

## Open Text - Based Assessment Annual Examination-2014



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**CENTRAL BOARD OF SECONDARY EDUCATION**

Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi-110 092 India



## OPEN TEXT MATERIAL

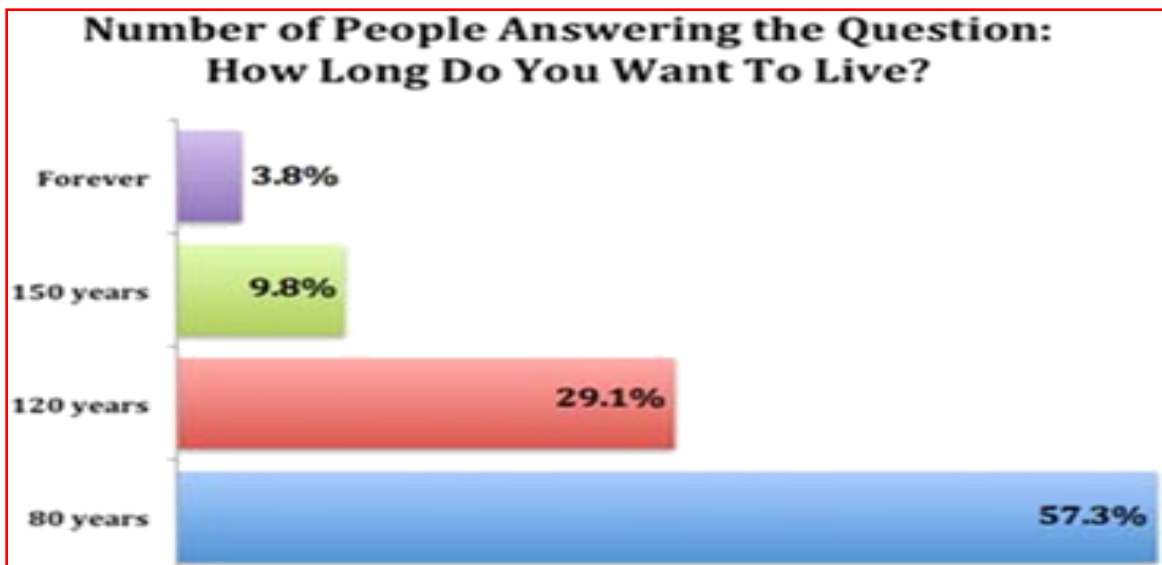
### 1. Theme - *Life & Living*

#### Abstract:

*Globalization is an ultra modern term which is spreading its aura in every corner of the world, so it takes India also in consideration. For a country to become developed and achieve higher standards of success, it is of great significance. This widespread of the spirit of globalization is also affecting the style of working, which ultimately affects the health of the country. Since most of the working population of the country is youth, it is indirectly affecting the future of the country. Awareness about such consequences can lead to their prevention and it is a well known fact that "Prevention is always better than cure".*

India is sitting on the cradle of progress. With massive change in economic policy of Liberalisation, Privatization and Globalization in 1991, India has moved on the path towards modernisation and great technical and professional advancements. There has been a tremendous growth of private sector enterprises in our country and a rise in number of school and college going educated youth who are employed in these sectors.

A survey on willingness of the people to live a long life reveals following result:



*Statistics-1 [Source: Survey conducted by NIH]*

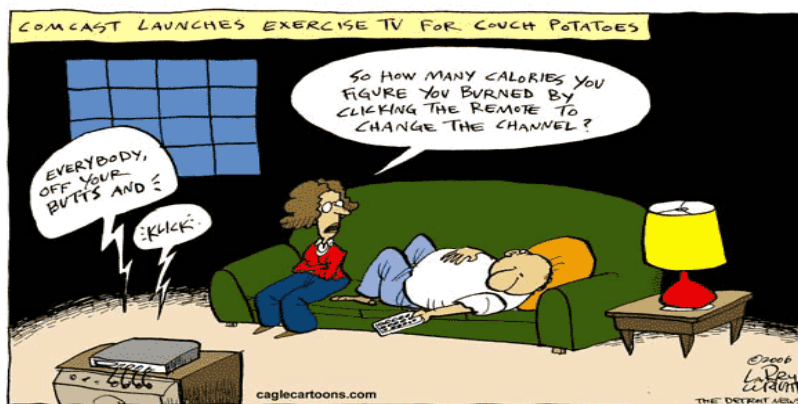
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The interpretation which can easily be drawn is, more than 50% of the population wants to live atleast for 80 years and not below.

India's youth force is highest in the world, which is extremely determined, ambitious, tech-savvy and confident. The youth vigour is seen as the prime agent for contributing to the country's economic intensification and development. Youngsters are employed in large number in BPO (Business process Outsourcing), IT and KPO (Knowledge Process Outsourcing) industries, and are being provided handsome salaries. The most striking feature about India's youth is its desire to stay ahead in the rat race of cut-throat competition, and to succeed as fast as possible.

But this picture of 'India shining' comes at a cost and studies reveal that this cost has to be paid by none other than the very factor that is bringing the country to the brink of high growth, prosperity and development. Majority of college-going students and young working population is concentrated in metropolitan cities, Delhi, Mumbai, Bangalore, Chennai and Kolkata and the urban cities like Pune, Ahmedabad, Hyderabad, Surat, Kochi, Kanpur, Indore etc. Rapid urbanisation, growth of professionalism and the desire to earn fast and more money, has proved extremely detrimental to the country's youth. Despite the growth in industry and commerce, the foremost and important sector, neglected in the process, is health. It is observed that there has been a significant difference in life style of urban young population compared to the traditional, rather 'disciplined' style of living. It is seen that the life style adopted by majority of youth is extremely disorganised and unhealthy, and is further coupled with a defective diet. This can be owed to the idea that time is converted to money, and corporate and personal ambitions are being kept over and above health priorities.

