

OPEN TEXT BASED ASSESSMENT 2016-17

Biology (044) Class - XI

Theme 2: 'Learn to live well'

Learning objectives

- ☐ To understand that good health is central to human happiness and well-being.
- ☐ To relate the cause of some common hormonal disorders with the lifestyle.
- ☐ To evaluate his/her own lifestyle and improve it for living well.
- ☐ To formulate a diet chart and an exercise regime for himself/herself and his/her family members for healthy living.
- ☐ To appraise that healthy society makes an important contribution to economic progress of the nation.
- ☐ To appreciate the contribution of government for well-being of the society.
- ☐ To understand his/her responsibility and be the agent for the change in the society.
- ☐ To spread awareness in society about the importance of leading a healthy lifestyle.

A note to readers

Following text passage is designed for helping the learners understand the importance of well-being. Its purpose is capacity building of learners to evaluate their lifestyle and improve it. Two hormonal disorders - diabetes mellitus and Thyroidism, which are cause of concern in the modern world and can be prevented, have been taken as examples. The focus is on understanding of causes and symptoms of these disorders rather than memorizing them. It will help the learner relate these causes and symptoms with his/her own life and/or with the life of his/her relatives or friends. The teacher is expected to follow a discussion approach so as to help the learners relate the text with life. Teacher should encourage the learners to discuss the related cases from family or friends in the class for better understanding of concepts. The learner should evaluate his/her lifestyle and formulate strategy for dietary and lifestyle changes for living well. Two sample questions have been included at the end of the text. The teacher should design and discuss some more questions which are open ended and the answers to which should not be directly available in the text.

OPEN TEXT BASED ASSESSMENT 2016-17

Biology (044) Class - XI

Theme 2: 'Learn to live well'

Abstract

Everybody in this world is striving hard for personal and professional growth. In this race for progress, somewhere we are forgetting to take care of our health and well-being. Becoming rich does not necessarily mean better quality of life. In order to live well, we should live a healthy and balanced life. In this text, we will focus on some of the common hormonal disorders such as diabetes and thyroid disorders, which have become a challenge for the world including India and can be prevented by change in the lifestyle.

“The ultimate goals of life namely virtue (dharma), wealth (Artha), enjoyment (Kama) and salvation (Moksha) can be enjoyed only by achieving optimum health.”

These are the words of Charaka, the father of medicine and author of the famous medical treatise Charaka Samhita.

“Better health is central to human happiness and wellness. It also makes an important contribution to economic progress, as healthy populations live longer, are more productive and save more.”

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”-WHO

Wellness refers to enhanced quality of life. Wellness of a human being is influenced by nutrition, physical activity, healthy physical and social environment.

Wellness is important not only for prosperity of an individual but also for a prosperous nation. Policies of a nation and its budget allocations can reflect the vision of its government for its citizens' well-being. Let us analyse India's position and the efforts being made in this context by a closer look at some sections of budget 2016 - 17.

India has been ranked 70th among 145 countries in terms of 'well - being' Index. At present India is home to 194.6 million malnourished people (UN Report) who comprise over 15 percent of its population. If we see it in global context, around 25 percent of world's malnourished people (795 million) live here. While developing strategies to steer India towards growth and development, Government of India has increased its investment on nutrition by 1.4% to reduce the number of malnourished people. Integrated Child Development Scheme and Mid-Day Meal Scheme of Government of India are some of the schemes to tackle malnutrition and health problems in children and provide free lunch to school going children on all working days respectively. More money is now transferred to states as untitled funds so as to give greater freedom to states to set their own priorities.

Social sector, healthcare and education appear high in key priorities of the Government. There is an overall increase in social sector allocation. Overall budget allocation in fiscal year 2016-17 for health, including AYUSH (Ayurveda, Yoga and naturopathy, Unani, Siddha and Homeopathy) is Rupees 39,532.55 crore or 13% higher than previous financial year. Central Government Health Scheme of the Government provides comprehensive medical care facilities to central government employees and their family members. Education has been listed as one of the nine pillars of budget with an allocation of Rupees 72,394, which is 4.9% higher than previous budget.

