Sem-I

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Engineering & Technology**

Subject: **Engineering Maths-I (GC102)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Find length of the Arc of a circle of radius 10cm and angle at the centre is 60^0.

b) Find equation of line having slope 3 and passing through point (2,3)

c) State nature of roots and Solve $3x^2-4x+2=0$

d) Divide x^3-5x^2+4x+1 by $(x+2)$

e) Find volume of frustum of cone having end radii as 4cm and 2cm and height of frustum is 3cm.

f) Find slope of tangent to curve $y=x^2+3x$ at (1,4)

g) Find $\frac{dy}{dx}$ if $y= 3x\tan x$

h) Find centre and radius of circle $x^2+y^2=16$

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) Find equation of circle having (2,4) and (-1,3) as end points of the diameter.

b) Find equation of line passing through points (3,4) and (2,5)

c) Find value of p if line $px+3y+1=0$ is perpendicular to line $3x-y+5=0$

d) Find equation of line passing through (2,3) and perpendicular to line $y=4x+2$

e) Find equation of circle concentric to circle $x^2+y^2-4x-2y+1=0$ and having radius 5 units.

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) Prove $\frac{\tan x+\sin x}{\tan x-\sin x}=\frac{1+\cos x}{1-\cos x}$

b) In any ΔABC show $\frac{a}{bc}+\frac{\cos A}{a}=\frac{a^2+b^2+c^2}{2abc}$

c) Solve ΔABC if $\angle A=102^0$, $\angle B=26^0$ and b=61cm

d) Find $\tan\theta$ and $\cot\theta$ if $\sin\theta=\frac{4}{5}$ and θ lies in I quadrant.

e) In ΔABC if a = 3cm, b= 4 cm, c=5cm, find cos A and cos B

Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Evaluate $\lim_{x\to 0}\frac{(4^x-1)\sin(5x)}{x^2}$

b) Evaluate $\lim_{x\to 0}\frac{(1+6x)^{1/x}\tan(2x)}{x}$

c) Find maximum and minimum for the function $y=x^3-9x^2+24x$

d) If displacement S of a particle at time 't' it is given by $S=2t^3-9t^2+12t$, find time when body stops.

e) Evaluate $\lim_{x\to 3}\left[\frac{1}{x-3}-\frac{3}{x^2-3x}\right]$

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Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

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a) Find $\frac{dy}{dx}$ if: i) $y=\frac{e^{4x}}{5x+1}$ ii) $y=5^x+2\sec x+\log(2x)$

b) Find $\frac{dy}{dx}$ if $xy = x^2+y^2$

c) Find $\frac{dy}{dx}$ if $y = (\tan)^x$ $(\tan x)^x$.

d) Find $\frac{dy}{dx}$ if $\log y=x^3e^{2x}$

e) Find $\frac{dy}{dx}$ if $x=1+\cos(2t)$, $y=1-\sin(3t)$

Q.No.6. Answer any three of the following Questions: **3 x 4 = 12**

a) Find x if: i) $\log_x 36=2$ ii) $\log(2x+1)+\log 3 = 3\log 2$

b) Find volume and lateral surface of pyramid whose base is hexagon of side 10cm. Given height of pyramid of 25cm and slant height is 26.46cm.

c) Find area by Simpson Rule from the given data.:

x(cm)	2	5	8	11	14	17	20	23
d (cm)	2.8	3.5	3.7	4.2	4.5	3.8	2.1	1.9

d) Find height of a prism having base as equilateral triangle of side 4cm and volume of the prism is $16cm^3$

e) Find $\frac{dy}{dx}$ if $y=\frac{(2x+1)^3\sin(4x)}{e^{5x}}$

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Engineering & Technology**

Subject: **Applied Physics-I (GC103)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Sub-question (a) is compulsory, answer any 7 from the remaining questions:

a) State the relation between linear expansion (α) and cubical expression (γ) **(1)**

b) What is positive zero error in the case of micrometer screw gauge? **(2)**

c) Define least count of a Vernier Calliper. State its formula. **(2)**

d) Define one Newton. **(2)**

e) Distinguish between vectors and scalars. (any two points) **(2)**

f) Why curved roads are banked? **(2)**

g) Define radial acceleration and write down its expression. **(2)**

h) What is meant by critical velocity of a liquid? **(2)**

i) State Boyle's Law. **(2)**

j) Define angle of contact. **(2)**

k) Define: i) Variable state ii) Steady state **(2)**

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) State the fundamental quantities, their units and symbols in S.I. units.

b) Check the correctness of the following equation using dimension:
i)P= mgh, where P=Potential energy, m=mass, g=acceleration due to gravity, h=height
ii)$T=2\Pi\sqrt{\frac{l}{g}}$ where T=period, l=length and g=acceleration due to gravity

c) Convert the following values from one system to another:
i)30 Ns/m^2 to C.G.S. system ii)80$gm.cm^2/s^2$ to S.I system

d) Obtain the dimension Young's Modulus.

e) State any four types of errors. Explain any one of them.