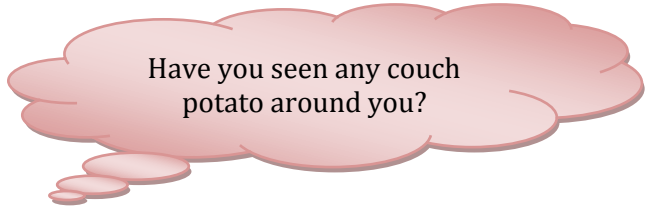
Employers have fixed long hours of working for their people, in the way it suits them and young employees are constantly engaged in monotonous and immobile practice of spending hours in front of computer screen, working. They do not realise that even though they may be progressing financially and seem to be securing their lives and their family's future, they are moving towards an even more insecure future, as they are becoming more vulnerable to serious health risks. It is very unfortunate that they are not conscious about the facts that smoking, consuming calorie rich fast food, alcoholism and drug consumption and eventually becoming couch potatoes while not at work or engaged in anything, will, at the end of the day, cut their life span and hinder the country's progress at large.



Picture-1



[[http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=life+style+diseases&gs\\_l=img.](http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=life+style+diseases&gs_l=img.)]



Today our eating habits are different from those of a generation ago in all ways. Fast food, takeaways and eating out are parts of life for modern teenagers. There are many changes during adolescence that can cause changes in eating behaviour. It can be very difficult for parents of teenagers to convince their children about the benefits of healthier eating when they are also competing with the powerful messages advertising the taste of unhealthy but enticing food.

Innumerable health issues, which are coming up among today's youth, show a growing concern among the medicos and health experts. Usually, such issues are attributed to conflicts prevailing in the country over the last 24-25 years. Sedentary, deskbound life styles and less physical activity are other contributing factors to it. "Change in dietary habits, obesity (which is rapid nowadays due to sedentary life style), less outside activity and more time spend on social websites are the contributing factors responsible for health issues among youth" says Dr. Aadil Ashraf, senior post graduate, Deptt. of medicines, Shri Maharaja Hari Singh (SMHS) hospital in Kashmir.

Common problems which arise due to today's life style are:

Obesity, a very common problem, arising due to change in life-style

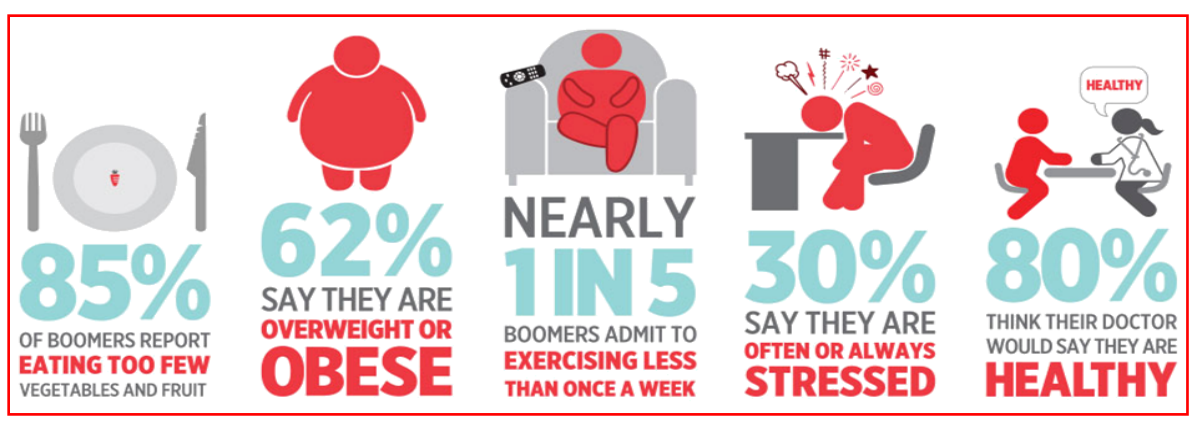
In modern living, there is very limited physical activity, which does not require a dense, calorie rich food but this is the kind of diet which teenagers are normally taking that leads to increase in their weight.

Obesity leads to other problems, like young people start to fight to control the weight, which further leads to diet related disorders like Anorexia, which is more than just a problem because of or with the food. It is a way of using food or starving oneself to feel more in control of life and to effortlessly ease tension, stress, anger and anxiety.

Bulimia nervosa is a disorder in the eating disorder range or spectrum. It is a characteristic disorder of binge eating and characterized by episodes of overeating and then hiding this habit from others and feeling ashamed of. Bulimia is characterized by episodes of secretive, undue excessive eating followed by inappropriate methods of weight control, such as self induced vomiting, abuse or misuse of laxatives and diuretics or excessive, self planned, self directed exercise. It is a psychological disorder. This is another condition that goes beyond control dieting. The cycle of overeating and purging becomes an obsession similar to an addiction to drugs or other substances. This disorder generally occurs after a number of unsuccessful attempts of dieting. Binge





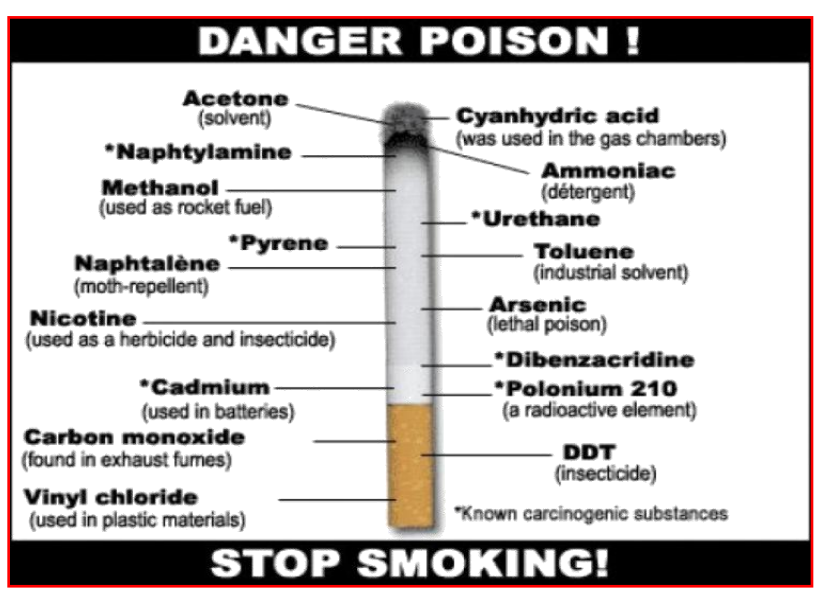


Picture-2

[Source:[http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=lifestyle+diseases&gs\\_l=img.](http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=lifestyle+diseases&gs_l=img.)]