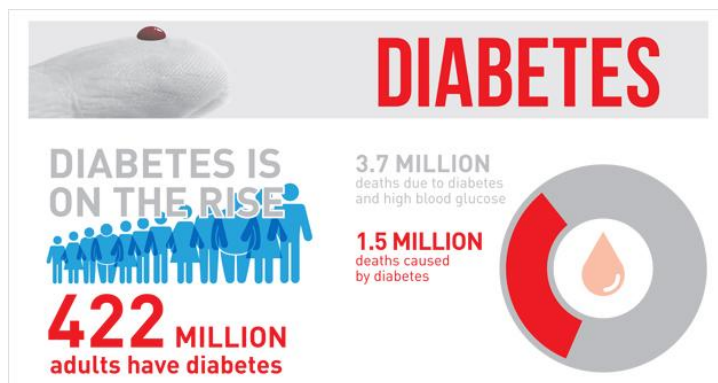
Not only in India, nutrition, health, social sector and education are top priorities for all nations all over the world but still the index of health and wellness is not very high globally also. The data in this regard have proven that more leverage should be given for improvement in health and well-being of populations at global levels. Technical and financial support can be productive only if there is a positive change in attitude towards health and wellness. It has been rightly said -

“There is no knowledge so hard to acquire as the knowledge of how to live this life well and naturally.” – Michel de Montaigne

Celebration of ‘**The World Health Day**’ on April, 07 every year by World Health Organisation (WHO) is an initiative at global level to spread awareness about health and wellness. WHO organises international, regional and local events on this day on a particular theme. This year the focus is on Diabetes mellitus.

‘**Action needed to halt rise in diabetes- Beat Diabetes**’ was the theme of World Health Day for 2016. Try to find out the theme of World Health Day for last five years.

Diabetes mellitus is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation. Its prevalence has been rising more rapidly in middle- and low-income countries. WHO projects that diabetes will be the 7th leading cause of death in 2030! We have to act today for stopping this to happen! Let us understand how can we do this...



Diabetes mellitus is a chronic disease that occurs mainly due to inability of pancreas gland to produce enough insulin or inability of the body to effectively use the insulin. Insulin is a hormone that regulates blood sugar level. A major indication of diabetes is hyperglycaemia, or raised blood sugar.

Try to recall the location and functions of Pancreas gland in the human body. Is it an exocrine or an endocrine gland?

Diabetes mellitus is mainly of two types: Type 1 and Type 2.

Type 1 Diabetes mellitus (previously known as insulin-dependent, juvenile or childhood-onset) results from the autoimmune destruction of the insulin producing beta cells in the pancreas (Figure 1). It leads to lack of Insulin and increased glucose in blood and urine. It requires daily administration of insulin for survival. The cause of type 1 diabetes is not fully known. Its symptoms are frequent urination (polyuria), increased thirst (polydipsia), increased hunger (polyphagia), weight loss, vision changes and fatigue. These symptoms may occur suddenly.

