Question 1

i) Reasons why parents ought to follow parental courses:

(2 x 1 mark)

Before the birth of a child:

- Learn how to bring-up a child in a formal, but relaxed environment, and be taught by professional and experienced personnel. That way the parents will build up their knowledge and confidence, in preparation for the birth and upbringing of a baby, and ensure that they are getting accurate information.
- Parents receive a lot of practical advice at a pre-natal class, such as how to change a diaper, bathing a baby, feeding, and all the other basics you should be best prepared for.
- Parents are prepared for labour: taught breathing exercises, organising visits in the ante-natal, delivery and post-natal hospital wards, etc.
- Provides a social group where parents-to-be can share the same experiences they are going through. The extra support can develop into new friendship that can last throughout pregnancy and the child’s childhood.

(2 x 1 mark)

When the young child is following late primary schooling:

- These programmes will assist parents in dealing with their children who are growing up, and update them with the latest ways to handle leadership, communication, child development and drug and alcohol abuse issues.
- The courses will also provide a social arena where the parents can vent their family problems encountered in the daily up-bringing of children, and professionals can give them some expert help to assist them to overcome these problems.
- Learn about entities (governmental and non-governmental) that can assist them or their children on different matters.
ii) (8 X 0.5 marks for benefits), (8 X 0.5 marks) for each area of development

Benefits of play activities for various areas of development, and activities suitable for a three year old:

*(NOTE TO MARKERS: ACCEPT ANY OTHER RELEVANT ANSWER)*

<table>
<thead>
<tr>
<th>Development Area</th>
<th>Benefits</th>
<th>Play activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>• Reduces fear, anxiety, stress, irritability</td>
<td>• Play ball, using the swings, slide, etc</td>
</tr>
<tr>
<td></td>
<td>• Creates joy, intimacy, self-esteem and mastery not based on others' loss of esteem</td>
<td>• Role playing, dressing up,</td>
</tr>
<tr>
<td></td>
<td>• Improves emotional flexibility and openness</td>
<td>• Role play</td>
</tr>
<tr>
<td></td>
<td>• Increases calmness, resilience and adaptability and ability to deal with surprise and change</td>
<td>• Role play, ‘Iz-zunzana ddur ddur’ traditional Maltese game. Hide and seek.</td>
</tr>
<tr>
<td></td>
<td>• Decreases tactile defensiveness</td>
<td>• Role play</td>
</tr>
<tr>
<td></td>
<td>• Healing process for hurts</td>
<td>• Role play</td>
</tr>
<tr>
<td>Social</td>
<td>• Increase linguistic capabilities for communication purposes</td>
<td>• All group play activities</td>
</tr>
<tr>
<td></td>
<td>• Enhances feelings of acceptance of difference</td>
<td>• Team games</td>
</tr>
<tr>
<td></td>
<td>• Increases empathy, compassion, and sharing</td>
<td>• Team games and role play</td>
</tr>
<tr>
<td></td>
<td>• Creates options and choices</td>
<td>• Team games, role play, hide &amp; seek</td>
</tr>
<tr>
<td></td>
<td>• Models relationships based on inclusion rather than exclusion</td>
<td>• Role play</td>
</tr>
<tr>
<td></td>
<td>• Alternative to aggressor-victim model of relationships</td>
<td>• Role play</td>
</tr>
<tr>
<td></td>
<td>• Decreases revenge and need for self defence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Improves touch and nonverbal</td>
<td></td>
</tr>
<tr>
<td><strong>socialization skills</strong></td>
<td><strong>Physical</strong></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>- Increases attention and attachment capacities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Team games and role play</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- All play activities, Charades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- All play activities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cognitive</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increases efficiency of brain function</td>
</tr>
<tr>
<td>- Increases creativity and imagination</td>
</tr>
<tr>
<td>- Matching, building blocks, counting games, Charades.</td>
</tr>
<tr>
<td>- Drawing, role play, building blocks, clay/ sand activities.</td>
</tr>
</tbody>
</table>

**iii) (6 X 0.5 marks)**

*Factors parents should consider when choosing the child care centre for their children:*

- Is the child centre licensed and accredited?
- The educational, health and safety standards of the child care centre. Are they in line with the national regulations set?
- Qualifications of staff. Are they qualified for this job? Do they have first aid training?
- Type of education programmes and provisions followed at the centre.
- The staff-to-child ratio in the classroom. Does it change throughout the day?
- Operation hours tally with parents’ childminding needs.
- Child centre policy when the child is injured or falls sick at the centre.
- Vicinity of child centre from work place.
- Restrictions enforced with regard to picking up children.
- Fees and any additional expenses, example for meals, nappy changing, etc.
- Parent involvement in programmes and excursions.

iv) (3 X 1 mark), (2 X 1 mark)

*Advantages and disadvantages of having children looked after by relatives and friends.*

**Advantages:**

- Less financial demands on the young family.
- Parents will have full trust in their friends and relatives to care of their children.
- More one-to-one care.
- Hours of child minding can be set according to the parents’ needs.
- Relative/friend may share similar views on issues such as discipline, food and activities.
- Children are familiar with home environment of relatives and friends.
- Children are less likely to get all the colds and ear infections that many children in childcare tend to bring home.
- If children are sick, the relatives can still mind them.

**Disadvantages:**

- Having a close personal relationship with the child's caregiver can make it difficult for parents to establish an employer-employee relationship.
- If relative is a grandparent of the child, they may feel that they know more about raising children than parents do. They may have their own ideas about issues such as feeding, discipline and sleep.
- They may undermine parent’s authority, which can confuse the child and end up damaging the relationship with the relative.
- A closer bond may develop between the relative/friend and child.
- The activities that children are engaged in may not be so professional as those organised at a professional child care centre.
- Safety standards and hygiene regulations may not be of a high level.
Question 2

i) (1 mark)

*Explain family quality of life:*

Family quality of life pertains to the wellbeing of the family as a whole whilst individual quality of life centres or focuses on the individual within the family.

(2 x 0.5 mark, 2 x 0.5 mark)

*Indicators of good and bad quality of life:*

*(NOTE TO MARKERS: ACCEPT ANY OTHER RELEVANT ANSWER)*

<table>
<thead>
<tr>
<th>GOOD indicators</th>
<th>BAD indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High/reasonably high monetary income</td>
<td>• Low monetary income</td>
</tr>
<tr>
<td>• Healthy family members</td>
<td>• Ill/health issues within family</td>
</tr>
<tr>
<td>• Good employable family members</td>
<td>• Unemployed family members</td>
</tr>
<tr>
<td>• Good level of education/access to education for all members</td>
<td>• Low education level/no or limited access to education</td>
</tr>
<tr>
<td>• Reasonable household monthly expenditure on basic needs</td>
<td>• Low household monthly expenditure on basic needs because there is not enough money for it OR extremely high monthly expenditure due to lack of budget or expensive medical treatments</td>
</tr>
<tr>
<td>• Opportunity to save money on a regular basis</td>
<td>• Debts on regular basis</td>
</tr>
<tr>
<td>• Access to basic services e.g. health, education</td>
<td>• Limited access to basic services</td>
</tr>
<tr>
<td>• Safe housing environment with all basic needs in a house e.g. functional bathroom, good drainage and water system, hot water system</td>
<td>• Housing lacking basic needs, or unsafe housing environment, including unsafe neighbourhood</td>
</tr>
<tr>
<td>• Family members have stress</td>
<td>• Family members do not possess stress</td>
</tr>
</tbody>
</table>
management skills to overcome stressful situations and prevent burn out

management techniques in stressful situations and revert to comfort eating, smoking, substance misuse (alcohol, drugs)

- Take care of their physical surroundings and care for the general environment. Are proactive on eco-issues.
- Not sensitive to eco-issues and always expect the central government to take the necessary action. Laid back or laissez faire attitude.

- Care for their health by taking the necessary measures to prevent accidents and illness. Carry out regular medical check-ups to safeguard their health.
- No interest in health issues. Take medical action only when the need arises.

ii) (1 mark)

Definition of social exclusion:

People are excluded when they are not part of the networks which support most people in ordinary life: networks of family, friends, community and employment. This is a very broad concept which not only includes deprivation, but problems of social relationships, including stigma, social isolation and failures in social protection.

(2 x 0.5 mark)

Groups of people at risk of social exclusion:

Poor people, ex-prisoners, homeless people, people with AIDS, people with learning disabilities, or psychiatric patients, might all be said to be at risk of exclusion. People with physical disabilities, obese people, people who suffer from body deformities example amputees, stammering individuals, crossed eyed individuals, refugees, and many others

(1 mark)

Types of social exclusion:
Three main types of social exclusion are described:

*(NOTE FOR MARKERS: ACCEPT ANY ONE OF THE FOLLOWING ANSWERS)*

- The first is financial - exclusion is identified with poverty, and its effect on a person's ability to participate in ‘normal’ activities i.e. activities practised by those that form a particular group of people who share a similar culture.
- The second is exclusion from the labour market - exclusion is strongly identified with long-term unemployment.
- Third, there is exclusion in its social sense - this identifies exclusion partly with alienation from social networks, and partly with the circumstances of stigmatised groups.

(3 x 1 mark)

*Causes for increased poverty and social exclusion:*

*(NOTE TO MARKERS: ACCEPT ANY SUITABLE CAUSE WHICH HIGHLIGHTS THE INCREASE OF POVERTY AND SOCIAL EXCLUSION)*

- Families with more than two children and single-parent households carry the highest burden of risk in terms of poverty and deprivation, since cost of living has increased dramatically over the past 15 years.
- Income poverty – it is difficult for people on basic earnings to cope with the higher cost of living (commodities bills).
- Lack of education for example early school leavers – this puts a limitation on the types of jobs available for such people. In addition the jobs available are not highly paid, so it is a continuous struggle for such people to make ends meet.
- Young people are finding it difficult to work good work with good pay especially since these people need to continue studying well in their 20s in order to get good jobs. Some students have to support their own studies, as families may not be able to cope. Furthermore applicants need to have already some years’ experience for certain good jobs, excluding them automatically from applying.
- People with low income will not have access to immediate medical and health services as they simply rely on welfare services, which, despite the effort, waiting lists are growing longer every year. Lack of medical and health assistance will prevent people in need of it from working daily and full-time, thus reducing their pay even further.
- Though longevity increased over the years, elderly people who are living on their basic pensions and are in need of medical assistance are finding it hard for them to live on their pensions and pay for their medicine even though they are eligible to certain free medicine. In addition, pensions do not increase over the years like salaries, so a pensioner may have to live on the same pension for quite a number of years.

- Persons who would like to buy lodgings are finding it difficult to do so since most dwellings are expensive, so some of these people are entering into huge loan contracts making it difficult for them to cope. One result of this would be that people go to live in incomplete houses which lack comfort and healthy environment. This leads to negative health effects, which then require medical treatment, which again costs money, putting an increased burden on these people. Another result would be negative mental effects leading to depression, forcing these affected people to go on sick leave or even leave jobs and end up worse than they started.

iii) (1 x 1 mark)

*Malta’s contribution towards eradicating poverty and social exclusion:*

National Action Plan on Poverty and Social Inclusion

The first plan was drafted in 2004 which lasted till 2006; the second plan is an improved continuation of the first and came into action between 2006 and 2008.

This project was funded by: Ministry for the Family and Social Solidarity (being the lead/coordinator ministry in the area of social inclusion), Ministry for Education, Youth and Employment and Ministry for Tourism and Culture.

Target group was population at risk of poverty and social exclusion, with a special emphasis on children and youth.

immigrants, long term unemployed and single parents), while the multi-policy approach focuses upon several areas, including facilitating employment; investing in human capital; building stronger communities (prevention and intervention); strengthening the voluntary sector; investing in social welfare services.

The second Action Plan builds on the first one and includes 70 original policy measures (extended from the previous plan), plus 21 new policies, all characterised as:

- programmes and services that are interdisciplinary and outreach oriented
- prevention programmes that create awareness and provide early intervention
- the introduction of new legislation that protects the most vulnerable
- the implementation of practical measures that particularly target education as the means for enhancing investment in human capital
- the creation of more employment opportunities
- the provision of adequate structures to enhance networking

All policies target individuals and social groups who may be at risk of poverty and social exclusion at any point in their life, with some specifically focusing on children and young people, especially those with special needs and disabilities, early school leavers etc., to enhance their capabilities to integrate in the labour market and empower their emancipatory potential.

(2 x 1 mark)

*Aims*:

- Promote social cohesion through effective collaboration, co-ordination and networking.
- Safeguard present and future generations against poverty, empower the emancipatory potential of children and young people.
- Promote an inclusive society through policy measures that provide equal opportunities to everyone, including the integration of persons with disability and disadvantaged groups.
- Reduce early school leaving and illiteracy rates, effectively address inclusive and quality education for all.
- Enhance the link between academic education/lifelong learning and employability.
iv) (1 mark)

Definition of social influence:

Social influence is defined as change in an individual's thoughts, feelings, attitudes, or behaviours that results from interaction with another individual or a group. Social influence is distinct from conformity, power, and authority.