RJ, 33 years old, was highly dedicated to his job and lived a very hectic lifestyle. He was considered as the hardest working employee in his organisation. He never liked to waste time during lunch hours and worked continuously during office time. He either frequently ate from outside, grabbing quick meals from hawkers or stalls, cafes and fast food restaurants, or he just skipped food. He never had time for exercise and was very overweight. He was also a heavy smoker, and frequently used the excuse that cigarettes helped him deal with stress.

Research on the most fascinating components of so called harmful substances uncovers the components, intake of which is being enjoyed by smokers:



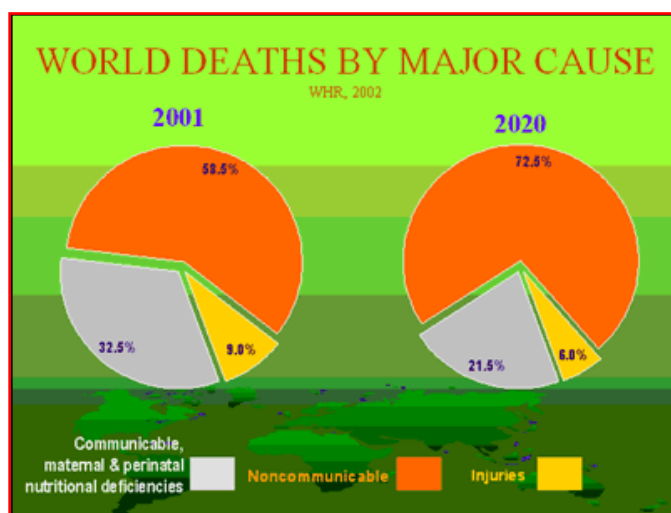
Picture-3

[[http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=lifestyle+diseases&gs\\_l=img.](http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=lifestyle+diseases&gs_l=img.)]

One day, he suffered with severe chest pain and collapsed because of that. His colleagues rushed him to the hospital. Upon investigations, the doctor revealed that he had partial blockage of his blood vessels and had suffered a heart attack during the meeting.

RJ's lifestyle is characteristic of many working people who tend to focus more on their careers than their health. This kind of lack of concern for their health is extremely disturbing and alarming. It is because of this that incidences of non-communicable diseases (NCDs) such as heart diseases have been on the rise.

Non-communicable diseases (NCDs) are diet-related chronic diseases and the main ones include heart diseases, obesity, diabetes, hypertension and different cancers. According to the World Health Organisation (WHO), more than nine million deaths worldwide, attributed to Non Communicable Diseases, occur before the age of 60.



**Statistics-2:** [Source: WHR, 2002]

[[http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=life+style+diseases&gs\\_l=img.](http://www.google.co.in/search?hl=en&site=imghp&tbm=isch&source=hp&biw=1708&bih=833&q=lifestyle+diseases&oq=life+style+diseases&gs_l=img.)]

The pie chart above reveals that the larger number of deaths is contributed by non – communicable diseases, which includes life style related diseases too.

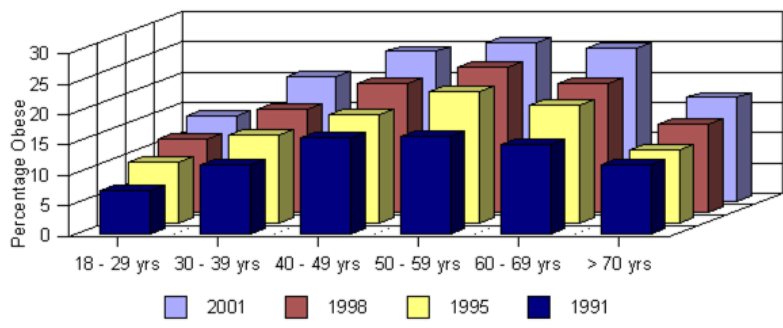
The report of the year 2011 of National Health and Morbidity Survey (NHMS) gives clear indications of the rise in NCDs and its risk factors.

According to the survey, the prevalence for the following has increased compared to previous years:

- ★ Diabetes – increased from 11.6% (2006) to 15.2%.
- ★ Hypertension in adults above 30 years old – increased from 32.2% (2006) to 32.7%.
- ★ Obesity – increased more than three-folds from 4.4% (1996) to 15.1%.

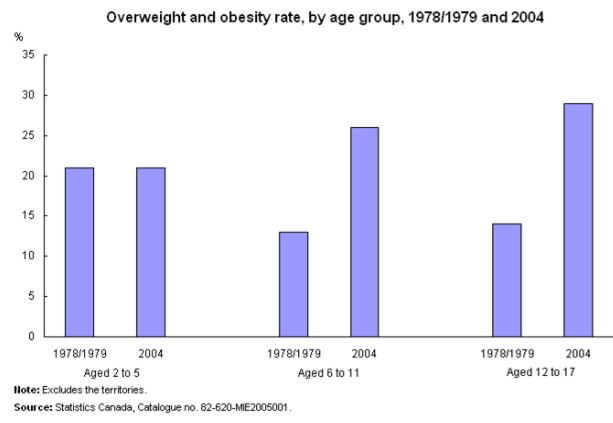


### Prevalence of Obesity by Age



**Statistics-3** [Source: Survey conducted by NGO]

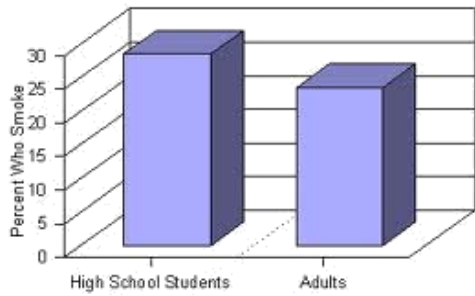
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**Statistics-4**

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### Prevalence of Smoking



**Statistics-5** [Source: Data by NIH]

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These changes have been occurring in our country and worldwide over the past few decades, but the most worrying fact is that most of the people do not realise that their health is in danger.