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) Classify the following into scalars and vectors:
i)Acceleration ii) Volume iii) Temperature iv) Energy
v) Pressure vi) Voltage vii) Electric intensity vii) Magnetic flux

b) State law of conservation of energy. Give one example of kinetic energy and potential energy.

c) Define and write down the S.I. units of: i)Force ii) Work

d) A locomotive pulls a train with uniform velocity 100km/hr. Find the work done by the locomotive in 10 minutes, if the force exerted is 20KN.

e) A body is thrown vertically upwards from the ground with an initial velocity 45m/s. Find the maximum height reached by the body and the time taken to reach it.

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Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Define acceleration due to gravity. Obtain an expression for it.

b) Show that $\tan\theta=\frac{v^2}{rg}$, where θ=angle of banking, v=velocity of the vehicle, r=radius of curvature of the road

c) Define centrifugal force, sate its expression and give two applications.

d) A body of mass 0.06kg is tied to a string and is whirled in a horizontal circle of radius 0.7m, making 80r.p.m. Find the tension along the string.

e) What is escape velocity? State the expression for it. Calculate escape velocity on the surface of the earth. Given radius of earth=6.4×10^6m, mass of earth=6×10^{24} kg, G=6.67×10^{-11} Nm^2/kg^2

Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) Define shearing strain. Draw the diagram. Show that shearing strain is equal to shear angle.

b) State four applications of surface tension.

c) With a neat diagram, explain terminal velocity of a spherical body falling through viscous liquid.

d) A force of 8N required to move a liquid over a solid surface of area $0.3m^2$ with velocity of 0.055m/s. If the thickness of the liquid layer is 0.003m, calculate coefficient of viscosity.

e) A force of 100N is applied at the lower end of a wire of length 4.5m, cross-sectional area is $0.25m^2$. Find the elongation of the wire. Y for wire is 2×10^{11} N/m^2

Q.No.6. Answer any three of the following Questions: **3 x 4 = 12**

a) Distinguish between conduction, convection and radiation. (three points)

b) State law of thermal conductivity. Draw diagram and state its equation.

c) Define the following terms: i)Specific heat ii)Latent heat of vapourisation

d) Certain mass gas occupies 45CC at 40°C and 680mm pressure. What volume will the gas occupy at 60°C and 980mm pressure?

e) A glass window pane 1.5m long and 0.75m broad is 2mm thick. Calculate the thermal conductivity of glass if 2.5Kcal of heat is conducted per second and the temperature difference between both sides is 12°C

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Common**

Subject: **Environmental Studies (GC203)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) What is Ecological Footprint?
b) Name any six Biogeographical zones of India.
c) What is land degradation? List the methods of control of land degradation.
d) How is high activity radioactive waste disposed?
e) What are secondary air pollutants? Give example.
f) Explain the role of decomposers in an ecosystem.
g) State any six rules you will follows as not to violate Motor Vehicle Act.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a note on Environment Impact Assessment.
b) Discuss the environmental ethics to be developed as true earth citizen.
c) State any six Human Rights.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain primary ecological succession.
b) Write a note on In-Situ or Ex-Situ method of conservation of biodiversity.
c) Describe: i) Desert Ecosystem ii) Ocean Ecosystem

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss the effect of excessive use of synthetic pesticides in modern agriculture on environment.
b) Discuss any six drawbacks of construction of dams.
c) What are the causes of deforestation? Explains the steps taken for forest management.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) What is Green House effect and Global Warming? Explain its effects.
b) Discuss how pathogens and heavy metals in polluted water affect human health.
c) Explain the method of composting of wet waste and methods of waste utilization with examples.

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss the effects of noise pollution on human health. What precautions will you take to protect yourself from noise pollution?
b) Discuss the short term and long term effects of marine water pollution due to oil spills.
c) Explain the role of Information Technology in environment.

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Engineering & Technology**

Subject: **Applied Physics-II (GC202)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Sub question (a) is compulsory. Answer any 7 from (b) to (k):

a) State SI unit of electric potential. **(01)**
b) Define electric field. **(02)**
c) Define capacitance. **(02)**
d) State law of resistances in series. **(02)**
e) A potential difference of 100V is applied across a resistance of 20 ohm. Determine the current flowing through resistance. **(02)**
f) Convert 1KWh into joules. **(02)**
g) State right hand thumb rule. **(02)**
h) Define self induction. **(02)**
i) Define refraction. **(02)**
j) Give the name of any two sources of LASER. **(02)**
k) State two applications of resonance. **(02)**

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) State four important properties of electric lines of force.
b) Two charges of 30 micro Coulomb and 50 micro Coulomb are placed 0.2m apart in air. Calculate force between them.
c) Find the electric intensity at a point 0.6m from a charge of 40 micro coulomb placed in medium of dielectric constant 2.5.
d) Two capacitors of 12F and 24F are connected in: i) Series ii) Parallel. Find effective capacitance in each case.
e) Draw a circuit diagram with three resistances connected in parallel across a battery of V Volt. Write the equation for effective resistance.

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) Define: i) Specific resistance ii) Electric power
b) Draw Wheatstone's network and write balancing condition.
c) The copper wire has a resistance of 4 Ohm at 0°C. Determine its resistance at 60°C. Temperature coefficient of copper = 0.00426/°C
d) State Joule's law of electrical heating. Write an expression.
e) A person uses, 4 number of 60W bulbs and 2 number of 100W fans, on an average 8 hours a day. Calculate energy bill for the month of 30 days at Rs. 3 per unit.

Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Explain magnetic effect of electric current as demonstrated by Oersted's experiment. Write the conclusion.
b) Explain the principle of transformer. Draw parts of transformer.
c) i) Define Magnetic flux. ii) State Lenz's Law.
d) A wire carrying current of 6A is 0.5m long. What will be the force acting on it, if it is kept in a magnetic field of strength 4.5×10^{-3} T at an angle of 60° to the direction of the field?
e) Explain mutual induction with neat diagram.

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Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) Explain total internal reflection with ray diagram.

b) What are X rays? State three important properties of x-rays.

c) A ray of light is travelling from air to glass. The angle of incidence is 30° and refractive index of glass is 1.5. Determine angle of refraction.

d) i) State two properties of LASER. ii)State two applications of LASER.

e) Two lamps of 10 Candela and 90 Candela are placed 1.5m apart. Find the position of the point between them, where luminance due to two sources will be equal.

Q.No.6. Answer any three of the following Questions: **3 x 4 = 12**

a) i) Define amplitude and frequency of sound wave.
ii)Write the relation between wavelength, frequency and velocity of a wave.

b) Explain free and forced vibration with an example for each.

c) Define pitch of a sound. Draw waveform to represent high pitch and low pitch sound.

d) Explain how ultrasonic waves are used to find the depth of the sea with diagram.

e) When a resistance of 12 Ohm is connected in the left gap of meter bridge, the null point is situated at 40cm. Find the value of resistance in the right gap.

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Sem - II

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Common**

Subject: **Engineering Materials (GC205)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Differentiate between Metals and Non-Metals.
b) List down the properties and uses of high speed steel.
c) Write a note on semiconductor materials.
d) Explain the composition and properties of Bricks.
e) Classify magnetic materials giving two examples of each type.
f) Write a note on lead and its hazards to environment.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) State and define any three mechanical properties and any three physical properties of engineering materials.
b) Explain any two types of cast iron along with its properties and applications.
c) List down various constituents of aluminium alloys. Explain effect of these constituents on properties of metal.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a short note on properties and uses of stainless steel.
b) State various desirable properties of refractory materials.
c) List down common varieties of timber. Also state any four uses of timber.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a note on classification of rocks.
b) What are insulting materials? State the characteristics and application of any two solid insulating materials.
c) What are high conductivity materials? State properties and applications of any two high conductivity materials.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Give specification of Silicon and Germanium as semiconductor material along with their uses.
b) What are different constituents of paints? Explain any three constituents in detail.
c) Write a note on function of lubricants.

Q.No.6. Write short note any three: **3 x 4 = 12**

a) Magnetic properties of engineering materials
b) Types of reinforcement materials and their applications
c) Properties and uses to soda glass
d) Classification materials as conductor, semiconductor and insulating materials

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Engineering & Technology**

Subject: **Applied Chemistry (GC104)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All Questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5x3=15**

a) State Aufbau Principle. Write the values of principal quantum number (n) and Azimuthal quantum number(l) for 3p,4f,6d and 2S orbital.

b) For principal quantum number 'n' = 4, write the possible values of Azimuthal quantum number (l) and magnetic quantum number(ml)

c) What are the causes of hardness in water?

d) Define the following terms: i)Electrolyte ii) Electrolysis iii)Degree of Ionization

e) Write a note on corrosion due to gases.

f) Give reasons for following: i)Part of nail inside wood corrodes ii)Why galvanized wares are not used for storing food stuff?

g) State any three drawbacks of natural rubber.

h) i)Which of the following metals can displace H_2 gas from acid solutions and why? Zn, Cu, Ag, Au?
ii)Give two points of difference between temporary and permanent hardness of water.

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) How covalent bond is formed? Explain the information of 0_2 molecule by covalency.

b) Give four points of difference between orbit and orbital.

c) Define Quantum Numbers. Explain the significance of principal and Spin quantum numbers.

d) State Octet rule. Write the orbital electronic configuration of Neon, Magnesium and Chlorine.

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) What is desalination of brackish water? With the help of diagram, explain the process of electro-dialysis for desalination of brackish water.

b) i) Define sludge and scale.
ii)What are the disadvantages of sludge and scale formation in boilers?

c) Define hard water. Explain the disadvantages of using hard water for domestic purpose.

d) With reference to zeolite process of water softening:
i)Write the formula of sodium zeolite.
ii)Write one reaction each for removal of temporary and permanent hardness of water.
iii)Write the reaction for regeneration of exhausted zeolite.

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Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) State any four postulates of Arrhenius theory of electrolytic dissociation.

b) In the electrolysis of aqueous $CuSO_4$ solution using platinum electrodes:
i)Write the ionization reactions.
ii)Write the reactions occurring at cathode and anode.
iii)Why the intensity of blue color of solution decreases?

c) Explain the process of electrolysis of aqueous NaCl solution using platinum electrodes.

d) Define corrosion. Describe the different types of oxide layers formed in oxidation corrosion.

Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) With a neat diagram, explain the oxygen absorption mechanism of electrochemical corrosion.

b) State any four principles of corrosion control by proper designing of metallic structures.

c) Explain the following methods of environment modification to control corrosion: i)Dehumidification ii)Deactivation

d) Describe the process of galvanizing for protection of metals from corrosion.

Q.No.6. Answer any three of the following Questions: **3 x 4 = 12**

a) Describe the process of metal spraying.

b) Define Addition Polymerization. Write equation for polymerization of: i)Ethene to polyethene ii)Vinyl Chloride to Polyvinyl Chloride

c) What is vulcanization of rubber? Give the reaction for vulcanization of rubber and state why it is necessary to vulcanize natural rubber.

d) Define Galvanic Corrosion. Explain galvanic corrosion giving any two examples.

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Organic Chemistry (FD302)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Define giving two examples:
i)Aromatic compounds ii)Aliphatic compounds iii)Heterocyclic compounds

b) State the functional groups of the following giving two examples:
i)Carboxylic acids ii)Aldehydes iii)Ketones

c) State three physical properties of Carboxylic acids and Benzene.

d) Write the general formula of alkanes, alkenes and alkynes giving one example each.

e) Write the structure of:
i)Phenol ii)Toluene iii)Benzene

f) Discuss briefly the classification of carbon atoms.

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) Write the structure of the following compounds:
i)5-methyl-2-hexyne ii)2,2,4-trimethyl pentane

b) Discuss in detail the manufacturer of Ethyl alcohol from molasses.

c) Write the reaction for the preparation of the following:
i)Ethane from ethylene ii)Acetaldehyde from acetylene

d) Write the reactions involved in the following:
i)Nitration of Toluene ii)Sulphonation of Toluene

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) Write the 1UPAC names of the following structures:

(i) $CH_3-CH_2-\underset{Br}{CH}-CH_2-\overset{O}{\overset{\|}{C}}-H$

(ii) $CH_3-CH_2-\underset{Cl}{\overset{Cl}{C}}-CH_2-CH_2-Br$

b) Discuss in detail the characteristics of homologous series giving examples.

c) Complete the following reactions:

i) $CH_4 + O_2 \xrightarrow{FLAME}$ ii) $CH_2 = CH_2 + HBr \rightarrow$

d) Write the reactions involved in the chlorination of methane in the presence of UV light at 300-400° C.

Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Write the structures of the following radicals:
i)Benzo ii)Phenyl iii)Benzyl iv)Benzal

b) Give the reactions involved in the following:
i)Reduction of acetaldehyde to alcohol
ii)Reduction of acetone to alcohol

c) Complete the reactions:

i) $CH_2 = CH_2 \xrightarrow[KMnO_4]{COLD} ?$

ii) $CH_2 = CH_2 + Br_2 \xrightarrow{INERT}$?

d) Discuss the preparation of ethyl alcohol from starchy materials.

Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) With the help of reactions write the product obtained when:
i)Acetylene is passed through red hot tube
ii)Sodium benzoate is treated with soda lime

b) Write the structures of the following:
i)Acetophenone ii)Benzene Sulphonic acid

c) Discuss in detail the manufacturer of alcohol from starchy materials

d) What is vapor phase nitration of Alkanes?

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Kekule's structure of Benzene and homologous side chains of benzene

b) Isomerism of alkanes taking butane as example

c) Structural formula of amines. Examples of primary, secondary and tertiary amines

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **General Microbiology (FD301)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Define: i)Protists ii)Mordant iii)Resolving Power iv)Bacteriostasis v) TDP vi) DRT

b) Discuss the composition of Nutrient Agar.

c) What is Selective Media? Give two examples of the same stating the bacteria it is used for.

d) Name 2 gram positive and 2 gram negative bacteria.

e) Give the functions of Capsule and Pli in a bacterial cell.

f) Briefly describe one equipment which involves dry heat.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) With the help of a ray diagram discuss the working of the compound microscope.

b) Discuss in detail "Microorganisms as Allies and Foes"

c) Differentiate between Eukaryotes and Prokaryotes.

Q.No.3. Write short note on any three: **3 x 4 = 12**

a) Bacterial endoscope

b) Temperature as a physical agent

c) Importance of algae.

d) Bacterial cell membrane

Q.No.4. Answer the following Question:

a) How would you? (any 3) **3 x 4 = 12**
i)Isolate a pure culture from a mixed culture
ii)Study the colony characteristics of an isolated culture
iii)Stain the flagella of bacterial cells
iv)Determine the total plate count of a given food sample

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss about the discoveries of any 2 of the following scientists:
i)Robert Koch ii)Edward Jenner iii)Louis Pasteur

b) With the help of a neat diagram discuss in detail the bacterial growth curve.

c) Discuss in detail the indirect methods of measuring bacterial growth.

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss in detail the factors affecting the growth of microorganisms.

b) With the help of a diagram discuss in detail Whittaker's 5 Kingdom theory.

c) List out the characteristics of an ideal disinfectant.