(2 x 1 mark)

Implications of social influences on individuals and families:

(NOTE TO EXAMINERS: PLEASE ACCEPT ANY OTHER RELEVANT ANSWER)

<table>
<thead>
<tr>
<th>Individuals</th>
<th>Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>• An individual may feel the need to change attitudes, beliefs and behaviours to what society perceives as normal, even though the concerned individual may not agree with the change.</td>
<td>• Tensions may result within family members as to what the family as a whole perceive as normal and what individual family members believe and how to behave in order to conform.</td>
</tr>
<tr>
<td>Increased influence exerted by a peer group in encouraging a person to change his or her attitudes, values, or behaviour in order to conform to group norms. A person affected by peer pressure may or may not want to belong to any particular groups.</td>
<td>• Family members may be compliant with the whole family norm keeping their dissenting opinions to themselves.</td>
</tr>
<tr>
<td>• A person may change his/her attitudes, beliefs and behaviours to match those of a well-liked and respected individual.</td>
<td>• A family member may become alienated from the rest of the family as he/she refuses to comply with the rest of the family due to the new trends the family member has adopted or vice versa.</td>
</tr>
<tr>
<td>• An individual may accept new attitudes, beliefs and behaviours agreeing with the new trends both publicly and privately.</td>
<td></td>
</tr>
</tbody>
</table>
Implications of cultural influences on individual and family lifestyles:

(Note to examiners: please accept any other relevant answer)

<table>
<thead>
<tr>
<th>Individual</th>
<th>Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cultures influence the development of an individual’s personality.</td>
<td>• Family lifestyles may become enriched due new cultural habits, including diets and eating habits/cuisines.</td>
</tr>
<tr>
<td>• Culture influences an individual’s creativity.</td>
<td>• Size of families may change due to other cultural influences.</td>
</tr>
<tr>
<td>• Individual’s knowledge broadens due to introduction of new cultures.</td>
<td>• Different cultural influences may give rise to new attitudes/practices in parental behaviour, which may either help or hinder an existing family lifestyle.</td>
</tr>
<tr>
<td>• An individual can understand more and accepts more diversity and diverse opinions and lifestyles once he/she is introduced to them.</td>
<td>• Old practices which were good but deemed as old at some point in time may re-emerge due to different cultural influences injected in the present society e.g. re-introduction of breastfeeding.</td>
</tr>
<tr>
<td>• A person can alienate him/herself from different cultural attitudes and beliefs in attempt to reject new influences or changes.</td>
<td>• Interaction between parents and children may be enhanced, increased or vice versa due to different cultural influences.</td>
</tr>
<tr>
<td>• Different cultures give rise to new craftsmanship which an individual may learn and adopt as practice or an innovative idea for new business, thus creating possibilities of new jobs.</td>
<td></td>
</tr>
</tbody>
</table>

v) (3 x 1 mark)

Three ways how management of resources and economic influences can assist in the reduction of stress and conflict in families:

(Note to markers: please accept any other relevant answer)
• Most parents tend to keep the number of children small opting for 1 or 2 children in order not to have difficulties in raising their children as desired.
• Since considerable resources must be devoted to food, clothes, transportation, entertainment and schooling, it may be wise for a family to draw up a monthly budget to ensure that all finances are being taken care of and maybe save as well.
• Keeping the environment in mind, a family can reduce costs for water and electricity considerably by being efficient and conscious on the amount of energy used.
• Separation of waste can help a family save on resources by re-using or recycling waste rather than buying new things further reducing costs.
• Enrolling in health/medical insurance and pension plans will help a family put their mind at rest that when in need there will be assistance and when a decrease in income (i.e. pension) is experienced, something will be making up for the decrease. This will ensure that a family can keep the standard of living they strived for.

Question 3

i) (2 x 1 mark for definition), (4 x 0.5 marks for indicators)

*Definition and indicators of:*

<table>
<thead>
<tr>
<th>Definition</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| **High humidity** | • Condensation on windows  
• Wet stains on walls and ceilings  
• Mouldy bathroom  
• Musty smells  
• Allergic reactions  
• Fabric upholsteries feel wet |
| **Lack of ventilation** | • High humidity levels with the above indicators  
• Stale air  
• Odours and mildew infect the air |

Definition: Humidity is the amount of moisture or water vapour in the air. When this is too high it can pose difficulties for households.

Indicators:

- Condensation on windows
- Wet stains on walls and ceilings
- Mouldy bathroom
- Musty smells
- Allergic reactions
- Fabric upholsteries feel wet

Definition: Ventilation is the act of supplying fresh air and getting rid of foul air. If air is not circulated, lack of ventilation occurs.

Indicators:

- High humidity levels with the above indicators
- Stale air
- Odours and mildew infect the air
ii) Negative impacts these unsafe and unhealthy housing conditions have on:

(3 x 1 mark)

*Human health:*

- Musty, foul smelling odours which can be bothersome and cause nausea.
- These microscopic water molecules can make you itch, sneeze and cough.
- Since humidity promotes mould growth and dust mite population growth, which are significant indoor allergens, they can set off allergic sensitivity and trigger rhinitis and asthma.
- Lack of air ventilation can cause dizziness and a sense of uneasiness, which will impact the work performance of household members.
- Infectious disease with greater frequency of complications.
- Airborne infections, example TB.
- Dampness promotes venomous (with termites) buildings.
- Rheumatic conditions because of dampness in the house.
- Increase in child mortality (death) due to increased complications in infections.
- Increased chest conditions, example bronchitis.
- Increased mental illness, mainly depressions. Unfortunately depression can hit babies as from 9 months old to adults due to unhappiness that results from living in such conditions.

(3 x 1 mark)

*The home structure and its contents:*

- Causes warped wood floors, furniture and trim.
- Causes chipped and peeling paint and wallpaper.
- Causes wet stains on walls and ceilings.
- Encourages the growth of dust mites, fungi, bacteria, mould and mildew on walls, ceilings, tiles, etc.
- Causes rot and attracts pests (example: silver fish).
iii) Measures that can be taken when planning, constructing and furnishing a home, to lessen the humidity level and ensure adequate ventilation.

(2 x 1 mark)

Planning Phase:

- Planning many south facing windows to ensure maximum exposure to the sun facing area and good ventilation.
- Incorporate effective ventilation systems. Have ventilation facilities at the top of the house (example vent-holes, ridge vents, static roof vents, gable end vents or wind-driven turbines), so that the hot air will escape out and the room will start to cool. Besides these vents, you should plan to provide an inlet for fresh air to maintain the balance, by having another set of ventilators at the bottom of the room for the entry of fresh air.
- Ensure maximum insulation to avoid temperature change in the house. This can be achieved by planning to have:

(NOTE TO MARKERS: CANDIDATES DO NOT NEED TO GIVE A FULL EXPLANATION OF THE THERMAL INSULATION METHOD USED)

<table>
<thead>
<tr>
<th>Thermal Insulation Method</th>
<th>How it Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Glazing</td>
<td>Double glazing keeps your house at a constant temperature because there is a vacuum in between two layers of glass. There is no air or particles of any kind in a vacuum, so heat cannot be conducted through it. Therefore the heat inside the building cannot escape. Also, a vacuum does not allow sound to travel, so it would be a brilliant acoustics barrier.</td>
</tr>
<tr>
<td>Packing</td>
<td>Packing involves inserting insulation material (textiles, paper, wood chips, etc. in wall cavities and roof layers. This creates entrapped air pockets which will remain warm, and hence this insulates the roof and the walls.</td>
</tr>
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</tr>
</tbody>
</table>
(2 x 1 mark)

*Construction Phase:*

- Ensure that a damp-proof course is inserted on the foundation wall a few centimetres above the ground level, to stop rising dampness.
- For waterproofing concrete and other masonry walls above ground, apply two coats of cement paint, tinted with mineral colouring if desired. Waterproofed coatings to seal absorbent brick and other outside surfaces may be needed.
- Spread a layer of moisture-barrier material over the soil in crawl spaces under houses. You can use heavy roofing paper or polyethylene plastic film.
- Install whole-room fans. This will drive all the hot air upwards that escapes through the roof vents. As the windows are kept open, cold air from outside replaces the hot air. This will not only provide appropriate ventilation, but also reduces household energy bills.
- Install exhaust fans which are a suitable way of expelling the stale air from the house.
- Install an air conditioner or a dehumidifier.

(2 x 1 mark)

*Furnishing Phase:*

- Remove plants as these increase humidity in homes.
- Furnish your home with furniture made from leather, wood, metal or plastic.
- Use hardwood, linoleum flooring or washable area rugs.
- Use washable curtains made of plain cotton or synthetic fabric.
- Reduce the use of open fires as these increase humidity and cause the production of carbon monoxide.

iv) (4 x 0.5 mark)

*Recommendations for buying the dehumidifier*

- Energy consumption: the wattage the dehumidifier has.
- The capacity of the dehumidifier: is it suitable for the place it will be positioned at?
- The operating cost of the dehumidifier.
- Does it have a frost-free feature?
- Does it reset to your preset conditions after a power interruption?
• Any inbuilt energy saving features?
• Can it be drained into some external container or directly into a garden/yard outlet?
• Is it CFC free?
• Has recyclable material been used?
• Could parts of the dehumidifier be dismantled/reused or recycled after its ‘life’?
• Recyclability/sustainable management of packaging – e.g. member of Green Dot scheme.
• The guarantee and after sales service available.

(4 x 0.5 mark)

*How to care for the dehumidifier.*

• **Turn off and unplug your unit when it is not in use.** If you don't plan to use your dehumidifier for several days, make sure to turn it off and unplug it. This will not only save you energy but will also save the motor from working overtime when it isn't necessary. Even the best dehumidifier can wear down with continual use.

• **Empty the collection bucket whenever necessary and before storing.** Most dehumidifiers feature a removable bucket and an indicator that lights up when it is full. When you plan to store your unit or won't be using it for a while, you'll want to empty the water so that it doesn't breed bacteria. Before replacing the bucket in your dehumidifier, wash it with soapy water and rinse it well. If you need to get rid of mould and bacteria, add a bit of white distilled vinegar and let it sit for a few minutes before rinsing and drying the bucket thoroughly. White vinegar can also get rid of any odours in your air dehumidifier.

• **Clean the exterior of your dehumidifier.** Even the best dehumidifier will get dusty over time, so you'll want to vacuum the unit's grills to remove all dust clumps and lint periodically. Dip a cloth in soapy water and wash the exterior of your dehumidifier; then rinse it and dry it with a clean cloth. If you use a portable dehumidifier, you'll also want to check the casters to be sure they are free of dust. Check the handle of your portable dehumidifier, especially if it hasn't been moved in a while.

• **Check your dehumidifier's filter once a month.** While you may not need to replace the filter monthly in a mini dehumidifier, you may have to replace it more frequently in a basement dehumidifier, especially if you live in a particularly muggy area. It's a good idea to check the filter at least monthly to be sure, no matter what your environment is like.
i) (1 mark)

*Definition of sustainable development:*

Sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for generations to come.

(2 x 1 mark)

*Examples of sustainable development:*

- **A sustainable city** – this considers the natural environment in its design and aims to reduce the input of energy, water and other resources, as well as minimising the generation of waste and other environmental disturbances.

- **Eco-industrial parks** – these are areas where industries are placed together to co-operatively manage the use of resources and environmental impacts caused by their operations. By sharing resources they improve efficiency and create less waste.

- **Companies** are also recognising the importance of incorporating sustainable development principles into their operations. This is done by using recycled and more environmentally friendly products, and more efficient manufacturing processes, which have reduced their energy and water consumption. The levels of waste, particularly hazardous waste have also been greatly reduced.

- **Automobile sector** where electric cars and hydrogen-based cars are being developed and marketed as the cars of the future. Such cars do not use any fossil fuels, reducing the negative impact on the environment.

- **The power sector** has gone through sustainable development with the introduction on renewable means of energy such as Solar Electric Farms, Wind Farms, Tidal Generators, Biomass Electricity Generators.
• The **Kyoto Protocol** is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so.

• **Designing buildings** to permit usage of maximum natural light for the purposes of lighting. Such buildings are called green buildings, since the materials used as well as the design are environment friendly.

ii) (3 x 1 mark) (3 x 1 mark)

*Three examples of individual or family practices with a reason for each:*

• Organic farming such as rotating crops is a chemical free way to maximize the growth potential of gardening land as well as to diminish the presence of disease in the soil. This example of sustainable development can benefit home gardeners as well as commercial farmers.

• Installing efficient showers, toilets, and other water using appliances in existing structures and new construction is a way of making the most of available resources by conserving water since less water is used by individuals and families. A major waste of water in existing toilets is leaks. A slow toilet leak is undetectable to the eye, but can waste hundreds of litres each month. One way to check this is to put food dye in the tank, and to see if the water in the toilet bowl turns the same colour. In the event of a leaky flapper, one can replace it with an adjustable toilet flapper, which allows self adjustment of the amount of water per flush.