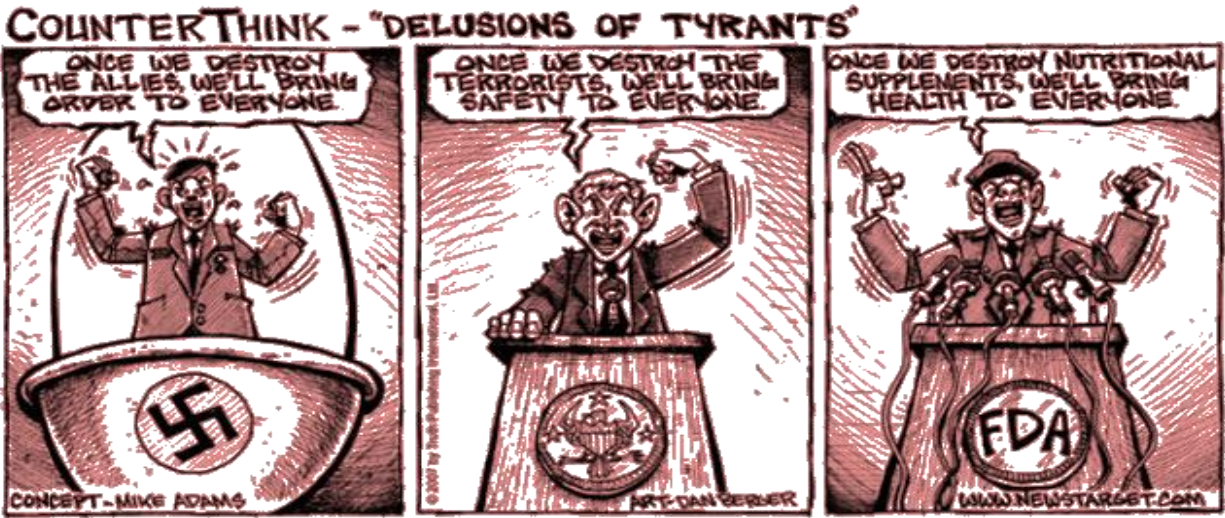
These lifestyle disorders affect adolescents in all ways, that is, psychological, emotional, physical and behavioural. Stress is very common in all diseases. They generally eat abruptly leading to other common problems, like gain in weight and nutrient deficiencies leading to anaemia etc.

A major cause of concern is the lack of exercise leading to excess weight. Adolescents who are involved in sports or dancing may want to change their diet for fitness or morphological appearance. This is all - right in moderation and temperance, but if they are becoming obese or cutting down their food too much, this may be a problem or may cause a problem. In these situations, an exercising schedule should be made and followed strictly. They like to go out with their peer group/friends and it is very common for this age group to eat 'fast food' which is readymade and easily available. This could mean that they won't want to eat the evening meal. Doing this once or twice a fortnight is not harmful to them but excessive indulgence into this practice should be avoided.

It should be understood that skipping meals actually hinders the process of weight control. Skipping breakfast is not a good practice. Many researches show that this is the most important meal of the day.

All such harmful practices are contributing to a number of chronic diseases in the long run, like heart stroke and diseases, cancer, diabetes, obesity, stress and respiratory infections at a very young age. Improper, faulty life style and dietary habits can be seen as going against nature and against mother earth too, the result of which definitely does not augur very well for the future. Rise in fast food joints across the country and immersion of a western culture of clubbing and eating out and alcoholism, especially in the metropolitan and urban cities, has only accelerated the process of **'Progression towards regression'**. Contemporary lifestyle has become a disease in itself, gradually working as a leisurely poison, leading to fatal consequences.

Lifestyle diseases are spreading very rapidly across the world. Quoting Dr. Syed Shuja Qadri, senior resident community medicine, the PRO of SKIMs says, these diseases are different from other diseases as they are potentially preventable and can be controlled with changes in diet, life style and environment, and are manageable through life style modifications like proper sleep, age appropriate and regular exercise, effective handling of stress, good work-life balance and abstaining from alcohol and smoking to maintain and organize life style.



Picture-4

[Source:[http://www.google.co.in/search?hl=en&site=imghp&tbn=isch&source=hp&biw=1708&bih=833&q=lifes+style+diseases&oq=life+style+diseases&gs\\_l=img.](http://www.google.co.in/search?hl=en&site=imghp&tbn=isch&source=hp&biw=1708&bih=833&q=lifes+style+diseases&oq=life+style+diseases&gs_l=img.)]

What is needed today is an extension of focus from organ based expertise – endocrinology, nephrology, neurology and cardiology to a more holistic approach where physicians can provide holistic care in a clinical setting, helping people avoid medical complications which require expensive treatment in hospitals. This new approach towards health and well being requires a dedicated team effort of physicians, dieticians, nutritionists, yoga experts and physiotherapists who work across their traditional silos.

The World Health Organisation and the World Economic Forum has recently said that India will incur an accumulated loss of 236.65 billion by 2015 on account of unhealthy lifestyle and wrong diet. It is seen that 31.2 percent of India’s urban population is overweight or can be called as obese. Two out of three employees in India are victims of stress in the cities. India is also considered as the diabetes capital of the world. Studies show that the possibility of Indians suffering from a lifestyle disease is 4% more than that of any other nationality. Such is the grim, grey, dark side of the prettified picture of ‘India shining’.

The situation demands a general growth of awareness among today’s youth, shaking them from their compliances towards the self-destructive life-style they have adopted, and requires to make them realise the dangers posed by it. It urgently calls for implementation of workplace health programmes, as the work place environment largely influences the youth to promote better health behaviour. Moreover, the corporate needs to adopt a healthier work style for their employees and also for themselves. On a personal level, we are required to strive towards leading a more fit and suitable lifestyle that nurtures the body, mind and soul by consuming a diet that is truly balanced in its nutrient value, and finding time for regular physical exercises from our busy schedules. There is



also an emergent need to give equal time to have a better social life and go back to the old, popular saying 'early to bed and early to rise, makes a man healthy, wealthy and wise'.

Since we uphold the country's future, there is the dire need to ensure that we take care of ourselves as the country depends on us. The country can not hope to move forward if its own people are not healthy enough to contribute towards its rise to glory and sustainable development.