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Electronics Engg./EC/EI/FT**

Subject: **Basic Electrical Engineering (CC304)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Draw sinusoidal A.C voltage waveform and label amplitude and time period.
b) State the three types of losses in transformer.
c) State three applications of D.C. shunt motor.
d) State any three main parts of slip ring induction motor.
e) State any three precautions against electric shock.
f) Explain 'necessity of earthing' for an electrical system.
g) Name any three main parts of D.C. motor.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Define real power, reactive power and apparent power in three-phase system.
b) Distinguish between star and delta connections of three phase circuit. (any 6 points)
c) Define average value, peak factor, and frequency of sinusoidal qualities.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) With neat diagram, explain the principle of operation of transformer.
b) Define efficiency of transformer and write its equation. Also define voltage regulation and write its equation. State two applications of transformer.
c) A 6000/600V, 20KVA single phase transformer has 100 turns on low voltage side. Neglect losses and calculate:
i) Rated full load current on high voltage side iii)Rated full load current on low voltage side

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain working principle of D.C. motor, with neat circuit diagram.
b) State different types of D.C motor, also draw their diagrams, and state one application of each.
c) With neat circuit diagram, explain methods of reversal of direction of rotation of D.C series motor.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) With neat circuit diagram, explain the construction and working principle of universal motor.
b) With a neat circuit diagram, explain the working of star-delta starter(manual), used in three phase induction motor.
c) Explain method of reversal of direction of rotation of 3 phase induction motor. State any three applications of squirrel cage induction motor. Draw neat diagrams.

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) With neat diagram, Explain 'Pipe Earthing'.
b) With a neat diagram, explain the principle of operation of Miniature Circuit Breaker. (M.C.B)
c) Define minimum fusing current, breaking capacity, voltage rating and current rating of fuse.

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Electrical Engg./E&EE/FT/FT&EE**

Subject: **Elements of Mechanical Engineering (CC307)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) State the difference between flexible and rigid coupling.
b) What is the function of gear train?
c) State the classification of I.C engine.
d) What is meant by suction head and discharge head of a pump?
e) What is meant by C.O.P of refrigeration?
f) List common types of lubricants.
g) What is the function of super heater in boilers?
h) Differentiate between window AC and split AC.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) With a neat sketch explain bush roller chain drive and state its applications.
b) With the help of a neat sketch explain construction and working of sliding contact bearing.
c) Differentiate between spur and helical gears.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) List various components of 4 stroke diesel engine. Explain function of any four four components.
b) Differentiate between Petrol and Diesel engine.
c) Explain the following I.C. engine terminologies:
i)Stroke volume ii)Compression ratio iii)Brake power

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) With the help of a neat block diagram, explain working of thermal power station.
b) Differentiate between centrifugal and reciprocating pump.
c) With the help of a neat sketch explain working of Babcock and Wilcox boiler.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) With a neat sketch explain construction and working of centrifugal pump.
b) What are refrigerants? Give some examples of commonly used refrigerants and state characteristics of a good refrigerant.
c) With a neat sketch explain working of vapour compression cycle.

Q.No.6. Write short note on any three: **3 x 4 = 12**

a) Predictive maintenance
b) Necessity of lubrication
c) Torque wrench
d) Disadvantages of 2 stroke engine

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Methods of Food Preservation I(FD303)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Write a note on classification of food based on perishability.
b) What is the principle of preservation by sugar?
c) List any six insects causing infestation in stored grain.
d) State the difference between slow and quick freezing.
e) State the additional benefits of fermentation technique used for preservation.
f) List the factors to be considered to calculate refrigeration load.

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) Write a detailed note on maillard reactions in foods.
b) Explain in detail spoilage in foods due to desiccation and mechanical injury.
c) Explain wet curing of fish.
d) Write a note on caramelisation of foods and its uses.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a detailed note on various techniques used for rodent control methods in grain storage.
b) Explain how temperature and moisture can lead to spoilage in stored grains.
c) Write a self explanatory note on modified gas atmosphere storage.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the principle of freezing and changes that take place in frozen foods.
b) Write short note on:
i)Pretreatments before freezing ii)Specific heat and heat of respiration
c) Write an explanatory note on immersion freezing and various immersion freezers used.

Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) Write the difference between sun drying and mechanical drying.
b) Explain the principle of freeze drying.
c) Write a short note on case hardening in dehydrated fruits and vegetables.
d) Write a short note on microwave drying.

Q.No.6. Write short note on any three: **3 x 4 = 12**

a) Osmotic dehydration
b) Techniques for detecting grain infestation
c) Fermentation in foods
d) Cold storage of fruits and vegetables

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Food Chemistry(FD401)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any ten of the following Questions: **10x1.5= 15**

a) State the significance of proximate composition.
b) Give proximate composition of Cow milk.
c) How are carbohydrates classified?
d) State the use of low methoxy pectins in foods.
e) What is zmitter ion?
f) What are conjugated proteins?
g) State the difference between saturated and unsaturated fatty acids.
h) List any three foods containing anthocyanin pigments.
i) Give examples of antioxidants used in foods.
j) Draw the structure of amylose and amylopectin.
k) Give examples of aromatic amino acids.