• Installing a photovoltaic system allows energy from the sun to be harnessed to replace or supplement grid power without the need to use up resources that are not renewable, reducing the amount of fossil fuels used locally and globally and their impact on the environment.

• A more sustainable means of acquiring food is to purchase locally and seasonally. Buying food from local farmers reduces carbon offsets caused by long-distance
food transport, and stimulates the local economy. Local, small-scale farming operations also typically utilize more sustainable methods of agriculture than conventional industrial farming systems, such as decreased tillage, nutrient cycling, fostered biodiversity and reduced chemical pesticide and fertilizer applications. Adapting a more regional, seasonally-based diet is more sustainable as it entails purchasing less energy and resource demanding produce that naturally grow within a local area and require no long-distance transport. These vegetables and fruits are also grown and harvested within their suitable growing season. Thus, seasonal food farming does not require energy intensive greenhouse production, extensive irrigation, plastic packaging and long-distance transport from importing non-regional foods, and other environmental stressors. Farmers’ markets, public events where local small-scale farmers gather and sell their produce, are a good source for obtaining local food and knowledge about local farming productions. As well as promoting localization of food, farmers markets are a central gathering place for community interaction.

- Urban gardening – In addition to local, small-scale farms, there has been a recent emergence in urban agriculture expanding from community gardens to private home gardens. With this trend, both farmers and ordinary people are becoming involved in food production. A network of urban farming systems helps to further ensure regional food security and encourages self-sufficiency and cooperative interdependence within communities. With every bite of food raised from urban gardens, negative environmental impacts are reduced in numerous ways. For instance, vegetables and fruits raised within small-scale gardens and farms are not grown with tremendous applications of nitrogen fertilizer required for industrial agricultural operations.

- Preserving and storing foods reduces reliance on long-distance transported food and the market industry. Home-grown foods can be preserved and stored outside of their growing season and continually consumed throughout the year, enhancing self-sufficiency and independence from the supermarket. Food can be preserved and saved by dehydration, freezing, vacuum packing, canning, bottling, pickling and jellying.

- Transportation – With rising peak oil concerns, climate warming exacerbated by carbon emissions and high energy prices, the conventional automobile industry is becoming less and less feasible to the conversation of sustainability. Revisions of urban transport systems that foster mobility, low-cost transportation and healthier urban environments are needed. Such urban transport systems should consist of a combination of rail transport, bus transport, bicycle pathways and pedestrian walkways. Public transport systems such as underground rail systems and bus transit systems shift huge numbers of people away from reliance on car mobilization and dramatically reduce the rate of carbon emissions caused by
automobile transport. Carpooling is another alternative for reducing oil consumption and carbon emissions by transit.

In comparison with automobiles, bicycles are a paradigm of energy efficient personal transportation. Bicycles increase mobility while alleviating congestion, lowering air and noise pollution, and increasing physical exercise. Most importantly, they do not emit climate-disturbing carbon dioxide. Bike-sharing programs are beginning to boom throughout the world and are modelled in leading cities such as Paris, Amsterdam and London. Bike-sharing programs offer kiosks and docking stations that supply hundreds to thousands of bikes for rental throughout a city through small deposits or affordable memberships.

A recent boom has occurred in electric bikes especially in China and other Asian countries. Electric bikes are similar to plug-in hybrid vehicles in that they are battery powered and can be plugged into the provincial electric grid for recharging as needed. In contrast to plug-in hybrid cars, electric bikes do not directly use any fossil fuels. Adequate sustainable urban transportation is dependent upon proper city infrastructure and planning that incorporates efficient public transit along with bicycle and pedestrian-friendly pathways.

- As populations and resource demands climb, waste production contributes to emissions of carbon dioxide, leaching of hazardous materials into the soil and waterways, and methane emissions. There are a number of ways to reduce waste in sustainable living.
  - One method is reducing paper waste, such as by taking action to cancel junk mail and move paper transactions to an online document. Another method to reduce waste is to buy in bulk, which reduces packaging materials.
  - Preventing food waste is an alternative to organic waste compiling to create costly methane emissions. Food waste can be reintegrated into the environment through composting. Composting can be carried out at home or locally, with community composting.
  - An additional example of how to reduce waste is being cognizant of not buying materials with limited use in excess, such as paint. Reduction aides in reducing the toxicity of waste if non-hazardous or less hazardous items are selected.
  - By reusing materials, one lives sustainably by not contributing to the addition of waste to landfills. Reuse saves natural resources by decreasing the necessity of raw material extraction.
  - Recycling, a process that breaks down used items into raw materials in order to make new materials, is a particularly useful means of contributing to the renewal of goods. Recycling incorporates three primary processes; collection and processing, manufacturing, and purchasing recycled products.
iii) (1 mark)

Definition of sustainable homes:

Sustainable homes are built using sustainable methods, materials, and facilitate green practices, enabling a sustainable lifestyle. Their construction and maintenance have neutral impacts on the Earth. Oftentimes, if necessary, they are close in proximity to essential services such as grocery stores, schools, daycares, work, or public transit, making it possible to commit to sustainable transportation choices. Sometimes, they are off-the-grid homes that do not require any public energy, water, or sewer service.

(3 x 1 mark)

Three features of sustainable homes:

(NOTE TO MARKER: ACCEPT ANY OTHER RELEVANT ANSWER)

- Power – Sustainable homes may not require any public energy. Alternatively, sustainable homes may be linked to a grid supplied by a power plant that is using sustainable power sources, buying power as is normal convention. Additionally, sustainable homes may be connected to a grid, but generate their own electricity through renewable means and sell any excess to a utility. There are two common methods to approaching this option: net metering and double metering. Net metering uses the common meter that is installed in most homes, running forward when power is used from the grid, and running backward when power is put into the grid (which allows them to “net“ out their total energy use, putting excess energy into the grid when not needed, and using energy from the grid during peak hours, when you may not be able to produce enough immediately). Power companies can quickly purchase the power that is put back into the grid, as it is being produced. Double metering involves installing two meters: one measuring electricity consumed, the other measuring electricity created. Additionally, or in replace of selling their renewable energy, sustainable home owners may choose to bank their excess energy by using it to charge batteries. This gives them the option to use the power later during less favourable power-generating times (i.e.: night-time, when there has been no wind, etc.), and to be completely independent of the electrical grid.

- Sustainably designed houses are generally sited so as to create as little of a negative impact on the surrounding ecosystem as possible, oriented to the sun so
that it creates the best possible microclimate (typically, the long axis of the house or building should be oriented east-west), and provide natural shading or wind barriers where and when needed, among many other considerations. The design of a sustainable shelter affords the options it has later (i.e.: using passive solar lighting and heating, creating temperature buffer zones by adding porches, deep overhangs to help create favourable microclimates, etc.)

- Sustainably constructed houses involve environmentally-friendly management of waste building materials such as recycling and composting, use non-toxic and renewable, recycled, reclaimed, or low-impact production materials that have been created and treated in a sustainable fashion (such as using organic or water-based finishes), use as much locally available materials and tools as possible so as to reduce the need for transportation, and use low-impact production methods (methods that minimize effects on the environment). In order for any material to be considered green, it must be resource efficient, not compromise indoor air quality or water conservation, and be energy efficient (both in processing and when in use in the shelter). Resource efficiency can be achieved by using as much recycled content, reusable or recyclable content, materials that employ recycled or recyclable packaging, locally available material, salvaged or remanufactured material, material that employs resource efficient manufacturing, and long-lasting material as possible. Examples of some sustainable materials are cellulose insulation, cork, linoleum and insulation concrete forms, natural rubber and organic cotton insulation.

- Insulation of a sustainable home is important because of the energy it conserves throughout the life of the home. Well insulated walls and lofts using green materials are a must as it reduces or, in combination with a house that is well designed, eliminates the need for heating and cooling altogether. Installation of insulation varies according to the type of insulation being used. Typically, lofts are insulated by strips of insulating material laid between rafters. Walls with cavities are done in much the same manner. For walls that do not have cavities behind them, solid-wall insulation may be necessary which can decrease internal space and can be expensive to install. Roof insulation with polyurethane/Expanded Polystyrene are also a good insulation from heat in summer and humidity of rainfall and cold in winter. Energy-efficient windows are another important factor in insulation. Simply assuring that windows (and doors) are well sealed greatly reduces energy loss in a home. Double or Triple glazed windows are the typical method to insulating windows, trapping gas or creating a vacuum between two or three panes of glass allowing heat to be trapped inside or out. Low-emissivity or Low-E glass is another option for window insulation. It is a coating on windowpanes of a thin, transparent layer of metal oxide and works by reflecting heat back to its source, keeping the interior warm during the winter and cool during the summer. Simply hanging heavy-backed curtains in front of windows may also help their insulation.
Energy efficiency and water conservation are also major considerations in sustainable housing. If using appliances, computers, HVAC systems, electronics, or lighting, the sustainable-minded often look for an Energy Star label, which is government-backed and holds stricter regulations in energy and water efficiency than is required by law. Ideally, a sustainable shelter should be able to completely run the appliances it uses using renewable energy and should strive to have a neutral impact on the Earth’s water sources. Greywater, including water from washing machines, sinks, showers and baths may be reused in landscape irrigation and toilets as a method of water conservation. Likewise, rainwater harvesting from storm-water runoff is also a sustainable method to conserve water usage in a sustainable shelter. All houses in Malta which are built need to have a well stipulated by local legislation in order for households to have other sources of water which is highly needed especially in summer. Well-water has various uses including watering plants and gardens and washing purposes.

iv) (1 x 2 marks)

The difference between reuse and recycle:

Recycling is processing used materials (waste) into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration) and water pollution (from landfilling) by reducing the need for "conventional" waste disposal, and lowering greenhouse gas emissions as compared to the production of a new product.

Recyclable materials include many kinds of glass, paper, metal, plastic, textiles, and electronics. Although similar in effect, the composting or other reuse of biodegradable waste – such as food or garden waste – is not typically considered recycling. Materials to be recycled are either brought to a bring-in site or civic amenity centre, or picked up from household doorsteps, then sorted, cleaned, and reprocessed into new materials bound for manufacturing.

In the strictest sense, recycling of a material would produce a fresh supply of the same material—for example, used office paper would be converted into new office paper, or used foamed polystyrene into new polystyrene. However, this is often difficult or too expensive (compared with producing the same product from raw materials or other sources), so "recycling" of many products or materials, involves their reuse in producing different materials (e.g., paperboard) instead. Another form of recycling is the salvage of certain materials from complex products, either due to
their intrinsic value (e.g., lead from car batteries, or gold from computer components), or due to their hazardous nature (e.g., removal and reuse of mercury from various items).

(1 x 1 mark)

Problems attributed to recycling:

- The costs and energy used in collection and transportation detract from (and outweigh) the costs and energy saved in the production process. The jobs produced by the recycling industry can be a poor trade for the jobs lost in logging, mining, and other industries associated with new production. Materials such as paper pulp can only be recycled a few times before material degradation prevents further recycling.

v) (2 x 1 mark)

Benefits of sustainable farming:

- Enhance environmental quality and the natural resource base upon which the agricultural economy depends.
- Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
- Sustain the economic viability of farm operations.
- Enhance the quality of life for farmers and society as a whole.

(2 x 1 mark)

Ways of sustainable farming:

- Agroforestry - It is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence. There are normally both ecological and economic interactions between woody and non-woody components in agroforestry.
• **Mixed Farming** - Many farmers in tropical and temperate countries survive by managing a mix of different crops or animals. The best known form of mixing occurs probably where crop residues are used to feed the animals and the excreta from animals are used as nutrients for the crop. Other forms of mixing takes place where grazing under fruit trees keeps the grass short, or where manure from pigs is used to feed the fish. Mixed farming exists in many forms depending on external and internal factors. External factors are: Weather Patterns, Market Prices, Political Stability and Technological Development. Internal factors relate to Local Soil Characteristics, Composition of family and Farmer’s Ingenuity. Mixed Farming provides farmers with:
  o an opportunity to diversify risk from single-crop production;
  o to use labour more efficiently;
  o to have a source of cash for purchasing farm inputs;
  o to add value to crop or crop by-product;
  o combining crops and livestocks.

• **Multiple Cropping** - The process of growing two or more crops in the same piece of land, during the same season is called Multiple Cropping. It can be rightly called a form of polyculture. It can be:
  o Double Cropping (the practice where the second crop is planted after the first has been harvested).
  o Relay Cropping (the practice where a second crop is started along with the first one, before it is harvested).

