Acceptance of coaching with appropriate mental preparation is performance boosting. Better concentration and motivation follows and setback and success are taken in one's stride. Controlling emotions, learning motor skills and preparing for competition is also made easier.
- (c) Most athletes need continuous support, especially from persons they trust and respect, and personal sports psychology trainers offer this. Trainers help cope with performance fears and their inputs, both mental and during training, help boost performance. Everyone needs some mental preparation for any competition and if one has access to a personal psychology coach, mutual understanding is easy and performance enhancing.
2. Adolescence has been rated as the most important and turbulent phase of human growth and development. Considered the most formative years, the age from 10 to 19 years needs not only special care but monitoring to ensure healthy balanced adults. Most troublesome adults start as troubled adolescents. This is the age of most dramatic change in humans not only physically but also emotionally, mentally and hormonally. Growing from a child to an adult brings with it a fair share of problems. Much research has been done and continues to be done to help battle problems of this age.
- (a) What changes does adolescence bring with it?
- (b) What are the common challenges faced by adolescents today?
- (c) What solution ought to be offered to ease transition from adolescence to early adulthood?
- Ans.** (a) Adolescence is the age of big and dramatic change. These changes are not only physical but emotional and mental as well. Adjusting to going from a child to a young adult makes the transition a time of stress and confusion in the young mind. Physical changes start with sudden increase in height and weight. Facial appearance changes as does voice tonality. While males develop facial hair and deep voices as a sign of adolescence, changes in females are even more with development of secondary sex characteristics as breasts and menarche.
- (b) Adolescence brings with it emotional changes and makes them irritable, argumentative and prone to mood swings. Teenage behaviour sets in such as listening to loud music, altered hairstyle and clothes. Substance abuse is possible at this stage. Health problems start with lack of attention to proper sleep, food and exercise. Current challenges include addiction to social media and aggressive behaviour which makes them prone to injuries. Peer pressure makes adolescents prone to reckless behaviour such as driving vehicles fast and often without licence, partying all night and neglecting studies and personal hygiene. Food takes a back seat and focus shifts to eating out at irregular times and a lot of unhealthy food choices because of group behaviour. Body image is also an important consideration at this age.
- (c) To ease transition during adolescence, a lot of support is required. This comes from family and friends as well as schoolmates and teachers. Understanding rather than rigid discipline is warranted. Gentle explanations yield better results than dictating. Understanding on the part of, especially, parents goes a long way. Paying attention to healthy diet and adequate rest and sleep also helps. Being judgmental is not a good idea. Rather, an understanding and supportive environment helps.

CHAPTER 10 – TRAINING AND DOPING IN SPORTS

1. Training is fundamental to all success and development. This applies a lot to sports as newer techniques and aids develop, the aim being to make athletes faster, stronger and better past records and achievements. Today, sports training has become a science that follows specific principles and pattern. No longer is a sportsperson alone and just dependent on their inbuilt skills. Coaching and sports trainings make it easier to excel. Today trainers abound and pay attention to all aspects of a sportsperson, from hydration to nutrition to planned rests and breaks. Training programs now are customised and follow different patterns and systems, based on individual needs.

- (a) Explain briefly the meaning and concept of sports training.
- (b) What principles are followed in sports training?
- (c) Why is sustained regular training important?

Ans. (a) Training is as important in sports as in other facets of life. Today, fitness and conditioning of an athlete depends on many factors. Once we study an athlete and assess their strengths and weaknesses, we can draw up a specific plan. This not only focuses on exercise but must consider what can help achieve the best with reference to specialised nutrition, focused body part training and proper rehabilitative and physiotherapy services. Training allows endurance and stamina to be built up gradually and helps boost self-confidence. Training also helps demonstrate progress the athlete is making in a tangible form. Training replaces the weak links a sportsperson may have. Reaction time, explosive strength, speed, agility and stamina all increase as a result of proper sports training.

(b) Sports training follows a broad but specific set of rules. These start with individual approach to an athlete. Genetics, gender, age, habits and past training are all considered. In any team game, each individual has a different role to play and ought to be prepared for the same. Marginal overload is encouraged on the players to increase performance. Adaptation to the game, climatic environment, team members and playing environment are important considerations. Each sports demands specific training module and has to be factored in. All sportspersons understand that all gains are reversible and all gains from training can be lost if discontinued. This principle of reversibility is important especially when the athletes are between competitions.

(c) Regular training is important not only while the competition season is on but especially between the competitive events. This is because the most important principle of sports training, called reversibility, dictates that an athlete can lose the effects of training once they stop but the gain starts again once the training is restarted. Keeping this in mind, all athletes practise and train continuously even when competitions are a little way off. After periods of prolonged breaks, athletes need to start with conditioning trainings. There have to be periods of active rest in between. Retraining ought not to start with maximum load but built up gradually and enhancing flexibility and ensuring continuity is important. Progression can be in micro cycles of 3 to 10 days or macro cycles of 3 to 6 weeks but always built up slowly.