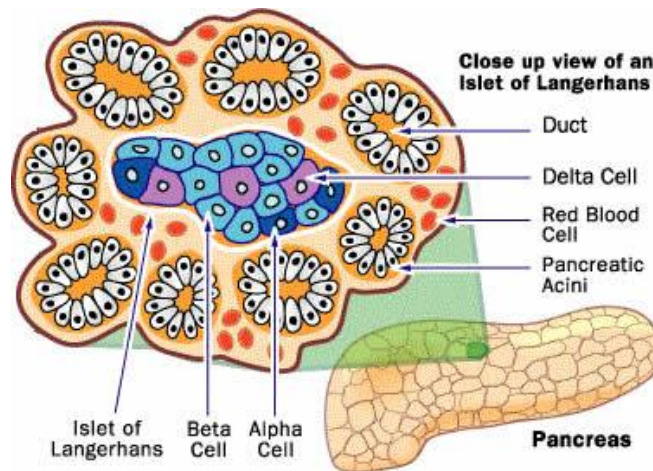
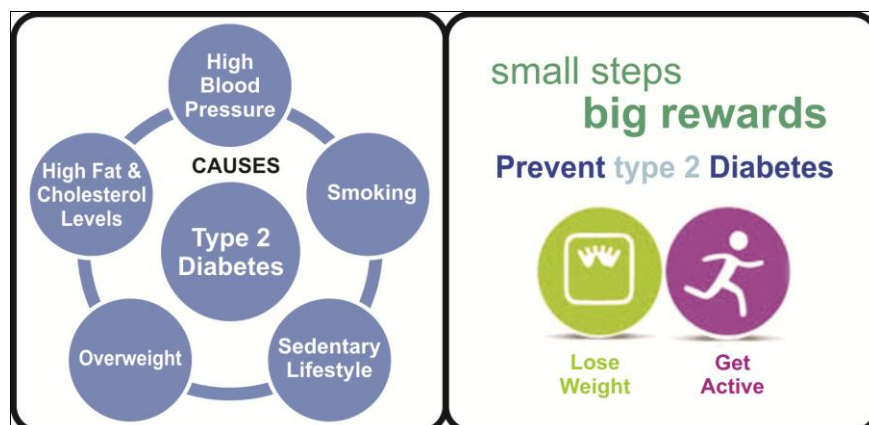


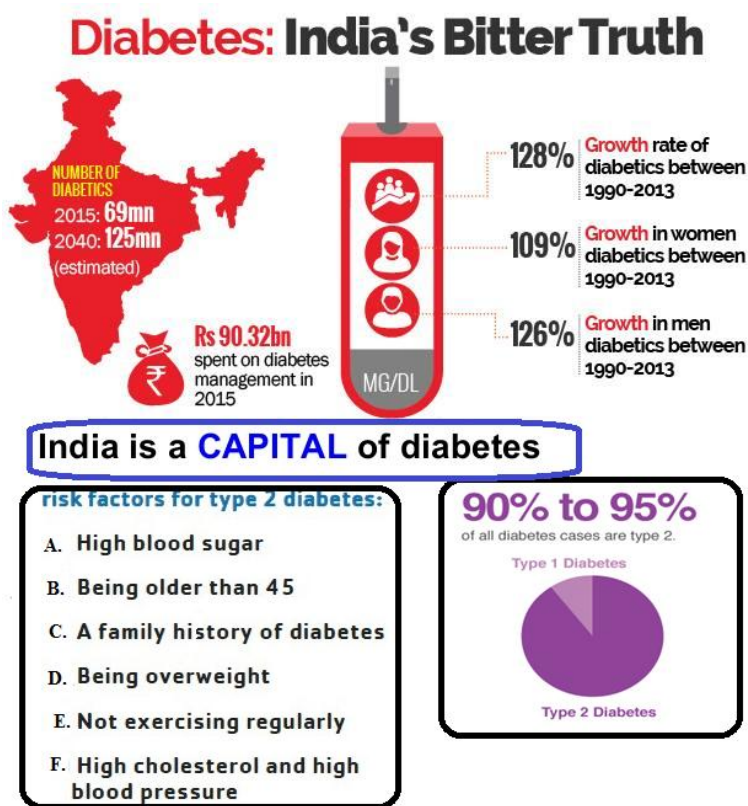
Fig 1: Microscopic view of the section of pancreas

Type 2 diabetes (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin. It occurs mainly due to of excess body weight and physical inactivity. Type 2 diabetes comprises the majority of people with diabetes around the world. 90% cases of diabetes are type 2 diabetes, whereas only 10% cases may be of type 1 diabetes. Symptoms of type 2 diabetes are similar to those of type 1 diabetes, but are often less marked. As a result, the disease may be diagnosed several years after onset, once complications have already arisen.