• **Crop Rotation** - The process of growing two or more dissimilar or unrelated crops in the same piece of land in different seasons is known as Crop Rotation. This process could be adopted as it comes with a series of benefits like:
  o Avoiding the build up of pests that often occurs when one species is continuously cropped.
  o The replenishment of nitrogen through the use of green manure in sequence with cereals and other crops.
  o Improves soil structure and fertility, by alternating deep-rooted and shallow-rooted plants.
  o It is a component of polyculture.
i) Advantages of advertising for:

(2 x 1 mark)

The consumer:

- Advertisement about new products keeps the **customer informed** about the new developments in the industry. They help to provide them with information regarding the newly launched products.
- **Keeps prices low** through the development of mass markets.
- Encourages store owners to **stock a variety** of items so consumers have a variety to choose from.
- **Improves the sale of products.** Advertising facilitates a noticeable increase in the sale of the product. It thus helps reduce per unit cost of the product and helps the businesses to earn profits.
- **Alters the attitudes of people.** An effectual advertisement results in a swift change in the attitudes and habits of the people.
- **Direct communication.** In earlier days customers believed on the opinions of retailers, when making the purchases of products. With the rapid spread of media and advertising to every nook and corner of the world, people have become aware of the various products that are available in the same category and the freebees and benefits of purchasing them. So the companies or manufacturers are able to communicate their message directly to the customers.
- **Increase employment.** Advertising is a complicated task and a lot of people are involved in the making of an advertisement. Research team, design team and many other people are required to make and deliver it. So, advertisements generate employment for a lot of people.
- Supports free expression by funding media sources.
- Spurs new inventions for the benefit of the consumer.

(2 x 1 mark)

The producer or service provider:

- Promotes competition among producers of products and services.
- Informs consumers about new developments and innovations and hence increases the demand of the product.
• Informs a wide spectrum of consumers about any special offers.
• Will be able to target different consumers, old customers, prospective customers and the general public.
• Maximizes the production level in the enterprise.
• Reduces the slumps in profit margin of the products.
• Large amounts of production may lead to stabilize the value of the product.

ii) (3 x 1 mark)

According to law, advertisements can be misleading.

Any advertising which, in any way, either in its wording or presentation:

• Deceives or is likely to deceive the persons to whom it is addressed or whom it reaches.
• By reason of its deceptive nature, is likely to affect their economic behaviour.
• or for those reasons, injures are likely to injure a competitor.

Examples of misleading commercial practices

• Claiming to be a signatory to a code of conduct when the trader is not.
• Displaying a trust mark, quality mark or equivalent, without having obtained the necessary authorization.
• Claiming that a code of conduct has an endorsement from a public or other body which it does not have.
• Claiming that a trader, including his/her commercial practices, or a product has been approved, endorsed or authorised by a public or private body when he/she/it has not, or making such a claim without complying with the terms of the approval, endorsement or authorisation.
• Making an invitation to purchase products at a specified price without disclosing the existence of any reasonable grounds the trader may have for believing that he/she will not be able to offer for supply or to procure another trader to supply those products or equivalent products at that price for a period that is, and in quantities that are, reasonable having regard to the product, the scale of advertising of the product and the price offered (bait advertising).
• Making an invitation to purchase products at a specified price and then:
  o refusing to show the advertised item to consumers; or
  o refusing to take orders for it or deliver it within a reasonable time; or
  o demonstrating a defective sample of it, with the intention of promoting a different product (bait and switch).
• Falsely stating that a product will only be available for a very limited time, or that it will only be available on particular terms for a very limited time, in order to elicit an immediate decision and deprive consumers of sufficient opportunity or time to make an informed choice.
• Undertaking to provide after-sales service to consumers with whom the trader has communicated prior to a transaction in a language which is not an official language of the Member State where the trader is located, and then making such
service available only in another language without clearly disclosing this to the consumer before the consumer is committed to the transaction.

• Stating or otherwise creating the impression that a product can legally be sold when it cannot.

• Presenting rights given to consumers by law as a distinctive feature of the trader’s offer.

• Without prejudice to the provisions of the Broadcasting Act (Cap. 350) and any regulations made thereunder, using editorial content in the media to promote a product where a trader has paid for the promotion without making that clear in the content or by images or sounds clearly identifiable by the consumer (advertorial).

• Making a materially inaccurate claim concerning the nature and extent of the risk to the personal safety or security of the consumer or his family if the consumer does not purchase the product.

• Promoting a product similar to a product made by a particular manufacturer in such a manner as deliberately to mislead the consumer into believing that the product is made by that same manufacturer when it is not.

• Establishing, operating or promoting a pyramid promotional scheme where a consumer gives consideration for the opportunity to receive compensation that is derived primarily from the introduction of other consumers into the scheme rather than from the sale or consumption of products.

• Claiming that the trader is about to cease trading or move premises when he is not.

• Claiming that products are able to facilitate winning in games of chance.

• Falsely claiming that a product is able to cure illnesses, dysfunction or malformations.

• Passing on materially inaccurate information on market conditions or on the possibility of finding the product, with the intention of inducing the consumer to acquire the product at conditions less favourable than normal market conditions.

• Claiming in a commercial practice to offer a competition or prize promotion without awarding the prizes described or a reasonable equivalent.

• Describing a product as "gratis", "free", "without charge" or similar if the consumer has to pay anything other than the unavoidable cost of responding to the commercial practice and collecting or paying for delivery of the item.

• Including in marketing material an invoice or similar document seeking payment which gives the consumer the impression that he has already ordered the marketed product when he has not.

• Falsely claiming or creating the impression that the trader is not acting for purposes relating to his trade, business, craft or profession, or falsely representing oneself as a consumer.

• Creating the false impression that after-sales service in relation to a product is available in a Member State other than the one in which the product is sold.
iii) (1 x 1 mark)

*Action a consumer can take if an advertisement is found to be misleading:*

The consumer should immediately report the case to the Malta Competition and Consumer Affairs Authority, a local entity which receives such complaints.

(1 x 1 mark)

*The role of the Malta Competition and Consumer Affairs Authority in such a situation:*

The Authority will check the reported advertisement and if it is found that the advertisement was misleading, it will ask the company making the advertisement to modify it. Should the company not regulate itself as proposed by the Authority, the Authority can take ulterior action as stipulated in the Consumer Affairs Act.

The remedies which are provided by the Consumer Affairs Act to combat misleading advertising are three:

- The criminal penalty for a misleading advertisement is a fine between €466 (Lm200) and €4660 (Lm2,000).
- Consumer associations have the right to challenge misleading adverts.
- The Director of Consumer Affairs can prohibit the issuance of misleading adverts or order their removal.

iv) (2 x 0.5 mark for alternative information source)
(4 x 0.5 mark for the advantages of each information source)
(4 x 0.5 mark for the disadvantages of each information source)

*Alternative information methods on rotary mops including advantages and disadvantages of each method:*
### (NOTE TO MARKERS: THE FOLLOWING ARE POSSIBLE ANSWERS FOR ADVANTAGES AND DISADVANTAGES FOR THE SOURCES OF INFORMATION)

<table>
<thead>
<tr>
<th>Source of information</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Visiting a showroom and talking to showroom personnel | • A personal touch to the encounter is often experienced.  
• Advice can be given on the particular situation of the consumer.  
• Once the consumer is at the showroom, the sales personnel can show him/her other models available. | • If the showroom personnel are good salespeople, the consumer can be forced to buy items without needing or being truly pleased with what is on offer.  
• Consumer may feel uneasy not buying the goods on offer after being given a lot of attention by the sales personnel. |
| Viewing the company websites            | • The latest detailed information can be provided on all the services/goods offered by the company.  
• The consumer can compare and contrast the goods offered by other companies on other websites.  
• The consumer can see the advertisement at his/her own leisure.  
• The consumer can opt to print the relevant material on the goods that interest him/her for future use.  
• The consumer will have black on white record of what is advertised and ensure that is what s/he is given.  
• Further clarifications can be obtained, simply by writing an email to the company, which normally is very prompt to answer prospective customers.  
• Purchases can be made directly from consumer’s own personal computer and delivered to his/her doorstep.  
• If the good is purchased over the internet, the consumer has a 15-day cooling off period, in which s/he may decide to cancel the order. | • The company may not keep the website updated, so recent information and maybe special offers would not be advertised on the website.  
• There is no personal contact and hence advice cannot be given there and then.  
• If item is purchased over the internet, consumer may not be so pleased with the goods once received or used. |
v) *Eco-related labels found on packaging of laptop and a printer and other eco-related features*

(3 x 1 mark)

_Eco-related labels and explanation_

- **Energy star certified** - ENERGY STAR is the symbol for energy efficiency helping all consumers to save money and protect the environment through energy-efficient products and practices. The ENERGY STAR label was established to:
  Reduce greenhouse gas emissions and other pollutants caused by the inefficient use of energy; and make it easy for consumers to identify and purchase energy-efficient products that offer savings on energy bills without sacrificing performance, features, and comfort.

- **Recycle logo** - This symbol and variations of recycling is used to designate recyclable materials. It is composed of three chasing arrows that form a continuous loop.

- **The Green dot symbol** - The basic idea of the Green Dot is that consumers who see the logo know that the manufacturer of the product contributes to the cost of recovery and recycling.

- **Green label** - In April 1992 the European Community introduced the Eco-labelling scheme. The aim was to encourage manufacturers to produce products with reduced environmental impact and to provide customers with better information on the environmental performance e.g. energy consumption, of products. Those awarded the label must conform to community health, safety and environmental requirements. Manufacturers wanting to use the eco-label pay a fee to have their products assessed.

(6 x 0.5 marks)

_Environment-friendly features:_

- Energy consumption: the wattage the laptop and printer have
- The possibility of recharging the laptop using solar energy.
• Any inbuilt energy saving features.
• Recyclable material used.
• Laptops which have the least possible chemicals. There are many hazardous chemicals currently used in laptop technology. Many companies claim to have removed up to 37 hazardous chemicals, including both lead and mercury – from their products. The current WEEE directives only ask for 6 to be removed.
• Whether parts of the laptop/printer can be dismantled/reused or recycled after its ‘life’
• The possibility of using refillable ink cartridges for the printer.
• Whether recycled paper can be used in the printer.
• Whether the printer can print on both sides of the paper, having the facility of inbuilt duplex printing.
• Any emissions of toxic substances when in use. (Example ozone from laser printers)

**Question 6**

i) (2 x 1 mark)

*Definition of rights and responsibilities of consumers and sellers/service providers.*

- **Rights** – By law consumers are entitled to a suitable protection when buying a good or service if this good/service proves to be faulty. Without rights consumers have little ground on which to defend themselves against faulty or defective products, or against misleading or deceptive advertising methods.

(Consumer rights were first presented in 1962 by President John F. Kennedy to the United States Congress in which he extolled four basic consumer rights, later called The Consumer Bill of Rights. In 1985, the concept of consumer rights was endorsed by the United Nations through the United Nations Guidelines for Consumer Protection, which expands them to included eight basic rights).

- **Responsibilities** – By law consumers are accountable for their purchases of goods or services. A responsible consumer is a person who exercises his/her discretion with the full awareness of the implication of his/her right to choice, and is accountable or answerable to other consumers and to the environment for his/her purchase decisions.

(2 x 0.5 mark), (2 x 0.5 mark)
Impact of rights and responsibilities on consumers and sellers/service providers.

<table>
<thead>
<tr>
<th>Impact of rights</th>
<th>Consumers</th>
<th>Sellers/Service providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consumer makes informed and better choices for him/her, his/her family and the environment.</td>
<td>Sellers/service providers are bound to give the best service possible, inform and not mislead customers, be honest and sell good and safe products.</td>
<td></td>
</tr>
<tr>
<td>• Get the best value for their money.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Can complain if they are not satisfied with the good or service.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Impact of responsibilities | Consumer is accountable to him/herself, his/her family other consumers and the environment for his/her purchase decisions. | Sellers/service providers are protected from dishonest consumers who try to take advantage of an unfortunate situation. |

ii) (3 x 1 mark)

Rights and explanation of each:

(Note to markers: accept any three of the following rights)

- **The right to satisfaction of basic needs** - To have access to basic, essential goods and services: adequate food, clothing, shelter, health care, education, public utilities, water and sanitation.
- **The right to safety** - To be protected against products, production processes and services which are hazardous to health or life.
- **The right to be informed** - To be given the facts needed to make an informed choice, and to be protected against dishonest or misleading advertising and labelling.
- **The right to choose** - To be able to select from a range of products and services, offered at competitive prices with an assurance of satisfactory quality.
- **The right to be heard** - To have consumer interests represented in the making and execution of government policy, and in the development of products and services.
- **The right to consumer education** - To acquire knowledge and skills needed to make informed, confident choices about goods and services, while being aware of basic consumer rights and responsibilities and how to act on them.

- **The right to a healthy environment** - To live and work in an environment which is non-threatening to the well-being of present and future generations.

