RV College of Engineering®
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DEPARTMENT OF

BIOTECHNOLOGY

Academic year 2024-2025 (Even Sem)

Date	27th August 2024	Maximum Marks	50+10
Course Code	BT242AT	Duration	110 min
Sem	IV Semester	Improvement Test	

Bio Safety Standards and Ethics (Basket course)

Answer QUIZ in sequence only in first two pages of answer booklets

Sl. o	Questions(quiz)	M	BT-L	CO
1.	Explain with two examples about food allergens	1	1	3
2	What is Research ethics?	1	1	3
3	What are the advantages of preservation of food?	1	1	3
4	What are flavouring agents used in food? Give examples	1	1	4
5	List out the health policies in India	2	1	4
6	What is ethics in food industry?	2	1	4
7	List out 4 methods used for food analysis	2	1	4

Sl. o	Questions (Test)	M	BT-L	CO
1.	Suggest and explain on various strategies involved in food preservation.	10	2	3
2	Illustrate and classify on various food packaging methods used in food industry.	10	3	4
3	"*Meat and meat products derived from livestock treated with antibiotics and hormones can cause adverse effects on consumer's health*" justify the statement	10	3	3
4	Elaborate on smart packaging methods with suitable examples. Add a note on packaging materials	10	4	4
5	Classify and explain the importance of food additives, Also add the permissible limits of few food additives	10	2	3

BT-L-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	--	--	33	27	10	20	20	10	---	--

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Academic year 2024-2025 (Even Sem)

Scheme and solution

Date	27th August 2024	Maximum Marks	50+10
Course Code	BT242AT	Duration	110 min
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Bio Safety Standards and Ethics (Basket course)

Answer QUIZ in sequence only in first two pages of answer booklets

Sl. o	Questions(quiz)	M	BT-L	CO
1.	Explain with two examples about food allergens cow's milk, eggs, peanuts, tree nuts, sesame, soy, fish, shellfish, and wheat ANY TWO ½+ ½ Mark	1	1	3
2	What is Research ethics? Research ethics, also known as research integrity, is a set of guidelines and norms that guide researchers in conducting their studies with integrity, respect, and adherence to human rights. These principles help ensure that research is conducted properly and conscientiously, and that the findings and theories are accurately reported and discussed. ANY OTHER DEFINITION OR EXPLANATION…1M	1	1	3
3	What are the advantages of preservation of food? Food preservation has many advantages, including: • Safety Preserving food makes it safe to eat by preventing the growth of germs and microorganisms. This can help prevent food poisoning and foodborne illnesses. • Quality Preservation can help maintain the nutritional and sensory quality of food. For example, chemical preservatives can help prevent nutrient loss, and radiation can extend the life of strawberries and mushrooms. • Availability Preservation can ensure food is available in remote areas and during the offseason. For example, you can enjoy seasonal fruits like strawberries and mangoes even when they aren't in season.	1	1	3

DEPARTMENT OF
BIOTECHNOLOGY
Academic year 2024-2025 (Even Sem)

	• Sustainability Preservation can reduce food waste and save resources like water, energy, and land that are used in food production. It can also reduce waste in landfills and your environmental footprint. Some methods of food preservation include canning, drying, and freezing. ANY TWO ADVANTAGES ½+ ½ Mark			
4	What are flavouring agents used in food? Give examples Flavoring agents are substances that enhance the taste and aroma of food products. • Natural Spices, spice extracts, essential oils, oleoresins, fruit or fruit juice, vegetables or vegetable juice, edible yeast, herbs, bark, buds, root leaves, or plant material, dairy products, meat, poultry, or seafood, and eggs. Examples include black pepper, basil, ginger, onion powder, garlic powder, celery powder, onion juice, and garlic juice. • Chemical Alcohols, esters, ketones, pyrazines, phenolics, and terpenoids. Alcohol has a bitter and medicinal taste, ester is fruity, ketones and pyrazines taste like caramel, phenolics have a smoky flavor and terpenoids have citrus or pine flavor. • Other Aromatic oils, such as caraway, clove, lemon, spearmint, rose, and peppermint; ginger; raspberry; maltol; syrups, such as citric acid, sarsaparilla, and cherry; glycerin; cocoa; licorice; vanillin; and ethyl vanillin. DEFNITION HALF MARK ,ANY ONE EXAMPLE HALF MARK	1	1	4
5	List out the health policies in India Janani Shishu Suraksha Karyakaram (JSSK) Rashtriya Kishor Swasthya Karyakram(RKSK) Rashtriya Bal Swasthya Karyakram (RBSK) Universal Immunisation Programme. Mission Indradhanush (MI) Janani Suraksha Yojana (JSY) ANY OTHER 4 POLICIES LISTI NG ½ X4=2 MARKS	2	1	4