Government of India is also making efforts to educate people about diabetes and prevent it. The central government has proposed to supplement the efforts of state governments by providing technical and financial support through National Program for Prevention and Control of Cancer, Diabetes, CVD and stroke(NPCDCS).

Success of any program depends on the willingness of all the stakeholders to implement it. Government can educate people but the onus of successful implementation lies on each one of us. A number of lifestyle factors such as reduced physical activity, obesity, fast food, sweetened drinks, high blood pressure, tobacco, alcohol intake and stress lead to serious complications and inevitably diabetes. It can thus be prevented by change in the lifestyle and dietary habits. Let us analyse and improve our lifestyle and diet today and ensure healthy living for tomorrow.



Let us accept the challenge to beat diabetes naturally and live well!

Another major health challenge being faced worldwide including India is prevention of thyroid disorders. Common disorders related with thyroid glands are hyperthyroidism, hypothyroidism and goitre. As per the estimates of World Health Organisation, over 200 million people in world and around 42 million people in India suffer from these disorders. Let us try to understand the cause of thyroid disorders and their prevention.

Try to recall the location and functions of thyroid gland. Thyroid is a butterfly shaped gland located in the neck, its two wings are represented by the left and right lobe (Figure 2). It utilises iodine

from the food to make two hormones – Triiodothyronine (T3) and Thyroxine (T4) which regulate the rate of metabolism and thus the energy level in the human body. The production of T3 and T4 hormone by thyroid glands is regulated by Thyroid Stimulating Hormone (TSH) released by Pituitary gland. For being well, it is important that the T3, T4 and TSH levels are normal (Euthyroidism). If any of these hormones is not within the reference range, the person may suffer from any of the following disorders –

Thyroid disorder	T3 and T4 level	TSH level
Hypothyroidism	Low	High
Hyperthyroidism	High	Low
Subclinical Hypothyroidism	Normal	Mildly elevated
Subclinical Hyperthyroidism	Normal	Low