(3 x 1 mark)

*Responsibilities and explanation of each:*

*(NOTE TO MARKERS: ACCEPT ANY THREE OF THE FOLLOWING RESPONSIBILITIES)*

- The responsibility to be aware of the quality and safety of goods and services before purchasing, by researching the goods and services and inspecting them before purchase.
- The responsibility to gather all the information and facts available about a product or service, as well as to keep abreast of changes and innovations in the marketplace.
- The responsibility to think independently and make choices about well considered needs and wants, rather than influencing oneself by friends’ and general public comments.
- The responsibility to speak out, to inform manufacturers and governments of needs and wants in order for better goods and services are researched and developed and later offered to consumers.
- The responsibility to complain and inform business and other consumers of dissatisfaction with a product or service in a fair and honest manner so that matters are rectified to both the consumer and the manufacturer’s satisfaction.
- The responsibility to be an ethical consumer and to be fair by not engaging in dishonest practices which cost all consumers money.
- The responsibility to respect the environment and avoid waste, littering and contribution to pollution.

*iii) (1 x 1 mark)*

*Explaining right to redress:*

- **The right to redress** - To receive a fair settlement of just claims, including compensation for misrepresentation, shoddy goods or unsatisfactory services.
(3 x 1 mark)

*Methods of redress:*

- **Over the phone or at the retail outlet or via a letter:**
  If a consumer has a problem with a purchased item/service the customer can go back to the person selling the goods or providing the service and complain. Most traders want the goodwill of their customers and will sort the problem out. Some traders are more difficult to deal with. Some steps to follow are:

  o Before making a complaint a customer should always check out his/her rights.
  o Collect anything written down which will help prove what to say e.g. a receipt which proves that the goods were bought from that specific shop on a certain date.
  o List the facts e.g. the date, time, anything the trader or assistant said about the goods or service.
  o If the goods were a gift the trader can choose to deal only with the person who bought the gift. The customer should ask the person who gave out the gift if they are willing to complain on their behalf. The trader will want to see the receipt.
  o The customer may find it better to ask a friend to accompany him/her both for support and as witness.
  o The customer should decide what the problem is and what he/she wants done about it before filing the complaint e.g. the strap on new shoes has broken because the stitching has come undone. The customer may decide that he would be happy to have it neatly re-stitched, but only if they can do it within two weeks.
  o The customer should decide and rehearse what will be said.
  o The customer should be polite, but firm and clear – some traders have a policy of refunding the money and the assistant will sort the problem out.
  o If the customer has no success with the assistant ask to speak to a manager or owner of the business – don’t be put off by an assistant.
  o Always explain the problem e.g. – ‘I Bought this pair of shoes here two weeks ago and now the strap has broken’.
  o The customer should tell the trader what he/she expects e.g. ‘If you can do the job within two weeks I want the strap neatly repaired. Otherwise I want my money back please’.
  o The customer should not get into arguments about whose fault the problem is, but should remain calm and composed. If the complaint cannot be resolved, the consumer should leave and write a letter to the manager of the establishment to put the complaint on a more formal basis.
Through the Consumer and Competition Division:
Prior to presenting the claim before the Tribunal, a consumer should refer the claim to the Director for Consumer Affairs or a registered consumer association, who would then try to help the consumer to reach an amicable agreement with the other party on the issues in dispute within fifteen (15) working days. If no agreement is reached, the consumer may then present a claim to the Consumer Claims Tribunal which will decide on all pending issues.

A claim or a counter-claim before the Tribunal is made by filling a form known as a "Notice of Claim (or Counter-Claim)". This form can be obtained from the Registry of the Tribunal. After the consumer presents a claim before the Tribunal, the other party will be notified. If the other party disputes the claim, the Secretary will then appoint a date, time and place, when the hearing before the Arbiter is to be held. The Secretary will inform the consumer and the other party with regards to the date in question.

At the hearing, each person involved in the dispute will state the facts of the case. The consumer should bring any letters, invoices, bills, sales slips, contracts, photographs, witnesses and anything else which may help establish the facts concerning the dispute. The consumer can also engage a lawyer to present the case; however the whole scope of the Consumer Claims Tribunal is to enable the consumer to state his/her case without the need of having a lawyer.

Tribunal hearings are informal and are heard in a room specifically designated for the purpose. The Arbiter will normally ask the claimant to give his version of the dispute first. The other party will then be asked to state its version. The claimant will need to show the Arbiter any documents related to the dispute. The Arbiter will also require information from any witnesses which can help clarify the facts. The Arbiter may also ask questions to each party and to their witnesses. After the hearing the Arbiter will deliver his decision in writing.

An appeal against a decision by the Tribunal can only be made if the Tribunal, during the hearing of the case, would have acted in violation of the principles of natural justice and, as a result seriously prejudiced the rights of any party.
In such a case one has 20 days from the date of the decision of the Tribunal to lodge an appeal before the Court of Appeal.

- **Through special service/column offered by local newspapers:**
  Both Consumer Association and the Consumer Affairs Department offer this service whereby consumers can address their complaints to these organisations where legal advice and support is given accordingly. When writing a letter of complaint, consumers should:
  
  o Include their name, address, and home and work phone numbers.
  o Type the letter if possible. If it is handwritten, then it has to be neat and easy to read.
  o The letter should be brief and to the point. All important facts about the purchase, including the date and place and any information about the product or service such as serial or model numbers or specific type of service should be given.
  o Customers should state exactly what he/she want to be done about the problem and how long the consumer is willing to wait to get it resolved. It is important for the customer to be reasonable.
  o Include all documents regarding the problem. Consumers should be sure to send COPIES, not originals.
  o Consumers should keep a copy of the letter for his/her records.

- **Through Consumer Association** - The third activity that the Consumers’ Association is engaged into is client services. The basic aim is to get redress for aggrieved consumers.

iv) (3 x 2 marks – 1 mark for definition and 1 mark for function)

*Definition and function of Consumer Claims Tribunal, Consumer Association and European Consumer Centre (ECC Malta):*

- **The Consumer Claims Tribunal** – this is the place where a consumer can obtain quick and inexpensive redress for his/her claims.

A consumer may file a claim before the Tribunal if a consumer, bought or hired goods or services from a trader for personal or family’s needs and would require
to lodge a claim regarding any damages, after failing to reach an amicable agreement with the trader.

The Tribunal may hear claims about the hire or purchase of goods or services if the value of the claim for compensation does not exceed the sum of €3494.06. It is normally the consumer who presents a claim before the Tribunal. However, the law also states that the Tribunal may hear and decide with regards to:

- any counter-claim by a trader if the consumer had made a claim against that same trader before the Tribunal;
- a case commenced before a Court, and which later by agreement between the consumer and the trader, is referred for a hearing before the Tribunal.

The Tribunal may also award the consumer up to €232.94 compensation for 'moral damages' caused by any pain, distress, anxiety and inconvenience which the consumer might have suffered because of the facts of the case under examination. Furthermore, when a claim in defence offered is considered manifestly frivolous and vexatious, the Tribunal may condemn the offending party to pay the other party a penalty of not more than €116.47.

**Consumer Association** - The Consumers’ Association was set up in 1982 and it is the only consumers’ association on the Island. It is recognised under the Consumers’ Affairs Act of 1994. It is a voluntary organisation and all of its officials are elected annually. It is financed solely on membership fees. The membership fee is nominal (€2.33 yearly) and the association tries to cater for those with low education, pensioners and those with special needs. No assistance is received from the government.

The Consumers’ Association has 4 main principal areas of activity:

1. It acts as a representative for the local consumers. It represents the local consumers on several national Boards amongst them the Consumers’ Affairs Council which is a national board whose primary function is to advise the Minister responsible for consumer affairs on policy and legislation. The association also represent consumers on other boards mainly Users’ Boards of Public Utilities. It also represents the local consumers in international fora.
2. The second area of activity is educating the consumers in order for them to make good choices and be aware of their rights. The Consumers’ Association is instrumental in making the concept of consumer understood and making business owners accept that consumers have rights. The consumers’ association has a weekly page in a local newspaper, and have used radio programmes to educate the consumers at large.

3. The third activity that the Consumers’ Association is engaged into is client services. The basic aim is to get redress for aggrieved consumers.

4. The last area of activity is being a pressure group. The association has been instrumental in bringing about two new pieces of legislation. However, they have also contributed greatly in pushing forward the consumers’ agenda with all government departments. The association also reviews and comments on new legislation and periodically, they also issue press releases to the local media as a form of added pressure whenever needed.

- **European Consumer Centre** - ECC Malta provides information and assistance when you purchase goods or services from another EU Member State.

ECC Malta is the designated information point for service recipients, who are consumers, for the purposes of the Services Directive.

What this means is that ECC Malta is to provide information to service recipients on legal requirements applicable to service activities in other Member States and also on available means of redress and contact details of organisations which can provide assistance. In order to provide this information ECC Malta co-operates with other service information points in other EU Member States as well as a number of competent authorities in Malta in order to obtain and be able to provide the relevant information to consumers.
Question 1

i) (4 x 0.5 marks)

*Chemical elements found in all carbohydrates and their ratio to one another:*

Carbon, Hydrogen and Oxygen

Ratio: 1:2:1

ii) (1 x 1 mark)

*Explanation of how disaccharides are formed:*

Disaccharides are formed when two monosaccharides are joined together and a molecule of water is removed.

(6 x 0.5 marks)

*Three examples of disaccharide formation:*

(2 x 0.5 marks)

*The enzymes responsible for disaccharides’ chemical breakdown:*

<table>
<thead>
<tr>
<th>Monosaccharides</th>
<th>Disaccharide</th>
<th>Enzyme responsible for chemical breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose + Fructose</td>
<td>Sucrose</td>
<td>Sucrase</td>
</tr>
<tr>
<td>Glucose + Galactose</td>
<td>Lactose</td>
<td>Lactase</td>
</tr>
<tr>
<td>Glucose + Glucose</td>
<td>Maltose</td>
<td>Maltase</td>
</tr>
</tbody>
</table>

iii) (4 X 2 marks)

*Nutritional explanation of the following statements:*

*(NOTE FOR MARKERS: THE CANDIDATES ARE TO GIVE A COMPREHENSIVE NUTRITIONAL SCIENTIFIC EXPLANATION TO BE GIVEN FULL MARKS.)*
• **Younger teenagers require a higher intake of carbohydrates, than those reaching adulthood.**

As teenagers reach adulthood, the basal energy needs for maintaining the body's physiological functions (basal metabolic rate, BMR) stabilize, and so energy requirements also stabilize. BMR is defined as the energy required by the body to keep functioning. These functions include the pumping of blood by the heart, respiration, kidney function, and maintaining muscle tone and a constant body temperature, among others. BMR is directly related to the amount of lean body muscle mass, size, and gender. Physical activity especially weight-training exercise helps increase and maintain lean body mass.

It is very important to reduce one's energy intake (including carbohydrate intake) at the onset of adulthood, and to make sure that all of one's nutritional needs are met. This can be accomplished by making sure that an adequate amount of energy is consumed (this will vary by body weight, degree of physical fitness, and muscle vs. body fat), and that this amount of energy is adjusted to one's level of physical activity. Foods that are chosen to provide the energy must be highly nutritious, containing high amounts of essential nutrients such as vitamins, minerals, and essential proteins.

• **Athletes need to consume a good amount of carbohydrate before a marathon.**

Athletes need to eat a diet high in carbohydrates to keep their glycogen stores full. The human body is able to store carbohydrates for energy use in the liver and the muscles in the form of a substance known as glycogen. This carbohydrate store is basically human "starch" and is able to be quickly broken down to fuel the muscles during high intensity exercise (muscle glycogen) and to maintain blood glucose levels (liver glycogen). Eating high carbohydrate meals prior to a marathon ensures a good glycogen store which will prevent fatigue.

• **The consumption of dietary fibre can reduce constipation and avoid other diet-related diseases.**

The main action of dietary fibre is to change the nature of the contents of the gastrointestinal tract, and to change how other nutrients and chemicals are absorbed. Soluble fibre binds to bile acids in the small intestine, making them less likely to enter the body; this in turn lowers **cholesterol levels** in the blood. Soluble fibre also attenuates the absorption of sugar, reduces sugar response after eating, **normalizes blood lipid levels** and, once fermented in the colon, produces short-chain fatty acids as byproducts with wide-ranging physiological activities. Although insoluble fibre is associated with **reduced diabetes risk**, the mechanism by which this occurs is unknown.
Dietary fibre also speeds the passage of foods through the digestive system and so *facilitates regular defecation*. It also adds bulk to the stools and so *alleviates constipation*.

Studies have also shown that dietary fibre balances intestinal pH and stimulates intestinal fermentation production of short-chain fatty acids, which in turn *may reduce risk of colorectal cancer*.