Q.No.2. Answer any three of the following Questions: **3 x 4 = 12**

a) Draw the open chain and closed structure of D-Glucose and L-Fructose.
b) Explain the following chemical properties of monosaccharides: i)Reducing property ii)Optical activity
c) Write a self explanatory note on non-enzymatic browning reactions.
d) Write a note on gelatinization of starch.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a detailed note on classification of proteins giving examples.
b) Write a detailed note on pectic substances, types, their uses and factors affecting gel formation.
c) Explain the following chemical properties of proteins: i)Amphoterism ii)Colloidal nature iii)Color reactions

Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Explain in detail the factors affecting proteins denaturation.
b) Write a note on the mechanism of fat oxidation and products formed during the process.
c) Explain the following chemical properties of lipids: i)Peroxide value ii) Saponification value iii) Acid value iv)Iodine value
d) Explain polymorphism in fats. Illustrate the process with an example.

Q.No.5. Answer any three of the following Questions: **3 x 4 = 12**

a) Give the structure of a triglyceride. What is the fatty acid? Name any two unsaturated fatty acids.
b) Distinguish between: i) Native and denatured protein ii) Protein and peptide
c) Distinguish between simple lipids, compound lipids and derived lipids with examples.
d) Write a note on flavor reversion of oils and fats.

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Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss the chemical characteristics of the following and their role in foods: i)Tannins ii)Essential oils

b) Write an explanatory note on: i)Oxidation of carotenoids ii)Effect of alkali and iron on anthocyanins

c) Give reasons for following:
i)Why Sulphur dioxide is used to preserve mango pulp?
ii)Why tomato pulp is dull in colour compared to fresh tomato?

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IV

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Cereal Technology (FD406)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) What is the nutritional importance of cereals in our diet?
b) Name any three varieties of wheat cultivated and products manufactured from them.
c) State the advantages of parboling.
d) State the importance of gluten in bread making.
e) List the factors responsible for rice breakage.
f) List the equipment used in bread manufacture.
g) State the FSSAI specification for maida.
h) State the application of malted cereal flour.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain in detail C.F.T.R.I method of parboiling of paddy. State the advantages of parboling.
b) Explain aging of rice and quality changes during the process.
c) Explain the modern milling process of rice and equipment used in milling.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the significance of following laboratory test conducted for wheat flour:
i)Protein content ii) Sedimentation value iii) Alcoholic acidity
b) Write short note on any 2:
i)Products of wheat milling and its uses
ii)Milling quality of hard wheat and soft wheat
iii)Essential ingredients for bread making
c) Explain in detail any one method of bread making. Also state its advantages.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Write in detail about spoilage in bread, its causes and measures to prevent spoilage.
b) List the dry ingredients and liquid ingredients used in the manufacture of biscuits and explain their main function.
c) With the help of neat flow diagram explain the production of hard dough biscuits.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a note on balancing of cake formula.
b) Explain the functions of following ingredients in cake making: i)Sugar ii) Shortening iii) Leavening agents
c) Discuss the ingredients and process for production of vermicelli.

Q.No.6. Write short note on any three: **3 x 4 = 12**

a) Production of flaked rice
b) Production of malted wheat flour
c) Quality evaluation of pasta products
d) Production of canned rice

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Technology of Food Products (FD405)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Explain the principle of extrusion technology.
b) List the ingredients and their functions in the manufacture of toffee.
c) What are the different types of tea and state their characteristics.
d) What are RFID tags?
e) List various pulse crops grown in India. State protein content of three major pulses.
f) What are convenience foods? Give examples.
g) Give flow chart for the production of peanut butter.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the working principle, advantages and disadvantages of twin screw extruder.
b) With the help of a neat flow chart explain the process of chocolate manufacturing.
c) Write short note on any two:
i)Production of expanded snacks ii)Roasting of cocoa beans
iii)Changes during roasting of coffee

Q.No.3. Answer any three of the following Questions: **3 x 4 = 12**

a) Write the active principle and oil content in following spices:
i)Pepper ii) Cloves iii) Turmeric iv) Ginger
b) Write a note on quality evaluation of starch.
c) Give a brief outline for production of caramel and state its uses.
d) What is fat bloom? Give causes and remedies to prevent it.

Q.No.4. Answer any three of the following Questions: **3 x 4 = 12**

a) Explain the production of any one traditional snack from pulses.
b) Write a note on coconut milk manufacturing process.
c) Give a flow chart for manufacture of soya milk.
d) What are modified starches? Give its uses.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the process of deep frying and changes during deep frying.
b) Write a detailed note on Ready to Eat foods and plant and machinery requirement for the production of RTE foods.
c) Explain the need for commercialization of traditional foods in India. Give examples of commercially manufactured traditional foods.

Q.No.6. Write short note on any three: **3 x 4 = 12**

a) Barcode printers
b) ERP
c) Packaging and storage of spices
d) Instant coffee manufacturing

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Marine Products Technology (FD512)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) How would you classify fish based on fat content? Give example.
b) What is honeycombing? Explain.
c) What is QIM? State all the subjective indicators used to measure freshness of fish.
d) Write a short note on preparation of laminated Bombay Duck.
e) Draw a flow sheet for production of fish sausage.
f) Give an account of bulk packaging used for marine products.
g) List the common pathogens found in frozen fish and discuss its sources.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Discuss the analytical methods used for evaluating freshness of fish.
b) Write the quality control and quality standards in canned fish.
c) Give a detail account of measures to be taken during handling and transportation of fish after landing.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) With a neat flow diagram explain freezing of whole fish and fish minced block. (Surimi)
b) Discuss the measures to minimize changes during freezing and frozen storage of fish.
c) Explain the different methods of salt curing of fish.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Give an account of microbiological spoilage of dried fish and measures to prevent it.
b) Explain in detail the products of seafood processing industry.
c) Describe the process for manufacture of fish pickle and state the standard requirements as per FSSAI.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Suggest the suitable packaging materials for: i) Fish sausage ii) Dried salted fish iii) Bulk package of marine products iv) Fresh fish v) Frozen fish vi) Fish protein concentrate
b) What is the nutritional significance of fish protein concentrates?
c) Write an explanatory note on coatings used on can for packaging fish and the advantages of each types of coating.