### References:

- ☆ [Dailykashmirimages.com/news-multiple-health-issues](http://Dailykashmirimages.com/news-multiple-health-issues)
- ☆ [ncbi.nlm.nih.gov/pmc/articles](http://ncbi.nlm.nih.gov/pmc/articles)
- ☆ [youthkiawaz.com/2012/02](http://youthkiawaz.com/2012/02) by Tanima Banerjee
- ☆ [bfysportsfitness.com/articles](http://bfysportsfitness.com/articles)

### Sample Questions

1. **"Don't be static, start living a healthier lifestyle today"**, support the negative and positive approach towards life mentioned in the statement by quoting the examples from above text. (2+3=5)
2. Justify the provision of this particular open text material in examination by mentioning its approach and objectives. (2+3=5)
3. Critically analyze all the pictures given in the text and give a detailed comment upon their relevance with the text. (1+1+1+2=5)
4. Identify some life style related disorders other than those which are mentioned in the text and also enlist some of the habits which may lead to any such disease in the long run. (5)

### Marking Scheme

#### Question 1:

Positive Approach

Being aware about life style and its effect on human health

Provision of better infrastructure and facilities to ensure healthier life style of employees (3 marks)

Negative approach

Sedentary life style

Eating fast food/junk food

Drug use and abuse

Example: Life style of RJ

(2 marks)



**Question 2:**

- To develop an understanding about various life style related disorders and diseases.
- To sensitize the stakeholders about vulnerability of their physiological systems to such disorders.
- To make the students aware about causes and consequences of such diseases.
- To strengthen decision making ability of students so that they can select the most suitable amongst the options available.
- To refine the cognitive skills of the students so that they can apply their knowledge about Biology in opting a better life style and hence be able to remain healthy.
- To infuse the sense of belongingness and being a responsible citizen of the country so that they spread their information and share their knowledge with others in society and hence contribute positively towards the cause of society. (3+2)

**Question 3:**

- Relevance of pictures with text.
- Picture 1: Highlighting/illustrating one of the very common examples of sedentary life style.
- Picture 2: Real picture of life style of community with data.
- Picture 3: Relation of chemistry of smoking with human physiology.
- Picture 4: Importance of natural food over artificial supplements
- Pretending to be following healthy life style and ignoring important health issues and bitter realities.

**Question 4:**

- A student may write any disease/disorder by using her/his thinking process and applying biological concepts to it.
- Some of them may include: piles because of long hours of sitting, colitis due to frozen shoulder due to writing continuously on black board, varicose veins due standing for hours may be related to the kind of job and its requirements.
- (Question to be assessed as a whole)



## OPEN TEXT MATERIAL

### 2. Theme - “Incredible India”

#### Abstract:

*India is known for its rich heritage of biological diversity. With only 2.5% of the world's land area, India accounts for 7.8% of recorded species of the world including 46,000 recorded species of plants and 91,000 recorded species of animals. It possesses an exemplary diversity of ecological habitats like forests, grasslands, wetlands, coastal and marine ecosystems, and desert ecosystems.*

*Therefore it is not surprising that India is considered to be one of the world's 17 'mega diverse' countries in terms of biodiversity.*

*India takes its commitment to preserve biodiversity very seriously. This is not only because of India's international obligations as a signatory to the Convention on Biological Diversity, it is also because India believes that protecting our biodiversity is a critical national priority as it is linked to local livelihoods of millions of people in the country. Sustainable use of our biodiversity therefore has both ecological and economic value.*

*This text focuses on the biodiversity found in one of the two major hotspots of biodiversity in India i.e. Western Ghats.*

India is a nation, rich in cultural heritage and biodiversity. Biodiversity here is related to socio-cultural practices. Efforts have been made since ancient times to conserve biodiversity either consciously or by relating it to culture and religion. But due to population explosion, urbanization, fragmentation of habitats, climate change and the careless attitude of human being, several species are facing the threat of extinction. This is not only affecting food chains, but is also affecting the livelihood and culture of many Indians as their life is intricately knit around the biodiversity of their area.

India is situated at the tri junction of the three realms- Afro-tropical, Indo-Malayan and Paleo-Arctic. It has characteristic elements from each one of them. This assemblage of three distinct realms makes the country rich and unique in biodiversity.

As measured by the number of plant and animal species, maximum biodiversity is seen in tropical rain forests. For this reason the Western Ghats and the North-East in India are the richest habitats for species diversity. They are also included in the world's list of hotspots of biodiversity; small geographical areas with high species diversity. Western Ghats have more endemic species, those that are found nowhere else.

Approximately 65 percent of total geographical area in India has been surveyed and approximately 46,000 species of plants and 91,000 species of animals have been described so far by the Botanical Survey of India and Zoological Survey of India respectively. Of these about 4,900 species of





flowering plants are endemic to India. They belong to 141 genera spread over 47 families. These are distributed mainly in floral valleys of North-East India, North- West Himalayas, Western Ghats and the Andaman and Nicobar Islands.

A biogeography region with a significant reservoir of biodiversity that is threatened with destruction is called biodiversity hot-spot. A hot-spot should have at least 0.5 percent of endemic plant species which are found nowhere else. 25 biodiversity hot-spots have been identified at global level, of which two are present in India. These include: Indo- Burma and the Western Ghats and Sri Lanka. These two hot-spots cover less than 2% of the world's land area but have about 50% of the total terrestrial biodiversity. They contribute prominently in geographic extent, bio-physical, socio-cultural diversity and uniqueness. The extent of species endemism in vascular plants alone ranges from 32% to 40% in these mountain ecosystems.

The Indo-Burma hot-spot is one of the most threatened biodiversity hot-spots because of the rapid rate of habitat loss and resource exploitation. It is spread over Cambodia, Vietnam, and Laos, Thailand, Myanmar, Bhutan, parts of Nepal, far eastern India and extreme southern China, Mainan islands in South China Sea and Andaman and Nicobar islands in Indian Ocean.

The Western Ghats, also known as the Sahyadri Hills constitute mountain forests along the south-western side of India and on the neighboring islands of Sri Lanka. This too enjoys the status of UNESCO World Heritage site. The range runs north to south along the Western edge of the Deccan Plateau and separates the plateau from a narrow coastal plain called the Konkan along the Arabian Sea. The range starts near the border of Gujarat and Maharashtra, south of Tapti river and runs over 1600 Km through the states of Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala ending at the southern tip of India. It is one of the world's ten hottest biodiversity hotspots.