- **Diabetic individuals should consume carbohydrates that have a low glycaemic index.**

All carbohydrates increase blood sugar levels (and so have a glycaemic index) and therefore cause insulin to be released from the pancreas in order to control the amount of glucose in the blood. The more glucose that has been made available in the blood, the more insulin is released to control it. The relative efficiency with which carbohydrates do this is known as the glycaemic index. So if the diabetic individual consumes food that has a low glycaemic index, the amount of insulin required to metabolise the blood sugar level is lower and this prevents creating sudden spikes that can overwhelm an already overworked insulin-producing pancreas.

iv) (10 X 0.5marks)

*Digestion and absorption of carbohydrates in a cereal bar.*

(Note for markers: The candidates should discuss the different types of carbohydrate found in the cereal bar, namely:)

- **Disaccharides** – Sucrose, Fructose (in dried fruit), Lactose (in dairy ingredients eg. milk powder, yoghurt and cream)
- **Polysaccharides** – Starch and Dietary fibre (in the cereal grains)

*Digestion:*

<table>
<thead>
<tr>
<th>Organ</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the mouth</td>
<td>The enzyme amylase, which is contained in saliva, mixes with food products and breaks some starches into smaller units.</td>
</tr>
<tr>
<td>Stomach</td>
<td>Once the carbohydrates reach the acidic environment of the stomach, the amylase is inactivated.</td>
</tr>
<tr>
<td>Small Intestine</td>
<td>After the carbohydrates have passed through the stomach and into the small intestine, key digestive enzymes are secreted from the pancreas and the small intestine where most digestion and absorption occurs.</td>
</tr>
<tr>
<td></td>
<td>Pancreatic amylase breaks starch into disaccharides and small polysaccharides.</td>
</tr>
<tr>
<td></td>
<td>Enzymes from the cells of the small-intestinal wall break any...</td>
</tr>
</tbody>
</table>
remaining disaccharides into their monosaccharide components.

| Large Intestine | Dietary fibre is not digested by the small intestine; instead, it passes to the colon unchanged. |

Absorption:

Sugars such as glucose, galactose and fructose that are found naturally in the cereal bar or are produced by the breakdown of polysaccharides, enter into absorptive intestinal cells.

After absorption, they are transported to the liver where galactose and fructose are converted to glucose and released into the bloodstream.

The glucose may be sent directly to organs that need energy, where it may be transformed into glycogen (in a process called glycogenesis) for storage in the liver or muscles, or it may be converted to and stored as fat.

Question 2

i) (1 mark)

Identification of anti-oxidants vitamins:

(*NOTE TO MARKERS: KINDLY DO NOT ACCEPT PARTLY CORRECT ANSWER, IF STUDENTS DO NOT IDENTIFY THE THREE VITAMINS THEN NO MARK IS GIVEN.*)

Beta-carotene, Ascorbic Acid and Tocopherol.

(1 mark)

Role of antioxidants in the body:

Antioxidants significantly decrease the adverse effects of free radicals on normal physiological functions in the human body. Normally, when a chain reaction takes place, bonds break and re-form to form new stable compounds. However, sometimes compounds split leaving a molecule with an odd, unpaired electron resulting into free radicals. Free radicals are highly unstable so they quickly react with other compounds, forming more free radicals in a chain reaction.

ii) (3 x 1 mark, 3 x 1 mark, 3 x 1 mark)

Role, deficiency and food sources:

(*NOTE TO MARKERS: KINDLY DO NOT ACCEPT ANY ANSWERS OTHER THAN THOSE LISTED IN THE TABLE.*)
<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Role</th>
<th>Deficiency</th>
<th>Food sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-carotene</td>
<td>• Helps maintain the cornea.</td>
<td>Hypovitaminosis: some symptoms are dry hair, dry skin, and brittle nails, a low resistance to infections, poor night vision or a decreased ability to see in poorly lit areas.</td>
<td>Spinach, broccoli, apricots, cantaloupe, carrots, squash, sweet potatoes and pumpkin.</td>
</tr>
<tr>
<td></td>
<td>• Participates in protein synthesis and cell differentiation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Supports reproduction (in men – participates in sperm development).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Supports bone and tooth growth.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ascorbic Acid</td>
<td>• Co-factor in collagen synthesis.</td>
<td>Scurvy: some symptoms are reddish-bluish bruise-coloured spots on the skin, soft and spongy gums vulnerable to bleeding, painful joints, extreme shortness of breath.</td>
<td>Any citrus fruit, cabbage-type vegetables, green leafy vegetables, strawberries, cantaloupe, tomatoes, potatoes, papayas, mangoes.</td>
</tr>
<tr>
<td></td>
<td>• Co-factor in thyroxin synthesis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Co-factor in amino acid metabolism.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strengthens resistance to infection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Helps in absorption of iron.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tocopherol</td>
<td>• Stabilisation of cell membranes.</td>
<td>Erythrocyte haemolysis (breakage of red blood cells).</td>
<td>Polyunsaturated plant oils, green leafy vegetables, wheat germ, whole grains, liver, egg yolks, nuts, seeds.</td>
</tr>
<tr>
<td></td>
<td>• Protection of polyunsaturated fatty acids (PUFA) and vitamin A.</td>
<td>Neuroumuscualar dysfunction (in prolonged deficiency).</td>
<td></td>
</tr>
</tbody>
</table>

iii) (1 x 1 mark)

**Definition of precursor:**

Precursor is a compound that can be converted into an active vitamin.

(1 mark)

**Different forms of vitamin A:**

*(NOTE TO MARKERS: KINDLY DO NOT ACCEPT PARTLY CORRECT ANSWER, IF STUDENTS DO NOT IDENTIFY THE THREE FORMS OF VITAMIN A THEN NO MARK IS GIVEN.)*
Three different forms of Vitamin A are active in the body: retinol, retinal and retinoic acid. Collectively, these compounds are known as retinoids.

Caretinoids are pigments commonly found in plants and animals, some of which have vitamin A activity. The caretinoid with the greatest vitamin A activity is beta-carotene.

iv) (3 x 1 mark)
*Conversion of different forms of vitamin A in the body:*

- **Retinoids** - Foods derived from animals provide retinyl esters that are easily converted to retinol in the intestine.

- **Caretinoids** - Foods derived from plants provide carotenoids such as beta-carotene, some of which have vitamin A activity. Beta-carotene can be split to form retinol in the intestine and liver. Beta-carotene’s absorption and conversion are less efficient than those of the retinoids.

- The cells can convert retinol and retinal to the other active forms of vitamin A as needed. The conversion of retinol to retinal is reversible, but the conversion of retinal to retinoic acid is irreversible.

v) (1 x 2 marks)
*Vitamin D – Calcium absorption in young children:*

The stomach’s acidity helps to keep calcium soluble, and vitamin D helps to make the calcium-binding protein needed for absorption. Whenever calcium is needed, the body increases its production of the calcium-binding protein to improve calcium absorption. Growing children absorb 50 to 60% of the calcium they consume. When growth slows or stops, absorption decreases to the adult level of about 30%.

(1 x 2 marks)
*Vitamin C – Iron absorption in vegans:*

Vitamin C enhances non-haeme iron absorption from foods eaten in the same meal by capturing iron and keeping it in the reduced ferrous form, ready for absorption. Non-haeme iron is the only type of iron a vegan can consume since it comes both from plants and animals. Though haeme iron accounts for a small proportion of the intake, it is well absorbed, whilst only 10% of the non-haeme iron is absorbed when not enhanced by Vitamin C.
Question 3

i) (1 x 1 mark)

**Definition of hypertension**

Hypertension is higher-than-normal blood pressure. Hypertension that develops without an identifiable cause is known as essential or primary hypertension; hypertension that is caused by a specific disorder e.g. kidney diseases is known as secondary hypertension.

(2 X 1 marks)

**Aetiology of hypertension:**

Blood flow to organs and the rest of the body is restricted due to atherosclerosis, a condition characterised by plaque (made up from fat streaks which are hardened with minerals) formation along the inner walls of the arteries. Plaque stiffens the arteries and narrows the passage through them. The progression of atherosclerosis in the arteries may restrict blood flow to the heart muscle, and limit the delivery of oxygen. This induces the heart to pump extra hard to push the blood against resistant arteries, thus increasing the blood pressure in the arteries. Hypertension worsens atherosclerosis by mechanically injuring the artery linings and accelerating plaque formation. In return, plaque induces a further rise in blood pressure, intensifying the problem.

ii) (4 X 0.5 marks)

**Symptoms that may be experienced by individuals with high blood pressure:**

- Headache
- Dizziness
- Blurred vision
- Nausea
- Vomiting
- Chest pain
- Shortness of breath.

(1 x 1 mark)

**Difference between systolic and diastolic readings:**

Whilst the **systolic** (the top number) measures the pressure in the arteries when the heart beats (when the heart muscle contracts), the **diastolic** (bottom number,
measures the pressure in the arteries between heartbeats (when the heart muscle is resting between beats and refilling with blood).

iii) (4 X 0.5 marks)
*Bodily damage that can be experienced if the condition of hypertension is not identified and treated*

- Strain on the heart’s pump, the left ventricle, can enlarge and weaken it, until it causes a heart failure.
- Constant high pressure in an artery may cause it to gradually balloon out, and eventually burst. This is known as aneurysm.
- Undetected aneurysms can lead to massive bleeding and death, especially if a major vessel like the aorta is affected.
- Aneurysms in the small arteries of the brain may lead to a stroke.
- Aneurysms in the eye can lead to blindness.
- Kidney disease may result when the heart is unable to pump enough blood through them.

iv) *Two dietary and two non-dietary measures:*

(2 x 0.5 mark)

*Dietary Measures:*

- Weight control
- Monitor and control alcohol intake
- Reduce sodium/salt intake
- Reduce saturated fat intake
- Increase fibre intake from fruits and vegetables

(2 x 0.5 mark)

*Non-Dietary Measures:*

- Physical activity
- Obtain regular prenatal medical care
- No smoking
- Reduce stress
- Drug therapy after medical consultation
v) (5 X 1 mark for nutrient dietary increases with explanation)  
(10 X 0.5 marks for the suitable food items)  
* Dietary changes required during pregnancy giving specific health-related reasons

<table>
<thead>
<tr>
<th>Nutrient needs</th>
<th>Health-related reason</th>
<th>Suitable food items for lacto-vegetarian mother</th>
</tr>
</thead>
</table>
| Increase in protein consumption       | • For the growth (cell formation) of the unborn child.                                                    | • Milk and milk products (no soft cheeses)  
• Textured Vegetable Protein  
• Mixture of grains and nuts                                                            |
| Ensure adequate folic acid intake     | • Needed for the correct development of the brain and the nervous system in the foetus.  
• Will prevent miscarriage, slow growth, malformations in the foetus (e.g. Neural Tube Defects, spina bifida) and premature birth. | • Green leafy vegetables  
• Legumes  
• Fortified breakfast cereals  
• Sunflower seeds  
*STILL NOT TO BE MENTIONED AS THE MOTHER IS A VEGETARIAN* |
| Increased intake of vitamin D         | • To aid the absorption of calcium and form strong bones and teeth in the unborn child.  
• Also to prevent osteomalacia in the mother.                                                  | • Milk  
• Milk products (no soft cheeses)  
• Fortified foods such as margarine, breakfast cereals and powdered milk |
| Increased calcium intake             | • For the development of the skeleton (strong bones and teeth) in the unborn child.  
• To prevent the mother losing calcium from her skeleton and teeth.                            | • Milk and milk products (no soft cheese)  
• Dark green leafy vegetables  
• Fortified breakfast cereals  
• Beans and peas  
• Sesame seeds  
• Nuts: almonds, brazil nuts  
• Broccoli  
• Kelp  
• Molasses  
• Oats  
• Parsley  
• Prunes |
Increased iron intake
- To have a good supply of blood for the mother, the unborn child and placenta.
- Spinach
- Beans
- Dried fruits, raisins, apricots
- Cocoa powder and chocolate
- Pumpkin seeds
- Sunflower seeds
- Whole meal/ whole grain bread
- Fortified cereals

Ensure adequate intake of essential fatty acids
- These are needed by the foetus for brain growth and cell division.
- Nuts, particularly walnuts
- Soyabeans
- Tofu
- Flax seeds
- Vegetable oils, like canola oil and soybean oil.

Question 4

i) (4 X 1 mark each)
Explanation of, and highlighting the importance of each psychological, technological, social and economic factors affecting food choice.

Psychological:
- Mass media - eating disorders said to be made more common by the peer pressure put on by skinny role models and the constant flow of quick fix diets offered daily in magazines and newspapers.

- Adverts - Constant adverts telling people that their body needs the product to remain healthy e.g. functional foods. Advertisements also depict certain food as a group fun activity and hence that particular food is consumed to obtain such fun feeling.

- Bullying - To be fat can be hard for some people and so this may result in dieting and may lead to an obsession with controlling their weight (e.g. Anorexia)

- Compulsive eating disorders – This is a mental disorder where compulsive overeaters will typically eat when they are not hungry, spend excessive amounts of time and thought devoted to food, and secretly plan or fantasize about eating alone. Compulsive overeating often leads to weight gain and obesity, but not everyone who is obese is also a compulsive overeater. In addition to binge eating,
compulsive overeaters also engage in grazing behaviour, during which they return to pick at food over and over throughout the day. This, results in a large overall number of kilocalories consumed even if the quantities eaten at any one time may be small. When a compulsive eater overeats primarily through binging, she can be said to have binge eating disorder. Where there is continuous overeating but no binging, then the sufferer has compulsive overeating disorder.