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Describe the procedure for sampling, isolation and identification of salmonella in fish.
b) Write the microbiological standards for the following as per

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Fruit & Vegetable Technology (FD502)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any ten of the following Questions: **10x1.5=15**

a) Write two methods of determining the maturity indices in fruits and vegetables.
b) Write the characteristics of mango variety suitable for canning.
c) Enlist the peeling methods used for fruits and vegetables.
d) Write the exhausting temperature and time used for canning of fruits and vegetables.
e) Write the TSS and PH of good quality jam.
f) Write the criteria for the addition of sugar in fruit jelly preparation.
g) What should be sugar content of candies for longer shelf life?
h) Write the importance of de-aeration of fruit juices before packing.
i) What should be the acidity and salt content of brine cured salt stock of fruits and vegetables.
j) Write the precautions to be taken to prevent the spoilage of brine cured salt stock.
k) Differentiate between fruit squash and fruit cordial.
l) Name the ingredients used for the manufacture of tomato ketchup.
m) Write the pre-treatments given to fruits and vegetables before freezing.
n) Why quick freezing method is preferred for freezing vegetables.

Q.No.2. Answer the following Questions:

a) Describe the harvesting, packing and transportation of the following fruits and vegetables: (any two) **2 x 2 = 4**
i)Mango ii) Grapes iii) Apples iv) Potato
b) Give a flow diagram for canning of fruits and vegetables and explain the processing and cooling of cans. **(04)**
c) Explain the process for canned pineapple slices in syrup. **(04)**

OR

c) Explain the process for canning of carrots in brine. **(04)**

Q.No.3. Answer the following Questions:

a) Describe the process for the manufacture of mixed fruit jam. **(04)**

OR

a) Explain the following: (any two)
i)Preparing fruit and jam making **(02)**
ii)Formation of crystals **(02)**
iii)Boiling and judging the end point of jam **(02)**
b) Explain the following: (any two)
i)Selection and preparation of fruit for jelly making **(02)**
ii)Extraction of pectin from fruits **(02)**
iii)Methods to detect pectin in the extract **(02)**
iv)Addition of sugar and acid **(02)**
v)Cooking of jelly and judging the end point **(02)**

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c) Describe the process for the manufacture of papaya candy. **(04)**

OR

c) Describe the process for the manufacture of amla preserve. **(04)**

Q.No.4. Answer the following Questions:

a) Explain the following in the manufacture of fruit juices:(any one) **1 x 3 = 3**
i)Juice extraction from fruits
ii)De-aeration of fruit juice
iii)Straining, filtration and clarification of juices
iv)Pasteurization of juice

b) Describe the method for the production of orange squash and write the legal standards for fruit squash. **(03)**

OR

b) Explain in detail the method for the production of squash and its preservation. **(03)**

c) Differentiate between brining and salting of vegetables and write the changes that takes place during brining of vegetables. **(03)**

OR

c) Explain the process of making oil pickles from salt stock. **(03)**

d) Describe the process for the manufacture of sweet mango chutney and write the legal standards. **(03)**

Q.No.5. Answer the following Questions:

a) Explain the following steps in the production of tomato ketchup: (any two)
i)Juice extraction and standardization **1.5**
ii)Addition of ingredients **1.5**
iii)Cooking and concentration **1.5**
iv)Bottling and pasteurization **1.5**

b) Explain the following steps in the production of tomato juice:(any one) **1 x 3 = 3**
i)Washing, trimming and crushing of tomatoes
ii)Hot pulping and extraction of juice
iii)Packing of juice

c) Describe the method of production of tomato puree. Write the FSSAI standards. **(03)**

d) Write the causes and prevention of the following defects in fruit jelly: **(03)**
i)Formation of crystals ii) Syneresis

Q.No.6. Answer the following Questions:

a) Explain the purpose and advantages of giving the following pre-treatments to fruits and vegetables before dehydration: (any two)
i)Blanching **1.5**
ii)Lye peeling **1.5**
iii)Sulphuring **1.5**
iv)Sulphiting **1.5**

b) Write the preparation, pre-treatments and drying temperature for the following: (any one) **1 x 3 = 3**
i)Onion ii)Grapes

OR

b) Write a brief note on packaging and storage of dehydrated fruits and vegetables. **(03)**

c) Describe the process for the production of frozen apple slices in syrup. **(03)**