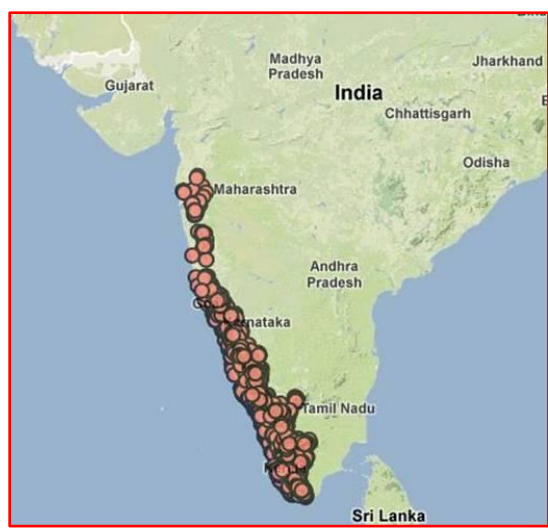


Figure-1: Western Ghats

<http://www.indiawaterportal.org/sites/indiawaterportal.org/files/wghat.jpg>



The word 'ghats' refers to a series of steps leading to a sacred river. Here, the steps are really a long range of hills and mountains covered in tropical vegetation. These hills drain water into large river systems which, according to the researcher, benefits 'over 200 million people'. A wholly unique forest, the Western Ghats also serves as a long standing agricultural area.

The climate here is humid and tropical, tempered by its proximity to the sea. Elevations of 1,500 m (4,921 ft) and above in the north and 2,000 m (6,562 ft) and above in the south have a more temperate climate. Average annual temperature here is around 15°C (60°F). In some parts, frost is common, and temperatures touch freezing point during winter months. Mean temperature ranges from 20°C (68°F) in the south to 24°C (75°F) in north. It has also been observed that the coldest periods in south Western Ghats coincide with the wettest.

Unlike many of the world's other great rainforests, the Western Ghats has long been a region of agriculture. This is one place in the world where elephants walk through tea fields and tigers migrate across betel nut plantations. While wildlife has survived alongside humans for centuries in the region, continuing development, population growth and intensification of agriculture are putting increased pressure on this inherently precarious relationship.



**Figure-2:** An Asian elephant wandering in tea fields in Western Ghats

[http://lh4.ggpht.com/RANt3jmxMOamziHzAhijM3nID8iGiLZwJG99ZII4d\\_fcn7i9UOeq-R0QsU8T4jT0Smlnw=s128](http://lh4.ggpht.com/RANt3jmxMOamziHzAhijM3nID8iGiLZwJG99ZII4d_fcn7i9UOeq-R0QsU8T4jT0Smlnw=s128)

Four types of tropical and sub-tropical broad leaf forests are found in the Western Ghats. These include:, North Western Ghats' moist deciduous forests, North Western Ghats' mountain rain forests, South Western Ghats' moist deciduous forests, South Western Ghats' mountain rain forests. The northern portion of the range is generally drier than the southern portion.

In the north, the lower elevation has deciduous forests whereas the higher altitude (above 1000 m) has mountain rain forests. The North Western Ghats' moist deciduous forests are rich in teak trees



and North Western Ghats' mountain rain forests are characterised by trees of family Lauraceae. The family comprises over 3000 species of flowering plants in over 50 genera world-wide. Most are aromatic evergreen trees or shrubs, but one or two genera such as Sassafras are deciduous, and *Cassytha* is a genus of parasitic vines. Lauraceae are among the top five families in terms of the number of species present. The fruit of Lauraceae is a drupe, a one-seeded fleshy fruit with a hard layer, endocarp, surrounding the seed. However, the endocarp is very thin, so the fruit resembles a one-seeded berry.

These plants are adapted to high rainfall and humidity, and have leaves with a generous layer of wax, making them glossy in appearance, and a narrow, pointed-oval shape with a 'drip tip', which permits the leaves to shed water despite humidity, allowing transpiration to continue.

- ★ Many members of family Lauraceae contain high concentrations of essential oils, some of which are valued for spices and perfumes. Some of the essential oils are valued as fragrances, such as in the traditional laurel wreath of classical antiquity, or in cabinet making, where the fragrant woods are prized for making insect-repellant furniture chests. Some are valued in cooking, for example, bay leaves are a popular ingredient in European, American and Asian cuisines. Avocados are important oil-rich fruit that are cultivated in warm climates around the world.
- ★ Many species are exploited for timber.
- ★ Some species are valued as sources of medicinal material.

The following genera include some of the best known species of particular commercial value:

- ★ *Cinnamomum*: Cinnamon, Cassia and Camphor Laurel
- ★ *Laurus*: Bay Laurel
- ★ *Persea*: Avocado

Loss of habitat and over-exploitation for such products, has put many species in danger of extinction, as a result of overcutting, extensive illegal logging and habitat conversion.

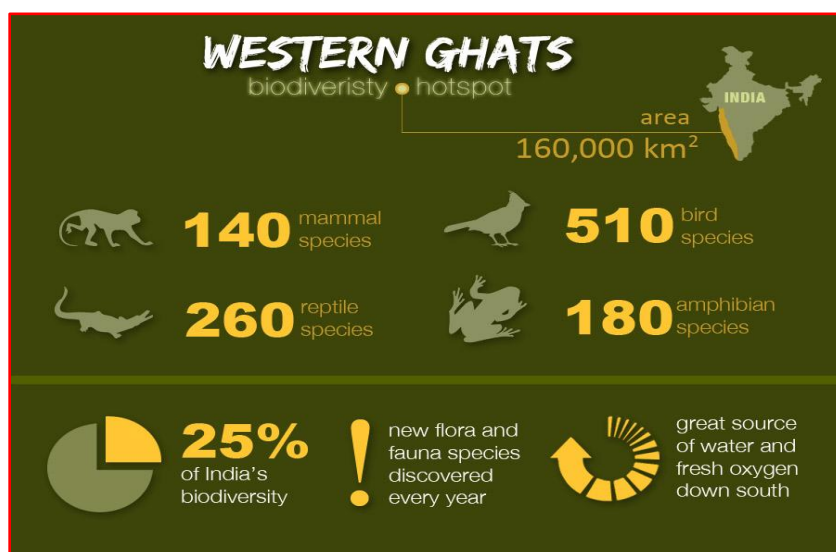
Lauraceae flowers have a complex flowering system to prevent inbreeding. The fruits are an important food source for birds. Seed dispersal of various species in the family is also carried out by monkeys, arboreal rodents, porcupines and opossums.