- **Self esteem** – A person with low-self esteem has a higher risk for compulsive eating disorders and comfort eating. Self-esteem is a term in psychology to reflect a person's overall evaluation or appraisal of his or her own worth. It encompasses beliefs (for example, "I am competent", "I am worthy") and emotions such as triumph, despair, pride and shame. If a person feels negative about him/herself s/he is more inclined to choose food which may make them feel good at that time – usually food high in fat and sugar.

- **Stress** - Psychological stress is a common feature of modern life and can modify behaviours that affect health, such as physical activity, smoking or food choice. The influence of stress on food choice is complex not least because of the various types of stress one can experience. The effect of stress on food intake depends on the individual, the stressor and the circumstances. In general, some people eat more and some eat less than normal when experiencing stress. The proposed mechanisms for stress induced changes in eating and food choice are motivational differences (reduced concern about weight control), physiological (reduced appetite caused by the processes associated with stress) and practical changes in eating opportunities, food availability and meal preparation. Studies also suggest that if work stress is prolonged or frequent, then adverse dietary changes could result, increasing the possibility of weight gain and consequently cardiovascular risk.

- **Mood** - It is recognised that food influences our mood and that mood has a strong influence over our choice of food. The influence of food on mood is related in part to attitudes towards particular foods. The ambivalent relationship with food – wanting to enjoy it but conscious of weight gain is a struggle experienced by many. Dieters, people with high restraint and some women report feeling guilty because of not eating what they think they should. Moreover, attempts to restrict intake of certain foods can increase the desire for these particular foods, leading to what are described as food cravings. Women more commonly report food cravings than do men. Depressed mood appears to influence the severity of these cravings. Reports of food cravings are also more common in the premenstrual phase, a time when total food intake increases and a parallel change in basal metabolic rate occurs. Thus, mood and stress can influence food choice behaviour and possibly short and long term responses to dietary intervention.
Technological:

(NOTE TO MARKERS: KINDLY ACCEPT ANY RELEVANT TECHNOLOGICAL ADVANCEMENT MADE IN FOOD PRODUCTION WHICH AFFECTS FOOD CHOICE.)

- **Hybrid seeds** – Hybrid seeds are a result of special breeding techniques where these seeds are crossed with 2 different parent varieties. The advantages of using hybrid seeds is that the resulting plant and fruit is often stronger and more resistant to disease. The fruit of the plant tends to be more uniform in shape, ripen at the same time, has better keeping qualities, and sometimes can be harvested early. The disadvantages of using hybrid seeds is that the seeds from that plant used the previous year cannot be saved and used in the future years. This means that the farmer has to purchase new seeds each year. In addition hybrid seeds are more expensive that non-hybrid seeds.

- **Food engineering** – It is a multidisciplinary field of applied physical sciences which combines science, microbiology, and engineering education for food and related industries. Food engineering includes, but is not limited to, the application of agricultural engineering, mechanical engineering and chemical engineering principles to food materials. Food engineers provide the technological knowledge transfer essential to the cost-effective production and commercialization of food products and services.

- **Food preservation** - Methods of preparing food so that it can be stored for future use. Because most foods remain edible for only a brief period of time, people since the earliest ages have experimented with methods for successful food preservation. Among the products of early food conservation were cheese and butter, raisins, pemmican, sausage, bacon, and grain. Nowadays a much wider variety of food is preserved as methods of preservation moved from drying and heating to exclusion of air, irradiation, and addition of preservatives.

- **Genetically modified food** - Meat and edible plants modified through genetic engineering. Although humans have genetically modified animal and plants since the beginning of civilization, they did it through selective breeding possible only within the same species through natural reproduction over decades or centuries. Modern techniques, however, can transfer genetic material from one organism to another to instantly create utterly different variants. Since alien genes are not welcomed by the existing genes, suppressive techniques must be used to force the animal or plant to accept them. Such artificially mutated foods are a source of unresolved controversy over the uncertainty of their long-term effects on humans and food chains.
Economic:

- **Cost** - There is no doubt that the cost of food is a primary determinant of food choice. Whether cost is prohibitive depends fundamentally on a person's income and socio-economic status. Low-income groups have a greater tendency to consume unbalanced diets and in particular have low intakes of fruit and vegetables. However, access to more money does not automatically equate to a better quality diet but the range of foods from which one can choose should increase.

- **Accessibility** – Availability and position of shops is another important physical factor influencing food choice, which is dependent on resources such as transport and geographical location. Healthy food tends to be more expensive when available within towns and cities compared to supermarkets on the outskirts. However, improving access alone does not increase purchase of additional fruit and vegetables, which are still regarded as prohibitively expensive.

- **Education and knowledge** - Studies indicate that the level of education can influence dietary behaviour during adulthood. In contrast, nutrition knowledge and good dietary habits are not strongly correlated. This is because knowledge about health does not lead to direct action when individuals are unsure how to apply their knowledge. Furthermore, information disseminated on nutrition comes from a variety of sources and is viewed as conflicting or is mistrusted, which discourages motivation to change. Thus, it is important to convey accurate and consistent messages through various media, on food packages and of course via health professionals.

Social:

- **Influence of social class** - What people eat is formed and constrained by circumstances that are essentially social and cultural. Population studies show there are clear differences in social classes with regard to food and nutrient intakes. Poor diets can result in under (micronutrients deficiency) and over-nutrition (energy over consumption resulting in overweight and obesity); problems that face different sectors of society, requiring different levels of expertise and methods of intervention.

- **Cultural influences** - Such influences lead to the difference in the habitual consumption of certain foods and in traditions of preparation, and in certain cases can lead to restrictions such as exclusion of meat and milk from the diet. Cultural influences are however amenable to change; when moving to a new country individuals often adopt particular food habits of the local culture.

- **Social context** - Social influences on food intake refer to the impact that one or more persons have on the eating behaviour of others, either direct (buying food) or indirect (learn from peer's behaviour), either conscious (transfer of beliefs) or subconscious. Even when eating alone, food choice is influenced by social factors because attitudes and habits develop through the interaction with others.
However, quantifying the social influences on food intake is difficult because the influences that people have on the eating behaviour of others are not limited to one type and people are not necessarily aware of the social influences that are exerted on their eating behaviour.

- **Social support** – This can have a beneficial effect on food choices and healthful dietary change. Social support from within the household and from co-workers was positively associated with improvements in fruit and vegetable consumption and with the preparative stage of improving eating habits, respectively. Social support may enhance health promotion through fostering a sense of group belonging and helping people to be more competent and self-efficacious.

- **The family** – The family itself is widely recognised as being significant in food decisions. Research shows the shaping of food choices taking place in the home. Because family and friends can be a source of encouragement in making and sustaining dietary change, adopting dietary strategies which are acceptable to them may benefit the individual whilst also having an effect on the eating habits of others.

- **Social setting** - Although the majority of food is eaten in the home, an increasing proportion is eaten outside the home, e.g. in schools, at work and in restaurants. The venue in which food is eaten can affect food choice, particularly in terms of what foods are on offer. The availability of healthy food at home and 'away from home' increases the consumption of such foods. However, access to healthy food options is limited in many work/school environments. This is particularly true for those with irregular hours or with particular requirements, e.g. vegetarians. With the majority of adult women and men in employment, the influence of work on health behaviours such as food choices is an important area of investigation.

ii) (4 x 0.5 mark for each cause, 4 x 1 mark for each implication)

*Causes and implications of changing dietary habits:*

- **Dietary shifts** - Diets have shifted far more dramatically in urban than in rural areas. This means that dietary habit changed according to this urban shift. People tend to eat less fruits and vegetables as they became more expensive and it is more time consuming to prepare dinners from scratch. It is easier to buy ready-made meals which are aimed for people who have busy schedules and long hours of work. This urban shift also brought about critical socio demographic issues such as:
  - rapid reductions in fertility that have speeded shifts in age distribution;
  - economic changes, in particular increased income and income inequality, that appear to define changes in many regions of the developing world.

- **Urbanization** - The structure of diet has shifted markedly as populations have urbanized over the years. This left less people to work in fields. Given that people are more focused on careers and work longer hours in addition to greater
pace in lifestyles, food production became more focused on crops which are versatile and easily prepared and cooked.

- **Structural shifts in income-diet relationships** - There are two types of behavioural change. One relates to the shift in the society toward the educated, rich, or urban. Here people may buy different types of commodities than people on lower income. The other relates to the way people with different characteristics behave, particularly their economic behaviour. This means that at the same level of education or income, a person might buy different amounts or types of commodities at different points in time. This suggests that the demand pattern for food has changed, so that for the same income level, patterns of demand are significantly different from others with the same income or changed over the years. The explosion in access to goods and exposure to mass media may well have created this situation.

- **Mass media** - There is no doubt that access to modern mass media has grown very rapidly. It is most useful to look at the proportion of households in a country that own television sets. In 1970s and 1980s there was no cable system in Malta thus offering a limited offer of different channels mostly all state-owned so adverts were minimal. Lack of adverts means that less people were influenced by new products so people had limited choices.

- **Health effects** - The BMI-disease relationships have been found to vary between major Asian and other subpopulation groups and those of European background. This can mean that Asian diets result in different diet-related disorders than that of European diets. It could also be that the body composition and other unmeasured racial and ethnic factors affect susceptibility to nutrition-related diseases. Another reason might also be that previous disease patterns (such as the presence of malaria or other tropical diseases) have predisposed the population to certain problems.

- **Historical Nutrition Patterns** - Human diet and activity patterns and nutritional status have undergone a sequence of major shifts, which can be defined as broad patterns of food use and of corresponding nutrition-related diseases. The pace of dietary and activity change appears to have accelerated over the years, albeit to varying degrees in different regions of the world. Dietary and activity changes have been paralleled by major changes in health status, as well as by major demographic and socioeconomic changes. Obesity emerges early among these shifting conditions, as does the level and age composition of morbidity and mortality.

- **Receding famine** - In this stage, the consumption of fruits, vegetables, and animal protein increases, and starchy staples become less important in the diet. Most of Europe had made great progress in reducing chronic hunger and famines, but only in the last 40 years did these changes become widespread, leading to marked
shifts in diet. However famines remain common in some regions of the world due to climate and demographic issues.

- **Diet-related disorders** - A diet high in total fat, cholesterol, sugar, and other refined carbohydrates, and low in polyunsaturated fatty acids and fibre, and often accompanied by an increasingly sedentary life, is characteristic of most richer societies (and of increasing portions of the population in poorer societies). These characteristics result in increased prevalence of and degenerative diseases.

- **Behavioural change** - A new pattern appears to be emerging in this stage as a result of changes in diet, evidently associated with the desire to prevent or delay degenerative diseases and prolong health. Whether these changes, instituted in some countries by consumers and prodded in others by government policy, will constitute a large-scale transition in dietary structure and body composition remains to be seen.

iii) (4 x 1 mark)

*Critical analysis of fast foods in relation to nutrient and energy value:*

- Most of the fast foods are deep fried. Fast food restaurants have developed selling strategies which encourage clients to purchase more food for lesser money. This has encouraged over-eating and resulted in increased rates of obesity.

- Despite the fact that fast foods are higher energy laden foods as opposed to healthier alternatives, people tend to consume the same or even more quantities. This leads to extremely high energy meals which, when coupled with a physically inactive lifestyle, may result in obesity.

- Energy is mainly coming from saturated fat leading to obesity, diabetes, hypertension and CHD.

- Most fast food outlets use lower quality produce when preparing their food. Fast foods also lack essential vitamins and minerals.

- Most fast food is high in salt or sugar to give a better taste. However the risk for hypertension leading to CHD and diabetes is increased.

iv) (4 x 1 mark)

*Reasons for higher risks for cancer:*

56
Dietary factors that appear to be associated with developing adenomatous polyps and an increased incidence of CRC risk include a diet high in total fat and meat (both red and white meat).

Higher consumption of refined food lacking fibre and water.

Cigarette smoking is associated with an increased tendency to form adenomas that develop into CRC.

Genetic predisposition.

Excessive alcohol use.

Obesity.

A sedentary lifestyle has been associated in some studies with an increased risk of CRC.

(2 x 1 mark)

Recommendations to reduce risk of CRC:

- Maintain healthy body weight.
- Increase consumption of water and fibre.
- Moderate alcohol consumption.
- Reduce consumption of saturated fat.

Question 5

i) (3 X 1 mark for explanation, 6 X 0.5 marks for food items)

Explanation of terms giving detailed explanation of process involved and food items that can be treated.

- **Modified Atmosphere Packaging** (MAP) is a technique used for prolonging the shelf-life period of fresh or minimally processed foods. In this preservation technique, the air surrounding the food in the package is changed to another composition. This way, the initial fresh state of the product may be prolonged. MAP is used with various types of products, where the mixture of gases in the package depends on the type of product, packaging materials and storage temperature.