OR

c) Describe the process for the production of frozen mango pulp. **(03)**

d) Write in detail the method of production of frozen green peas. **(03)**

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Elementary Food Analysis (FD501)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) State the Beer Lambert's laws of absorption of light.
b) State the application of chromatographic methods.
c) List the proximate composition of food and its importance in food industry.
d) List out adulterants in milk, ghee and red chili powder.
e) Explain indicators used in acid base titrations.
f) What is crude fiber?
g) State the principle of Iodometry and Iodimetry titration.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain in detail drying method of determining moisture content in foods.
b) Describe in detail estimation of ash content in foods.
c) Using a neat sketch, explain the principle and working of Soxhlet method for crude fat analysis.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Define adulteration and list the common adulterants found in the following: i) Turmeric ii) Tea iii) Coffee iv) Oil v) Honey
b) Explain the principle and method of determining sugar by Lane and Eynon's method.
c) Using a n neat sketch, explain the working and function of various components of the photoelectric colorimeter.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) List the reagents required and explain determination of acidity in fruit juices.
b) Explain the procedure to determine salt content in brine.
c) Define the following: i) Normality ii) Equivalent weight iii) Primary standard

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the measurement of consistency using Brookfield's Viscometer.
b) Using a neat sketch, explain gas-liquid chromatography.
c) Describe in detail thin layer chromatography.

Q.No.6. Write short note on any three: **3 x 4 = 12**

a) Karl Fischer method of moisture determination
b) Munsell disc colorimeter
c) Adams consistometer
d) Saybolt Viscometer

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BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Dairy Technology(FD503)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any five of the following Questions: **5 x 3 = 15**

a) Explain the term platform test and its importance.
b) Define standardized milk and give its FSSAI specification.
c) Define neutralisation of cream and state its objective in butter making.
d) Explain over run in butter and its importance.
e) State the purpose and advantage of homogenization of ice cream mix.
f) Name any three defects in cheese, their causes and prevention.
g) State the application of whey powder.
h) State any three defects in ice cream, their causes and remedy.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Describe in detail the physical and chemical properties of milk.
b) Explain in detail the industrial process of cream manufacture.
c) Explain the important factors influencing fat percentage of cream.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain the following steps in manufacture of butter:
i)Vacreation ii) Ripening iii) Churning
b) Explain the steps involved in manufacture of cheddar cheese.
c) Discuss the properties of dry milk.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Describe the process of spray drying of milk and state the advantages and disadvantages.
b) Discuss the role of various ingredients used in ice cream.
c) Explain how any one of the following indigenous dairy products are manufactured:
i)Paneer ii) Shrikhand iii) Lassi

Q.No.5. Write short note on any three: **3 x 4 = 12**

a) Flavoured milk
b) Malted milk beverages
c) Freeze drying of milk
d) Manufacture of dahi

Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Explain in detail manufacture of processed cheese. State the FSSAI specifications for processed cheese.
b) Write in detail defects in butter, its causes and remedies.
c) Write the process of manufacture of following by products and state its uses: i)Lactose ii) Casein

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11/11/2025 7:30 TO 12:30 P.M.

BOARD OF TECHNICAL EDUCATION

PORVORIM-GOA

November, 2025 Examinations

Programme: **Food Technology**

Subject: **Food Packaging Technology (FD504)**

Time Duration: **3 Hrs.** Max. Marks: **75**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable additional data if required.

Q.No.1. Answer any ten of the following Questions: **10x1.5= 15**

a) State any three characteristics of ideal packaging material.
b) Define GTR.
c) State the advantages of glass as packaging material.
d) Give three distinguishing points between MAP and CAP.
e) State the general composition of glass and function of each component.
f) List the cushioning materials used in food packaging.
g) Suggest suitable packaging material for biscuits.
h) What is a shrink test?
i) State the advantages of edible packaging.
j) Mention the ingredients used to give black color to the glass.
k) Define thermal shock resistance test.

Q.No.2. Answer any two of the following Questions: **2 x 6 = 12**

a) Write properties, advantages and disadvantages of following packaging materials: (any 3)
i)LDPE ii)Glass iii)PVC iv)EVOH
b) Define packaging. tate its functions and explain the classification of packaging material based on: i)Form ii)Level of pack
c) Write a self explanatory note on retortable pouches.

Q.No.3. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a detailed note on shipping containers used in food industries.
b) Explain in detail the factors affecting selection of packaging material.
c) Write a note on information to be known before developing a packaging material.

Q.No.4. Answer any two of the following Questions: **2 x 6 = 12**

a) Define the following terminologies used in glass bottle making: i)Flow machine ii)Parison or blank iii)Neck ring iv)Annealing v)Blow mould vi)Parison mould
b) Explain the manufacture of rigid plastic containers by blow moulding process.
c) Explain the manufacture of DWI 2 piece cans.

Q.No.5. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a short note on:
i)Self heating and self cooling cans ii)Boil in bag
b) Write a detailed note on various printing methods used in food labeling.
c) Write a self explanatory note on cushioning materials and adhesives used in food packaging.

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Q.No.6. Answer any two of the following Questions: **2 x 6 = 12**

a) Write a detailed note on various methods used for testing and identification of packaging material.

b) Explain briefly criteria for selection of packaging material and packaging material used for fish and fish products.

c) Write a short note on:
i)Paper manufacturing ii)Shelf life estimation

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