Food Technology (XE-G)

Q.1 – Q.9 Multiple Choice Question (MCQ), carry ONE mark each (for each wrong answer: – 1/3).

Q.1	**In a typical bacterial growth curve, the first order kinetics for growth rate is observed in**
(A)	Lag phase
(B)	Log phase
(C)	Stationary phase
(D)	Death phase

Q.2	**Which one of the following microorganism is NOT a causative agent for food borne diseases?**
(A)	*Campylobacter jejuni*
(B)	*Clostridium perfingens*
(C)	Norovirus
(D)	*Borrelia burgdorferi*

Q.3	**Which of the followings is NOT a fermented food product?**
(A)	Tofu
(B)	Vinegar
(C)	Sauerkraut
(D)	Tempeh

Q.4	The Protein Efficiency Ratio (PER) is defined as
(A)	Percentage of absorbed nitrogen retained in the body
(B)	Weight gain in body mass (in gram) per gram protein intake
(C)	Ratio of essential and non-essential amino acids in a protein
(D)	Percent *in vitro* digestibility of a protein

Q.5	Which one of the following enzymes sequentially releases maltose from starch?
(A)	α–Amylase
(B)	β–Amylase
(C)	Glucoamylase
(D)	Pullulanase

Q.6	Which one of the following enzymes is involved in proteolysis of casein in cheese during aging?
(A)	Myrosinase
(B)	Alliinases
(C)	Cathepsin
(D)	Plasmin

Q.7	Which one of the following compounds is present in soybean and acts as phytoesterogen?
(A)	Tangeretin
(B)	Lutin
(C)	Quercetin
(D)	Genistein

Q.8	**Ultra high temperature (UHT) process of pasteurization of milk is achieved by Heating at**
(A)	145°F for 30 minutes
(B)	161°F for 15 seconds
(C)	280°F for 2 seconds
(D)	400°F for 15 seconds

Q.9	**Bittering agent in grape fruit formed after juice extraction under acidic conditions is**
(A)	Quinine
(B)	Theobromine
(C)	Isohumulone
(D)	Limonin

Q. 10–Q. 12 Multiple Choice Question (MCQ), carry TWO marks each (for each wrong answer: – 2/3).

Q.10	**The conversion of pyruvate to lactic acid in homolactic fermentation is catalyzed by**
(A)	Lactate dehydrogenase
(B)	Pyruvate dehydrogenase
(C)	Lactase
(D)	Pyruvate decarboxylase

Q.11	**Which one of the following statements is INCORRECT with respect to Controlled Atmosphere Package (CAP) and Modified Atmosphere Package (MAP) of agro-produce?**
(A)	CAP and MAP limit microbial as well as biochemical activities.
(B)	Gas composition inside a MAP during the storage is continuously monitored and regulated.
(C)	CAP implies a greater degree of precision than MAP in maintaining specific levels of the gas composition.
(D)	Modification of the atmosphere inside a MAP is achieved by natural interplay between respiration of products and permeation of gases through the packaging film.

Q.12	Match unit operation in **Column I** with its application in food processing in **Column II**. **Column I** P. Hydrogenation Q. Blanching R. Leaching S. Winterization **Column II** 1. Removal of soft wax 2. Shortening of fat 3. Inactivation of enzyme 4. Separation of dye
(A)	P-2, Q-4, R-2, S-I
(B)	P-2, Q-3, R-4, S-1
(C)	P-4, Q-1, R-2, S-3
(D)	P-4, Q-2, R-1, S-3

Q.13 – Q.19 Multiple Select Question (MSQ), Carry TWO marks each (no negative marks).