2. Most sports trainings start with warm-up activities. These are part of any training and fitness program and even the fit athletes initiate practice and participation with this warm-up. Also, all competitive athletes do not stop activity suddenly but have cool off period after the event participation. We see all international cricketers, for example, play at the nets the day before the match. Any new bowler who comes to ball does a few practice runs and we see tennis champions throw a few test balls and hits before the competition.

- (a) What is warm up and cool down?
- (b) Why is warm up important?
- (c) Why should an athlete limber down?

Ans. (a) Warm up is the gentle exercises one does to prepare the body for the increased intensity of exercises that will follow. Cool down involves slowing down the intensity and pace of exercises gradually. This is to transition from working hard to coming to the normal.

(b) Warm up starts at a low intensity and gradually the intensity is increased. This is to permit the body to adjust to increasing heart rate, breathing rate and loosen up the muscles. Properly done warm-up prevents injuries allowing the muscles to get adequate oxygen and increased energy release. Pre-tensioning of the muscles helps them stretch to maximum possible. Warm-up also has mind calming effect and helps improve concentration and focus on exercise. Joints loosen up and body core temperature increases thus relaxing the whole body. Warm-up can be general or sport-specific. Gradual stretching helps build up power, speed and agility of the muscles as well.

(c) Limbering down, also known as cooling down, is an equally important aspect of sports training. These help transition the body from peak performance to slow down and let the heart rate and respiratory efforts normalise. Cooling down prevents dizziness as it helps prevent blood pooling in large muscles of the legs. Cooling down is also important to condition the muscles for the next set of exercises. A feel-good feeling is also generated with gradual limbering down. Repair of the damaged tissues is also initiated in this time.

3. Performance enhancement is currently a very important aspect of modern sports. Training, discipline and regular practice all improve performance but with the urge to attain excellence fast, a few people resort to aid of chemicals that decrease fatigue or enhance performance. Fair play in sports demands that competitors do not resort to any artificial means or aid but sometimes the pressure of getting a result from a sportsperson or his family and peers leads to indulging in what are unfair means. Use of performance-enhancing drugs as well as many biochemical techniques pose challenge to the concept of fair play in sports. Doping, which is use of substances or techniques to improve athletic performance, is banned but is nevertheless a reality. In the long term, doping harms but the urge to produce immediate results causes some sportspersons to give it a try. While worldwide sports authorities have lots of measures to prevent doping, it is still a reality of modern sport and indeed modern life. While continuous testing for doping is done on most competitive sportspersons, there is also a specific list of banned substances that are available for all to see and avoid.
- What is the concept of doping with special reference to sports?
 - What are the different types of doping resorted to by sportspersons?
 - What broad groups of substances are prohibited for sportspersons?

- Ans.**
- Doping in sports is a sad reality. Doping is defined as use of substances or techniques to illegally improve sporting performance. Doping is universally banned worldwide. Doping may cause a temporary boost in performance but has long-term bad effects on health. First reported in 1904, doping has since been regulated by WADA—the world anti-doping agency. Dope-testing is done both by blood as well as urine samples. Athletes are randomly tested and in most events, medal-winners have to undergo compulsory testing. Even off-competition random tests are done to check for doping. Nothing that can interfere to artificially enhance performance is allowed and use of any banned substance is known as doping.
 - Doping methods include use of performance-enhancing substances as well as physical methods of doing it. Performance-enhancing substances are either taken orally or are injected. The most common of these are stimulants such as amphetamines, ephedrine and cocaine. Anabolic steroids have long been the favourite enhancers to build up muscle mass. Human growth hormone used to increase haemoglobin and red blood cell production is also widely used. Steroids are used to build up muscle and decrease response to fatigue. On the other hand, we also have physical methods such as blood doping where extra blood is injected into the athlete to increase endurance. These can be blood transfusions or injections of erythropoietin. With the advent of science, gene doping is used to modify a person's genetic structure to improve sports performance.
 - WADA, the world anti-doping agency, has classified many groups of substances with the aim to inform athletes as to what they are not to use. These are classified as per their mechanism of action as well as aim of use. Anabolic steroids, derived from the male hormone testosterone, are banned as they are used to increase muscle mass and strength. While they boost performance, they also have side-effects like liver abnormalities, increased changes of muscle rupture, heart and blood problems, depression and altered growth in adolescents. A second group of banned drugs are adrenal derivatives called androstenedione. These cause skin problems, enlargement of breast and in males decreased sperm production, etc. A third group of banned substances are the human growth hormones. Also known as somatotropin, this increases muscle mass but leads to side-effects such as joint pains, vision problems, high blood pressure and diabetes.