DEPARTMENT OF
BIOTECHNOLOGY
Academic year 2024-2025 (Even Sem)

6	What is ethics in food industry? Ethics in the food industry may involve many different topics, ranging from child labour, working conditions, environmental responsibility and fair trade, which are all highly relevant topics but not food industry specific, to packaging and labelling practices, which are more food specific,	2	1	4
7	List out 4 methods used for food analysis Mass spectrometry (MS) nuclear magnetic resonance (NMR) spectroscopy. gas chromatography (GC) PCR SPECTROPHOTOMETRY ANY OTHER 4 METHODS USED IN FOOD ANALYSIS 1/2X4=2 Marks	2	1	4

Sl. o	Questions (Test)	M	BT-L	CO
1.	Suggest and explain on various strategies involved in food preservation. some strategies for food preservation: Chilling Keep food in the fridge at a temperature between 1°C and 4°C to prevent or slow bacterial growth. You can use separate fridges for raw food, ready-to-eat food, and high risk food to avoid cross-contamination. You can also label food with use by and best before dates, and use a FIFO system to use food with the closest dates first. • Freezing Freezing is a common and ancient method that helps preserve food's taste, texture, and nutritional content. It prevents harmful microorganisms from growing on food that might otherwise grow at room temperature. • Canning Canning uses heat and pressure to kill bacteria and create a vacuum-sealed jar that preserves food's flavor and texture. You can use canning to preserve almost any food. • Drying Drying removes water from food to stabilize it and minimize chemical and physical changes during storage. Dehydration is one of the oldest methods of food preservation, and prehistoric people used it to sun-dry seeds. • Pickling	10	2	3

	Pickling involves soaking food in a brine solution of salt, vinegar, and water. It's a traditional method that can help preserve fruits and vegetables that might otherwise spoil. • Fermentation Fermentation is an ancient technology that can increase a food's shelf life and microbiological safety. It can also make some foods more digestible. Other food preservation methods include heating, curing, vacuum packaging, and smoking. Listing 4marks, explanation 6marks			
2	Illustrate and classify on various food packaging methods used in food industry. Food packaging can be classified into three main types: primary, secondary, and tertiary: Primary packaging: Contains the product. For example, a tube of toothpaste. Secondary packaging: Contains specific quantities of primary packaging, such as boxes or containers. For example, a folding carton. Tertiary packaging: Includes large shipping containers and pallets for storing and warehousing. For example, a display box. Packaging can also be classified by the materials used to prepare edible packaging, such as polysaccharides, proteins, and lipids. Films are usually made by dissolving the edible ingredient in water, alcohol, or a mixture of solvents. Food packaging can also be classified by the methods used, such as: Modified atmosphere packaging Vacuum packaging Aseptic packaging Paperboard boxes Bottle and jars Shrink wrap Hinged containers Plastic containers Clamshell packaging	10	3	4

	Foil-sealed bags Food packaging can be used to contain, protect, preserve, communicate, and perform other functions. It can be done before processing, such as canning, retort pouch, and dairy fermentations, or after major processing steps, such as pasteurization, baking, frying, and ultra high temperature (UHT) processing.			
3	"*Meat and meat products derived from livestock treated with antibiotics and hormones can cause adverse effects on consumer's health*" justify the statement Deatailed explanation 5marks and justification 5marks	10	3	3
4	Elaborate on smart packaging methods with suitable examples. Add a note on packaging materials Smart packaging consists of packaging systems with embedded sensor technology used for different product tracking. Direct distribution aims to extend its shelf life, track and trace products, monitor freshness, display information on quality, or improve the effect on customer safety. **It can be used for a variety of products**, including food and pharmaceuticals, and can help with many things, including: Safety: Monitoring product safety during manufacturing, storage, picking, and transport Quality control: Detecting product status and removing unwanted particles Customer empowerment: Providing a customer interface to understand products Information transmission: Informing management on storage and transport Theft and counterfeit prevention: Protecting businesses from false products being sold under a company's name or logo Fulfilled customer expectations: Helping customers find products across the store quickly High-quality maintenance: Monitoring and indicating contamination in a product Packaging materials: **Primary Packaging** For businesses that produce perishable items, primary packaging is crucial. Industries or factories that produce medicines, food items, beverages, and other perishable items, need compact packaging to preserve or protect the item. There are different types of packaging materials that are used in primary packaging, and here is more about them. – Laminated Pouches – Laminated pouches are made of very thin plastic or polymer. They have a	10	4	4

special adhesive on the opening end that reacts to heat and gets sealed. To use the laminated pouches, one needs special equipment for lamination.