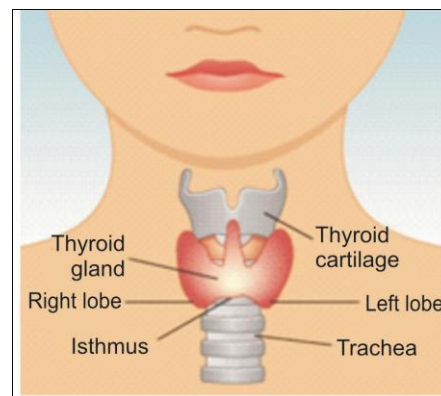


Fig 2: Thyroid glands

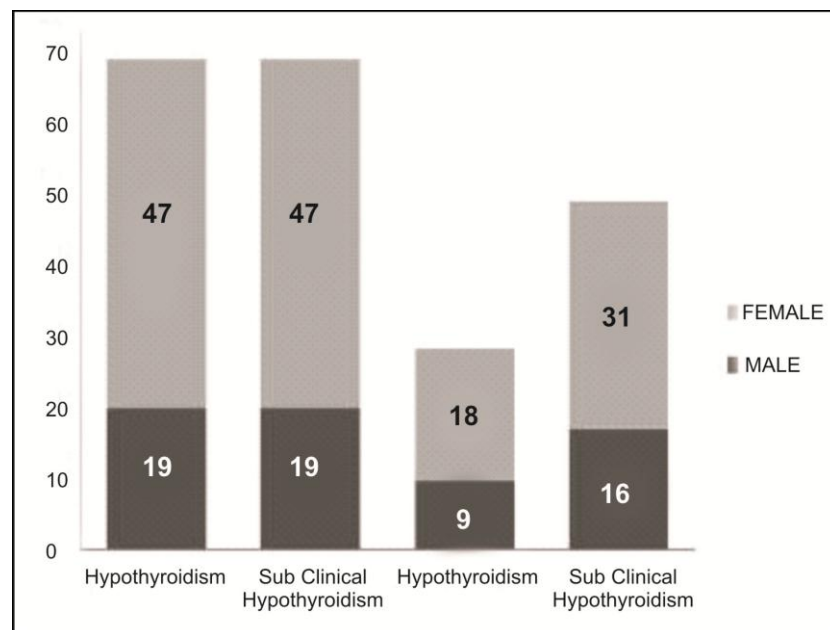


Fig 3: Gender wise prevalence of thyroid dysfunctions

Both hypothyroidism and hyperthyroidism are more common in women than men. Thyroidism is different from other disorders in terms of easy diagnosis and accessibility of treatment.