The evergreen Wayanad forests of Kerala mark the transition zone between northern and southern ecologic regions of the Western Ghats. The southern ecologic regions are generally wetter and more species-rich. At lower elevations are the South Western Ghats moist deciduous forests, with *Cullenia*, the characteristic tree genus, accompanied by teak and other trees.

Above 1,000 meters are the South Western Ghats mountain rain forests, also cooler and wetter than the surrounding low-land forests, and dominated by evergreen trees, although some mountain

grasslands and stunted forests can be found at the highest elevations. The South Western Ghats mountain rain forests are the most species-rich ecologic region in peninsular India; eighty percent of the flowering plant species of the entire Western Ghats range are found in this ecologic region.

Historically Western Ghats were well-covered in dense forests that provided wild foods and natural habitats for the native tribal people. Its inaccessibility made it difficult for people from the plains to cultivate the land and build settlements. After arrival of the British in the area, large swathes of territory were cleared for agricultural plantations and timber. Forest in the Western Ghats has been severely fragmented due to human activities, especially clear felling for tea, coffee, and teak plantations during 1860 to 1950. Species that are rare, endemic and habitat specific are more adversely affected and tend to be lost faster than other species. Complex and species rich habitats like the tropical rainforest are much more adversely affected than other habitats.



**Figure-3:** Animal Species diversity in Western Ghats

<http://amoghavarsha.com/stories/western-ghats/western-ghats-infographic.jpg>

Western Ghats are home to thousands of animal species with more than thousand vertebrate species including at least 325 globally threatened species. Many are endemic species, especially in amphibian and reptilian classes. Thirty two threatened species of mammals live in the Western Ghats. Of the 16 endemic mammals, 13 are threatened.

- ★ **Mammals** – There are at least 140 mammal species. The Malabar large-spotted civet (*Viverra civettina*), also known as the Malabar civet, is endemic to the Western Ghats of India. It is listed as Critically Endangered by IUCN as its population size is estimated to number fewer than 250 mature individuals. The arboreal lion-tailed macaque (*Macaca silenus*), is an Old World monkey, endemic to the Western Ghats of South India. It has been listed as endangered, as only 2500 members of this species are remaining. The largest population of the Lion tailed macaque is in Silent Valley National Park. Kudremukh National Park also protects a viable population.





**Figure-4 a):** Lion tailed macaque



**Figure-4 b):** large-spotted civet

<http://t2.gstatic.com/images?q=tbn:ANd9GcTbXhQZ0CcdEwRyteZhVHa8SL4Mf2CprJGPwgeBgOTdPhn9B>  
[http://media5.picsearch.com/is?MzA8Gtmg9ZNdcy5sucew71jScAvn0Y51kTV0ab\\_YTC8&height=228](http://media5.picsearch.com/is?MzA8Gtmg9ZNdcy5sucew71jScAvn0Y51kTV0ab_YTC8&height=228)

These hill ranges serve as important wildlife corridors, allowing seasonal migration of endangered Asian elephants. The Nilgiri Bio-sphere is home to the largest population of Asian Elephants and forms an important part of Project Elephant and Project Tiger. Brahmagiri and Pushpagiri wildlife sanctuaries are important elephant habitats. Karnataka's Ghat areas hold over six thousand elephants (as of 2004) and ten percent of India's critically endangered tiger population.

The largest population of India's tigers outside the Sundarbans is in unbroken forests bordering Karnataka, Tamil Nadu and Kerala. It has an important elephant corridor connecting the forests of Tamil Nadu with those of Karnataka. It is a home to Black Panther and normal variety of leopards and significant populations of Great Indian Hornbill.

- ☆ **Reptiles** – 260 species of reptiles are found in this region. The snake family Uropeltidae of the reptile class is almost entirely restricted to this region.
- ☆ **Amphibians** – Amphibians of the Western Ghats are diverse and unique, with more than 80% of the 180 amphibian species being endemic to the region. Most of the endemic species have their distribution in the rainforests of these mountains. The endangered Purple frog was discovered in 2003 as a living fossil.



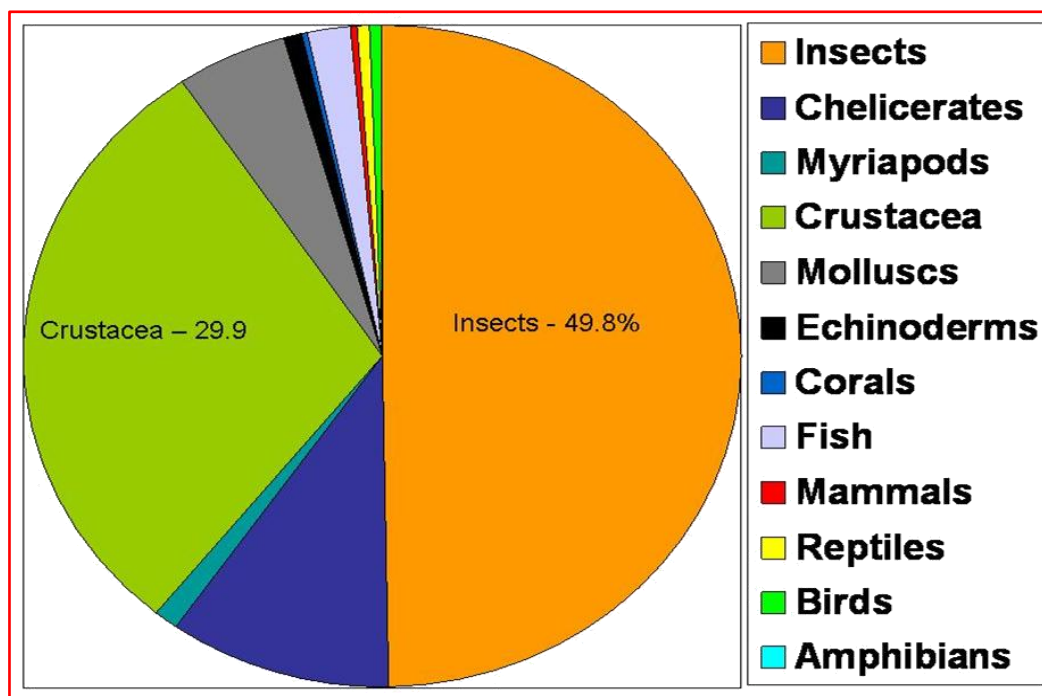
**Figure-5:** Purple frog

<http://t3.gstatic.com/images?q=tbn:ANd9GcTDfx9fNli8HYh360lrEB4aRn9S1kmgY6EqPdgfUMtf8TOrVQ2TNw>



The bizarre purple frog is one of the wonders of Western Ghats. It spends most of its life underground.