Q.13	**Which of the followings are correct pair of GRAS chemical food preservative, affected organism and given food matrix?**
(A)	Sodium lactate-Bacteria-Pre-cooked meats
(B)	Caprylic acid-Insects-Cheese wraps
(C)	Dehydroacetic acid-Molds-Squash
(D)	Sodium nitrite-Clostridia-Meat curing preparations

Q.14	**Choose the correct pair of pigment and their corresponding color in given plant product.**
(A)	Carotene - Yellow-orange-Peppers
(B)	Betanin – Purple/red-Cactus pear
(C)	Lycopene – Red-Red beets
(D)	Flavanols – Orange-Cauliflower

Q.15	**Which of the following compounds act as anti-nutritional factors?**
(A)	Phytate
(B)	Isoflavones
(C)	Trypsin Inhibitor
(D)	Resveratrol

Q.16	**Which of the followings is/are commonly used medium/media in the supercritical fluid extraction of spices and tea?**
(A)	Water
(B)	Carbon dioxide
(C)	Dichloromethane
(D)	Carbon dioxide with Ethanol

Q.17	**Which of the following expressions represent the Reynolds number of a fluid flowing through a uniform circular cross section pipe?**
(A)	$\frac{\text{(density of the fluid)} \times \text{(average velocity of the fluid)} \times \text{(internal diamater of the pipe)}}{\text{(dynamic viscosity of the fluid)}}$
(B)	$\frac{\text{(average velocity of the fluid)} \times \text{(internal diamater of the pipe)}}{\text{(kinematic viscosity of the fluid)}}$
(C)	$\frac{\text{(dynamic viscosity of the fluid)}}{\text{(average velocity of the fluid)} \times \text{(density of the fluid)} \times \text{(internal diamater of the pipe)}}$
(D)	$\frac{\text{(kinematic viscosity of the fluid)}}{\text{(average velocity of the fluid)} \times \text{(internal diamater of the pipe)}}$

Q.18	**Which of the following combinations of analytical equipment, property measured and food property are correct?**
(A)	Particle size analyzer - particle size distribution - span value
(B)	Texture profile analyzer - morphology - chewiness
(C)	Differential scanning calorimeter - glass transition temperature - degree of caking
(D)	Capillary viscometer - viscosity - sensory

Q.19	**Choose the correct pair(s) of Governing Law and corresponding application(s)**
(A)	Hagen Poiseuille law - Pressure drop
(B)	Rittinger's law - Vapour pressure
(C)	Stefan Boltzmann law - Radiation heat transfer
(D)	Raoult's law - Size reduction

Q. 20 – Q. 22 Numerical Answer Type (NAT), carry TWO marks each (no negative marks).

Q.20	**An orange juice sample is concentrated from 10% to 40% (by weight) total soluble solids in a single effect evaporator with a feed rate of 3600 kg hr-1 at 25°C. The evaporator operates at sufficient vacuum to allow the product moisture to evaporate at 55°C. The specific heat of both feed and concentrated juice is 4.0 kJ kg-1 °C-1. If enthalpy of water vapour at 55°C is 2600 kJ kg-1, heat transfer rate through the heating surface area of the evaporator in kilowatt (in integer) will be_____.**

Q.21	**Dry air is fed into a tray dryer. The percentage relative humidity of the air leaving the dryer is 60% at 70°C and 101.35 kPa. If, saturated vapour pressure of water at 70°C is 31.2 kPa, the humidity of the air leaving the dryer in kg water per kg dry air (round off to 3 decimal places) will be _____.** **(Given : Molecular weight of water and air are 18.02 g mol-1 and 28.97 g mol-1 respectively)**

Q.22	**In a cold storage plant, 5000 kg potato having a constant specific heat capacity of 3.65 kJ kg-1 °C-1 are cooled from 28 °C to 2 °C in 24 hours. The heat of respiration of potato per 24 hour is 3.12 kJ kg-1 during the storage. Assuming the efficiency of the storage plant to be 70%, the capacity of the plant in ton of refrigeration (round off to 2 decimal places) is _____.** **(Given: 1 ton of refrigeration = 3.517 kilowatt)**

END OF THE QUESTION PAPER