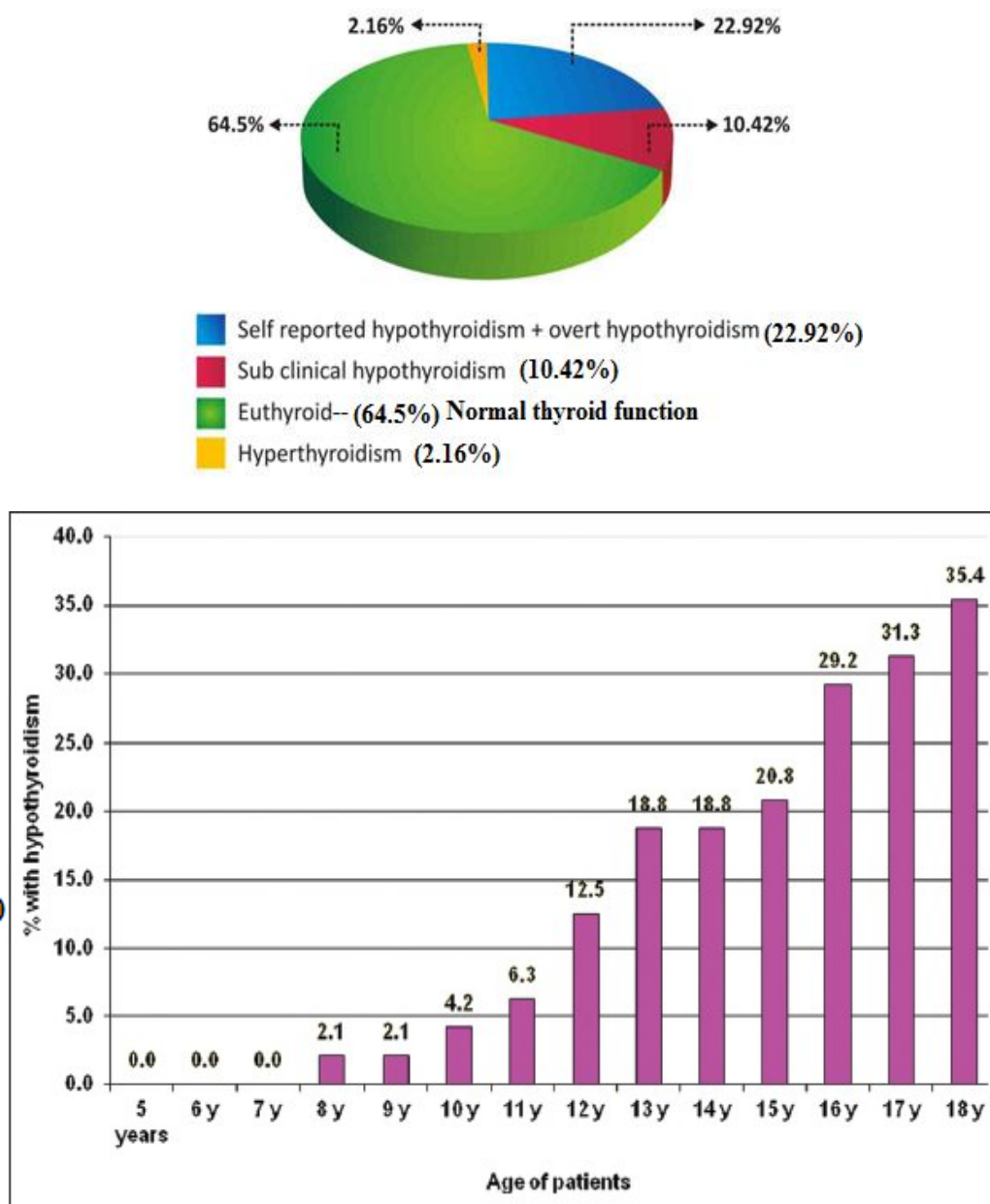


Fig. 4: Prevalence of thyroid disorders

In hyperthyroidism, the thyroid gland becomes overactive and makes excessive amounts of thyroid hormones. It speeds up the body's metabolism and results in nervousness, anxiety, fast heartbeat, intolerance to heat, hand tremors, sleeping problems, diarrhoea and weight loss. The most common cause of hyperthyroidism is Grave's disease, a type of auto immune disease, in which the body makes an antibody called Thyroid stimulating immunoglobulin. Another less common cause is eating excessive iodine in food.

Of all thyroid disorders, hypothyroidism is most common. Lack of physical activity coupled with imbalanced diet is pushing more people including youngsters towards underactive thyroid gland also called as hypothyroidism. It has been found to occur in all age groups in India. It may occur due to inflammation of a part of Thyroid gland which damages its cells and thus they become incapable of secreting sufficient hormone. If T3 and T4 levels are low in spite of the fact that pituitary is secreting more and more TSH (hypothyroidism), people will have all the symptoms related with slow metabolism which has an effect on almost every part of our body from heart to brain, muscles and skin. In such cases, the heart rate may be slower than normal, processing of food by intestine may be slower resulting in constipation and weight gain. The extent of symptoms may vary with the severity of the problem.

HYPERTHYROID	HYPOTHYROID
Nervousness, anxiety	Fatigue, weakness and depression
Diarrhoea	Constipation
Weight loss	Weight gain
Rapid heartbeat	Slow heartbeat
Oily skin	Dry skin and hairs
Rapid nail growth	Brittle nails
Heat intolerance	Cold intolerance
Infrequent periods/Menses in females	Heavy periods in females
Sleeping problems and hand tremors	Memory loss and muscle cramps

Stress can aggravate hypothyroidism and vice versa is also true. Weight gain is a common symptom of hypothyroidism. So, how do we prevent this disorder? We all know the importance of exercise for keeping good health, but are we doing enough of it? Exercise can boost energy, decrease stress and help to maintain a healthy weight. Regular exercise and walking should be an important part of lifestyle not only for thyroid patients but for all of us to live well. We should not forget to spare five minutes for deep breathing or meditation to relax our mind. As hypothyroidism makes the body sluggish and tired so proper sleep and healthy diet are also essential to remain fit. We should eat small fibre rich meals like vegetables, fruits, whole grains, proteins and healthy fats. There is no cure for hypothyroidism but regular medicine and healthy lifestyle can help to manage it. Thus eating well and exercising should be a part of our lifestyle to live well.

When thyroid gland produces too much of thyroid hormone (hyperthyroidism), healthy diet can help to limit mild hyperthyroidism symptoms. Cruciferous vegetables such as cauliflower, cabbage, food rich in vitamin D like egg, mushrooms, fish; protein and calcium rich diet such as beans, milk, cheese, yogurt, nuts and antioxidant rich food such as strawberries can be included in diet.