Food items which can be MAP packed:

- Fresh meat
- Processed meat
- Cheese
- Milk powder
- Fresh pasta
- Fruit & Vegetables
- Ready Meals
- Case ready meat
- Fresh poultry
- Fish & Seafood

- **Vacuum packing** (or vacuum packaging) is a method of packaging that removes air from the package prior to sealing. It can involve both rigid and flexible types of packaging. The intent is usually to remove oxygen from the container to extend the shelf life of foods and, with flexible package forms, to reduce the volume of the contents and package.

Food items which can be vacuum packed:
Commonly used to store dry foods over a long period of time. Foods such as cereals, nuts, cured meats, cheese, smoked fish, coffee, and potato chips (crisps).

On a more short term basis, vacuum packing can also be used to store fresh foods, such as vegetables, meats, and liquids, because they inhibit bacterial growth.

- **Wax coating** - Coating of fruit or vegetables packaging sheets is carried out by applying a thin layer of wax on the surface. The coating process can be carried out by either dipping, brushing or spraying with wax. This coating is normally referred to as edible coating. An edible coating is a thin layer that is applied on the surface of a fruit or vegetables which is consumed together with the fruit. Edible coatings are considered to be safe for human consumption. Therefore, these coatings are expected to be consumed together with the fruits.

Foodstuffs that are waxed are:
- Fruits: Apples, Avocados, Bell peppers, Lemons, Grapes, Bananas, Melons, Oranges, Limes, Passion fruit, Peaches, Pineapples.
- Vegetables: Cucumber, Tomato, Sweet potato

ii) (4 X 0.5 mark, 4 X 0.5 mark)
*Positive and Negative impacts of such process for Food Producer and the consumer.*

<table>
<thead>
<tr>
<th></th>
<th>Positive impacts</th>
<th>Negative impacts</th>
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<tr>
<td><strong>The food producer</strong></td>
<td>- The shelf-life of the product will increase.</td>
<td>More expensive Different thickness of barrier films are used for different food items, hence expenses increase. Though coating is an effective method of value addition and preservation for the food</td>
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<td>- Retains the product’s freshness, moisture and quality, so consumers are more ready to pay for the product even at a higher price.</td>
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- Freezer burn is eliminated, because foods no longer become dehydrated from contact with cold, dry air.
- Vacuum packing greatly reduces the bulk of items, hence less freight expenses.

<table>
<thead>
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<th>The consumer</th>
<th>product, it is having some problems, as continuous mechanization is not available for various coating operations.</th>
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</thead>
<tbody>
<tr>
<td>- The shelf-life of the product will increase.</td>
<td>- Many of the coating materials are high in cost and some of the coating operations are also higher cost. This leads to increase the cost of operation of coating. So, the food producers have to reduce the cost of operation by finding out the cheapest coating material and method possible which may not be of a high standard.</td>
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<tr>
<td>- More variety, better texture and colour.</td>
<td>- More packaging to dispose of.</td>
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<tr>
<td>- Dry, solid foods, such as brown sugar, won't become hard, because they don't come in contact with air and, therefore, can't absorb moisture from the air.</td>
<td>- Higher prices to pay.</td>
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<tr>
<td>- Good quality fresh non-seasonal food can be imported and consumed.</td>
<td>- Impact of MAP and wax coating on health are still not totally hazard free.</td>
</tr>
<tr>
<td>- Vacuum packaging delicate food items can be done by using an inert gas, such as nitrogen. This helps prevent crushing fragile items and delicate foods such as potato chips.</td>
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<tr>
<td>- Foods that are high in fats and oils won't become rancid, because there's no oxygen coming in contact with the fats, which causes the rancid taste and smell.</td>
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<td>- Insect infestation is eliminated, because insects require oxygen to survive and hatch.</td>
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Meat and fish will marinade in minutes when vacuum packaged in canisters, because as air is being removed from the canister, the pores of the meat or fish open up and allow the marinade to penetrate.

Food bills are reduced because food lasts longer (so less spoiled food will need to be thrown away), and because food can be purchased in lower-priced bulk quantities and re-packaged at home into smaller portions.

iii) (5 X 1 mark)

Measures to be taken by food transport companies to ensure that maximum hygiene and safety standards are attained:

- Identify a food protection management team.
- Develop a comprehensive transportation and storage security plan.
- Assess and identify vulnerable points of contamination. A flow diagram from your point-of-origin to final destination, including all shipping modes/routes, can be a helpful tool in your assessment.
- Define and implement controls to prevent product adulteration or contamination during transportation and storage.
- Have a system in place to identify and track the product during transportation or distribution (e.g., use of tamper-resistant seals corresponding to specific shipments and their documentation, Global Positioning System).
- Verify that contracted transporters (e.g., air, ground, maritime, rail) and storage/warehouse facilities have a security program in effect.

v) (0.5 mark)

Abbreviation HACCP:

Abbreviation HACCP stands for Hazard Analysis & Critical Control Points

(1 mark)

HACCP’s vital role in the food industry and the safe guarding of consumers’ health:

HACCP plays a vital role in food safety as it is a tool which addresses and ensures safe food to consumers through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.
(7 X 0.5mark)

Steps involved:

- Principle 1: Conduct a hazard analysis.
- Principle 2: Identify critical control points.
- Principle 3: Establish critical limits for each critical control point.
- Principle 4: Establish critical control point monitoring requirements.
- Principle 5: Establish corrective actions.
- Principle 6: Establish procedures for ensuring the HACCP system is working as intended.
- Principle 7: Establish record keeping procedures.

Question 6

i) (3 x 0.5 mark for definition and 3 x 0.5 mark for scientific principles involved)

Definition of conduction, convection and radiation:

**Conduction** - Conduction, one of the most basic principles of cooking, is the movement of heat from one item to another through direct contact. For example, when a flame touches the bottom of a pan, heat is conducted to the pan.

**Convection** – Convection is heat transfer by mass motion of a fluid, such as air or water, when the heated fluid is caused to move away from the source of heat, carrying energy with it.

**Radiation** – Radiation is energy transferred by waves of heat or light striking the food. Two types of radiant heat are infrared and microwave.

Scientific principles

In conduction, the heat causes molecules in the substance nearest to the heat sources to vibrate. These in turn cause other molecules next to them to vibrate also, producing heat, thus heat transfer is by means of molecular agitation within a material without any motion of the material as a whole. The heat is transferred right through the substance with the result that the whole substance becomes hot e.g. the gas flame heats the base of the pan and the heat is conducted all around the pan. The heat conducted then goes through the food and cooks it.

Heat is conducted at different rates as there can be:

- Good conductors of heat, which conduct heat rapidly and efficiently e.g. metals – when placing a metal spoon in a bowl of boiling water, the spoon becomes hot after a few seconds.
- Poor conductors of heat, which conduct heat slowly and inefficiently e.g. glass, wood, cotton cloths – when placing a wooden spoon in a bowl of boiling water, the spoon does not become hot.

**Convection** above a hot surface occurs because hot air expands, becomes less dense, and rises. Hot water is likewise less dense than cold water and rises, causing convection currents which transport energy. Convection can also lead to circulation in a liquid, as in the heating of a pot of water over a flame. Heated water expands and becomes more buoyant. Cooler, more dense water near the surface descends and patterns of circulation can be formed, though they will not be as regular as suggested in the drawing.

**Radiation** - Radiation is heat transfer by the emission of electromagnetic waves which carry energy away from the emitting object. Heat travels from one place to another by rays. A hot object radiates heat rays so a grill gives out heat by rays. This can be like cooking in a microwave or by using radiant heat from an electric heating element like in an oven (specifically for broiling) or toaster. Therefore, food that is grilled or toasted is cooked by radiant heat. The radiation heat works on the surface of the food and travels inwards to ensure that the food is cooked properly. Since the radiation heat sears the surface of the food, the juices in the food are not allowed to escape and the inside of the large food is cooked in its own juices. It is recommended that the food that is being cooked be turned to ensure even heating.

Heat rays can be reflected by a shiny or white surface. Dull black surfaces absorb and give off heat. During cooking e.g. grilling, the heat waves only heat the surface of the food; the rest is heated by conduction.

(3 x 1 mark for labelled diagram)

*Labelled diagrams:*

**Conduction:**

![Conduction Diagram]
Convection:

Radiation:

ii) (3 x 1 mark)

Suitable method of cooking:

(3 x 2 marks)

Effects on texture and nutrient content:

(NOTE TO MARKERS: KINDLY ACCEPT ANY SUITABLE METHOD OF COOKING)

- Beef for a 3-year-old child recovering from influenza.

Any method of cooking which keeps most of the nutrients in food and the food has to be easily chewed and digested by a 3-year-old. A variety of textures in food may be presented to the child with colourful vegetables. Examples would be:

Steamed slices of beef – steaming will make the beef tender and can be chewed easily by the child. It will retain most of its nutrients as there is no direct heat, however vitamin K is destroyed. The beef slices keep the appearance as they do not lose shape whilst cooking.

Stewed meat balls/meatballs cooked in tomato sauce – mincing makes the beef easier to chew. Slow moist cooking makes the beef tender. Nutrients may be lost however water-soluble vitamins are leached in the sauce or stew.
liquid which is also consumed. Vitamin C in tomato sauce will aid in the absorption of iron in meat.

In both methods, proteins in beef are denatured due to heat giving the brown colour of cooked meat. Since denatured proteins toughen the meat, the slow moist cooking will help keeping it tender.

- **Fish for an elderly person who has problems with chewing and swallowing.**

Fish is already tender due to its short muscle fibres. In this case fish can be cooked in any way, but one must keep in mind the destruction of nutrients by the heat applied. In addition since the elderly has difficulty in chewing and swallowing, cooking fish in a sauce such as stewing or casserole may help the elderly person eat more comfortably. The fish will be easily broken into small pieces and since it is soft, it will be easy to swallow. Any water-soluble vitamins lost will be in the liquid sauce. Since fish is cooked quickly, there is no need to cook it for a long time, so this will reduce the destruction of nutrients.

The fish can also be poached reducing loss of nutrients as water is not boiling when the fish is cooking. The texture remains soft keeping its taste and appearance.

The fish can also be baked together with potatoes and other vegetables. Since a bit of water is used, the food will remain mostly soft. However since this takes longer to cook more nutrients are lost. Top layer of the dish may be too tough for the elderly to eat, as during baking, topmost food becomes crunchy so this needs to be discarded. Alternatively dish can be covered with foil to prevent the food from getting crunchy; however food will not get a golden brown colour on top.

Another method would be grilling the fish to keep its appearance and bring out the taste, serving it with a sauce to help the elderly chew and swallow the fish without problems. Since there is direct heat, destruction of nutrients is at a greater risk.

- **Vegetables for a lacto-vegetarian.**

Vegetables are rich in water-soluble vitamins and green leafy vegetables, wheat germs and whole grains are also rich in vitamin K which is easily destroyed by heat. Suitable methods would be stir-frying, as vegetables will only be cooked for 2 to 3 minutes, reducing loss of nutrients, or lightly steamed to reduce length of cooking time thus reducing loss of nutrient content. In both cases, vegetables remain crunchy keeping their appearance, and colour is not lost.
iii) (3 x 1 mark)

*Scientific principles involved when cooking in a microwave oven:*

Microwave oven works by passing non-ionizing microwave radiation through the food. Microwave radiation is between common radio and infrared frequencies. Water, fat, and other substances in the food absorb energy from the microwaves in a process called dielectric heating. Many molecules have a partial positive charge at one end and a partial negative charge at the other, and therefore rotate as they try to align themselves with the alternating electric field of the microwaves. Rotating molecules hit other molecules and put them into motion, thus dispersing energy. This energy, when dispersed as molecular vibration in solids and liquids (i.e., as both potential energy and kinetic energy of atoms), is heat.

Microwave heating is more efficient on liquid water than on frozen water, where the movement of molecules is more restricted. It is also less efficient on fats and sugars than on liquid water.

Microwaves are absorbed in the outer layers of food in a manner somewhat similar to heat from other methods. Depending on water content, the depth of initial heat deposition may be several centimetres or more with microwave ovens, in contrast to infrared or convection heating, which deposit heat thinly at the food surface. Penetration depth of microwaves is dependent on food composition and the frequency. Microwaves cook from the inside out only in the sense that each molecule is generating heat from "inside" and radiating it "outward".

(2 x 1 mark)

*Precautions that a homemaker should follow to ensure safety when using a microwave oven:*

- Never to use metal containers to cook food in the microwave. It will damage the interior of the oven.
- Never boil liquid uncovered. When the liquid is removed from the oven it will erupt causing bad body scalding.
- Periodically test for any leakages around the microwave door as this can cause ill health to the family members when the oven is in use.
- Do not have thick layers of food cooked in the microwave, as this may result in food not being cooked in the centre and may cause food poisoning.