Plastic Containers –
This type of packaging material is more common in businesses. Most of these plastic containers are reusable.

Thermoformed Products –
Made out of thermoplastics, this type of packaging is primarily used for electronic items. Thermoplastics are heated and molded into shapes particular to the products and their subsidiary equipment.

Tin Can –
Tin cans are multipurpose packaging materials used in many types of business. Canned food, beer, and other beverages mostly come in tin cans.

Parchment Paper –
Parchment papers are also known as baking paper or bakery paper and are used extensively in the baking industry. Muffins, butter, and many other food items are wrapped in parchment papers before packaging. The baked item does not stick to the paper and comes out easily.

Paper Bags or Wet-Strength Paper –
Looking similar to paper bags, wet-strength papers have high-stress tolerance once they are wet. These are biodegradable packaging materials that can also be printed. The only difference between paper bags and wet-strength paper is that the former features convenient handle loops.

Lamitubes/Laminated Tubes –
Laminated tubes or lamitubes have resistance to oil and heat. These are primarily used to package paste or ointments. Generally, this type of packaging has heat sealing on one end and a cap on the other. Not only do they offer protection but also make using the product very convenient.

Secondary Packaging

After the primary packaging, all products that are delivered in bulk need to be packed again, and this type of packaging is called secondary packaging. There are different types of packaging materials that are used in secondary packaging, and here is more about them.

Plastic Crates –
Plastic crates are used to pack and carry bulk orders of goods. This

type of packaging is very common in stores and shopping centers.

Plastic Trays –

Plastic trays are similar to plastic crates; however, they have a lesser capacity. These are open flat containers made out of plastic and are mainly used in organizing stuff.

EPS Trays –

Expanded polystyrene trays or EPS trays are recyclable, food-grade trays that are used to pack food items. These trays are colorful and can be easily printed and branded. You can spot this type of packaging material used in supermarkets. Most of the time, they have cling film wrapped on them.

Wooden Crates –

Wooden crates are used primarily for storing and sorting purposes. These are extensively used in warehouses and supermarkets. Wooden crates are stackable, eco-friendly packaging supplies.

Tertiary Packaging

Tertiary packaging is required for the transportation and shipping of products. Essentially, this type of packaging ensures an added safety layer protecting products from bumps and jerks.

There are a few types of packaging materials primarily used in tertiary packaging, and here is more about them. –

Corrugated Fiber Board –

Corrugated fiber boards have fluted fiber sheets that cushion the product against accidental bumps and jerks. These are extensively used for making boxes that are used for shipping purposes.

Wooden Containers –

Many varieties of wooden containers are available in the market. As a matter of fact, wooden boxes and crates also come under this type of packaging material.

Wooden Pallet –

Wooden pallets are used to stack goods upon them. Because of their shape, shifting large packages or stacks of goods using forklifts becomes easy.

DEPARTMENT OF
BIOTECHNOLOGY
Academic year 2024-2025 (Even Sem)

	Plastic Pallet – Plastic pallets work exactly the same way wooden pallets do. This type of packaging material is made of plastic, and they are extremely durable. SMART PACKING EXPLANATION 5MARKS WITH EXAMPLES PACKING MATERIAL WITH EXAMPLES= 5MARKS			
5	Classify and explain the importance of food additives, Also add the permissible limits of few food additives Food additives are substances primarily added to processed foods, or other foods produced on an industrial scale, for technical purposes, e.g. to improve safety, increase the amount of time a food can be stored, or modify sensory properties of food. **examples of food additives and their uses**: Anti-caking agents: Prevent ingredients from becoming lumpy Antioxidants: Prevent foods from oxidizing and going rancid Artificial sweeteners: Increase sweetness Emulsifiers: Prevent fats from clotting together Food acids: Maintain the right acid level Colorants: Make food products more attractive and visually appealing Flavor enhancers: Alter or improve the existing flavor of food and beverages Monosodium glutamate: A common food enhancer that makes savory dishes taste great Thickeners: Macromolecular substances that can be dissolved in water to form a viscous, slippery, or jelly liquid Carrageenan: Acts as a stabilizer and emulsifier, and is added to ice cream to keep it creamy Foaming agents: Produce food with a light texture, and are commonly used in angel cake, meringue, and mousse Humectants: Stabilize the moisture content of foodstuffs, and some commonly used humectants include honey and glucose syrup Raising agents: Ensure the product rises and has an even texture, and common raising agents include baking powder or baking soda FOOD ADDITIVES DEFINITION 2M CLASSIFICATION 6MARKS LIMITS OF ANY 4 ADDITIVES = 2MARKS	10	2	3