Iodine deficiency disorders (IDD) such as goitre constitute the single largest case of preventable brain damage worldwide. In India, entire population is prone to such disorders due to deficiency of Iodine in soil and consequently the food derived from it. According to WHO, the daily value for iodine for adults and children older than four years is 150 mcg and for pregnant women, it is 250 mcg per day. Iodine is present in fruits and vegetables, but its amount is very small in general, for example around 3mcg per serving in banana and apple as compared to 99mcg in 3 ounces of baked cod or 75mcg in 1.5 gm of iodised salt. An estimated 350 million people in India do not consume adequately iodised salt and are therefore at risk.

Endemic goitre which results from iodine deficiency is very common in the Himalayan regions of India, Bhutan and Gangetic belts. The prevalence of goitre is high in Maharashtra (11.9%) and West Bengal (9%) and in many other states surveyed it was around 4%. Prevalence is higher in rural areas than in urban areas in many states. In goitre, the thyroid gland enlarges and the symptoms may include hoarseness, coughing, difficulty in breathing and swallowing. To combat the risk of IDD, salt is fortified with Iodine. IDD control programme in India is one of the success stories of public health in the country. Currently 91 percent households consume iodised salt in India, of which 71 percent is adequately iodised. Target of reaching to remaining population is not a difficult task, if we all follow it as a mission approach to spread the awareness. Find out which other diet can help IDD patients to overcome their iodine deficiency.

SYMPTOMS OF ENDEMIC COLLOID GOITER

- ❑ Breathing difficulty
- ❑ Dizziness when the arms are raised above the head.(large goiter)
- ❑ Enlarged neck veins.
- ❑ Swallowing difficulties.
- ❑ Thyroid swelling (nodule)



Everybody in this world is striving hard for personal and professional growth. In this race for progress, somewhere we are forgetting to take care of our health and well-being. Becoming rich does not necessarily mean better quality of life. In order to live well, we should live a balanced life. We need to take out some time from our busy schedule to learn more about our body and keeping it well. We not only need to take care of our physical health, diet and exercise but we have to maintain a balance between mind, body and spirit. Humour, music, yoga and meditation can help to relax our mind. With increasing competition for excelling in our life, balancing between these three aspects is the challenge that all of us are facing today. If each one of us is determined to bring the change in our attitude to face this challenge, the world will change automatically. “Be the change that you wish to see in the world.” – Mahatma Gandhi. So, let us awaken our self and take action today for a better tomorrow and learn to live a better life.

Sample questions

1. Suggest five measures that can be taken at global level for the prevention and control of diabetes and its complications. (5)
2. Being rich does not necessarily mean living a healthy life. Justify the statement. (5)

Marking scheme

1.
 - ☐ Providing scientific guidelines to prevent and manage diabetes and recommendations for governments, individuals, the civic society and the private sector;
 - ☐ Developing norms and standards for diabetes diagnosis and care;
 - ☐ Building awareness on the global epidemic of diabetes;
 - ☐ Conducting surveillance of diabetes and its risk factors;
 - ☐ Developing a global strategy on healthy diet, regular physical activity, managing body weight and health. Or other suitable points. (1 x 5 = 5)
2.
 - ☐ Richness can bring money and comforts but what is more important for being well is a balanced and healthy life. Thus, it is not the richness in terms of money but it is the healthy lifestyle which decides the quality of life.
 - ☐ Factors such as diet and physical activity influence our well-being.
 - ☐ If we are leading a sedentary lifestyle and are not eating healthy food, a lot of complications such as obesity, high blood pressure, diabetes and hypothyroidism may come up and affect our health and well-being.
 - ☐ Stress is also another important cause of such complications.
 - ☐ Yoga, meditation, humour and/or music should be the part of our lifestyle to keep our mind relaxed so as to live well. (other relevant points)

References

- ☐ <http://www.who.int/campaigns/world-health-day/2016/en/>
- ☐ <http://zenhabits.net/live/>
- ☐ <http://www.humankinetics.com/excerpts/excerpts/the-importance-of-health-fitness-and-wellness>
- ☐ <http://www.endocrineweb.com/conditions/hypothyroidism/4-lifestyle-tips-hypothyroidism?page=1>