- ☆ **Fish** – 102 species of fish are listed for the Western Ghats water bodies. Western Ghats streams are home to several brilliantly coloured ornamental fishes like Red line torpedo barb, Red-tailed barb, freshwater puffer fish and marine forms like mahseers such as Malabar mahseer.
- ☆ **Birds** – There are approximately 510 bird species. Most of Karnataka's five hundred species of birds are from the Western Ghats region alone. There are at least 16 species of birds endemic to Western Ghats, including the vulnerable Nilgiri Wood-pigeon, Broad-tailed Grass bird, nearly threatened, Grey-breasted Laughing thrush and Malabar Parakeet, Malabar Grey Hornbill.
- ☆ **Insects** – There are roughly 6,000 insect species from Kerala alone. Of 334 butterfly species recorded from the Western Ghats, 316 species have been reported from the Nilgiri Biosphere Reserve.
- ☆ **Molluscs** – Seasonal rainfall patterns of the Western Ghats necessitate a period of dormancy for its land snails, resulting in their high abundance and diversity, including at least 258 species of gastropods from 57 genera and 24 families.



**Figure-6:** Comparative account of animal species found in Western Ghatsz

<http://photos1.blogger.com/blogger2/7080/1125107647414726/1600/chart.jpg>



	No. in India	No. in WG	Percentage in of total population in India Western Ghats
<b>Families</b>	26	24	92.31
<b>Genera</b>	140	57	40.71
<b>Species</b>	1488	269	18.10

**Source:** Aravind *et al.* 2005

**Table:** Taxonomic break up and comparison of land snail diversity in India and in the Western Ghats

The area is ecologically sensitive to development and was declared an ecological hotspot in 1988 through the efforts of ecologist Norman Myers. Though this area covers barely five percent of India's land, 27% of all species of higher plants in India (4,000 of 15,000 species) are found here. Almost 1,800 of these are endemic to the region. The range is home to at least 84 amphibian species, 16 bird species, seven mammals, and 1,600 flowering plants which are not found elsewhere in the world.

Identification of 'Key Biodiversity Areas (KBAs)' has been initiated in Western Ghats. At present, there are 137 Protected Areas (PAs) (47,208 sq km) in the Indian Himalayan Region (IHR) and 88 PAs (13,695 sq km) in Western Ghats. Over the years, there has been a steady progression in number and area covered under the PA network in both the regions. Multi-ethnic composition within the mountain ecosystems makes it a distinct microcosm of biodiversity. Human interventions, including developmental activities and rampant poverty are leading to change in land use patterns, habitat loss and fragmentation in the IHR. Similarly, in Western Ghats, in the past, selective logging, and conversion to agriculture and cash crop plantations, river valley projects, etc., have contributed to the decline of biodiversity. Of late, mass tourism, unsustainable land use practices, excessive subsistence dependence on forests, etc., are major challenges.

The Government of India established many protected areas including two biosphere reserves, 13 National Parks to restrict human access, several Wildlife Sanctuaries to protect specific endangered species and many Reserve Forests, which are all managed by the forest departments of their respective state to preserve some of the eco regions that are still undeveloped. Many National Parks were initially Wildlife Sanctuaries. The Nilgiri Biosphere Reserve comprising 5500 km<sup>2</sup> of the evergreen forests of Nagarhole, deciduous forests of Bandipur National Park and Nugu in Karnataka and adjoining regions of Wayanad, Mudumalai National Park and Mukurthi National Park in the states of Kerala and Tamil Nadu has the largest contiguous protected area in the Western Ghats. The Western Ghats is home to numerous serene hill stations like Munnar, Ponmudi and Waynad. The Silent Valley National Park in Kerala is among the last tracts of virgin tropical evergreen forest in India.



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## Sample Questions

1. 'Biodiversity is under threat worldwide'. What can be the causes for it? What are its possible consequences? (2+3=5)
2. Suggest a method of classification of flora and fauna of Western Ghats. Give reason for your selection of method. Which characteristics you will take into account for this purpose? Which taxonomical aids would be of your help in this process? Try to develop a dichotomous key to present an example of classification by taking animals explained in the text into account. (1x5=5)

## Marking Scheme

### Question 1:

#### Causes

- Cutting of trees
- Hunting
- Over exploitation of natural resources for commercial use
- Selfish attitude of human beings
- Preference to short term benefits over long term sustainable use (2 marks)

#### Consequences

- Habitat destruction
- Species extinction
- Disturbance in ecological balance
- Ecological disasters (3 mark)



**Question 2:**

**Any one of the following criteria for classification:**

Morphological, cytological, embryological, evolutionary evidences, physiological etc.

Characteristics will be related to the criterion mentioned For example: Morphological, identifying features of animals.

Taxonomical aids: Herbarium, botanical garden, zoo, specimens or any other.

Development of a dichotomous key or classification of lion tailed macaque, maabar parakeet, torpedo barb, purple frog, snake

- a) External ear/hair present..... if yes, Lion tailed macaque .....If no, go to question b
- b) Wings present.....if yes, Malabar parakeet .....If no, go to question c
- c) Dry, hard and scaly skin present.....If yes, Snake .....If no, go to question d
- d) Moist and slippery skin.....If yes, Purple frog .....If no, go to question e
- e) Scales and fins present.....If yes, torpedo barb (1 mark for each)