

PREVIEW QUESTION BANK

Module Name : Dairy Engineering - 38-ENG
Exam Date : 29-Jun-2024 Batch : 14:30-16:30

Sr. No.	Client Question ID	Question Body and Alternatives	Marks	Negative Marks
Objective Question				
1	201	Movement of DNA from one bacterium to another through a tubular bridge or pilus: 1. Conjugation 2. Transposition 3. Transfection 4. Transduction A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
2	202	Which of the following is responsible for eliminating toxic oxygen by-products from cells? 1. Mitochondria 2. Golgi complex 3. Peroxisomes 4. Chloroplasts A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
3	203	A form of multiple parasitism in which a parasite preferentially attacks a host that is already parasitized by another species is known as 1. Cleptoparasitism 2. Ectoparasitoid 3. Obligate parasitism 4. Superparasitism A1 : 1	4.0	1.00

		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

4	204	For mass multiplication of DD-136 nematode, the common host used is 1. Silk moth 2. Fruit sucking moth 3. Codling moth 4. Lesser wax moth A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

5	205	Chlorpyrifos methyl is effective against stored product insects except 1. <i>Rhizopertha dominica</i> 2. <i>Tribolium castaneum</i> 3. <i>Caryedon serratus</i> 4. <i>Oryzaephilus surinamensis</i> A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

6	206	Which of the following insects often cause inhalational allergies in human following large emergence of adult insects. 1. Stick insects 2. May flies 3. Ear wigs 4. Preying mantis A1 : 1 A2 : 2	4.0	1.00
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A3 : 3

A4 : 4

Objective Question

7 207

4.0 1.00

Given below are two statements:

Statement (I): Climate is a weather condition related to smaller areas at a given place and at a given time,

Statement (II): Weather is a condition of atmosphere at a given place and at a given time

In light of the above statements, choose the *most appropriate* answer from the options given below.

1. Both Statement (I) and Statement (II) are correct.
2. Both Statement (I) and Statement (II) are incorrect.
3. Statement (I) is correct but Statement (II) is incorrect.
4. Statement (I) is incorrect but Statement (II) is correct.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

8 208

4.0 1.00

The local name of cyclone in Philippines is

1. Hurricane
2. Cyclone
3. Baquio
4. Typhoon

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

9 209

4.0 1.00

Which one of the following are secondary tillage implements?

- (A) Subsoiler
- (B) Cultivator
- (C) Disc harrow
- (D) Wetland plough

Choose the **correct** answer from the options given below:

- 1. (A), (B) and (D) only.
- 2. (B) and (C) only.
- 3. (B), (C) and (D).
- 4. (B) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

10 210

_____ is the most suitable, drought resistant and persistent grass?

- 1. *Alyosia* sp.
- 2. *Cenchrus ciliaris*
- 3. *Stylosanthes hamata*
- 4. *Sorghum bicolor*

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

11 211

The rainfed area in India is approximately

- 1. 30 mha
- 2. 40 mha
- 3. 57 mha
- 4. 70 mha

A1 : 1

A2 : 2

4.0 1.00

		A3 : 3		
		A4 : 4		
Objective Question				
12	212	Which nutrient is often a limiting factor in agricultural production? 1. Nitrogen 2. Carbon 3. Oxygen 4. Hydrogen A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
13	213	What is a potential disadvantage of agroforestry systems? 1. Increased soil erosion 2. Decreased carbon sequestration 3. Reduced biodiversity 4. Enhanced susceptibility to pests A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
14	214	Pungency in mustard oil is due to 1. Amino acid 2. Allyl isothiocyanate 3. Erusic acid 4. Oxalic acid A1 : 1 A2 : 2	4.0	1.00

		A3 : 3		
		A4 : 4		
Objective Question				
15	215	Sesamum belongs to the family 1. Chenopodiaceae 2. Papilionaceae 3. Leguminosae 4. Pedaliaceae A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
16	216	Dark period is critical in which type of plant? 1. Short day plant 2. Long day plant 3. Day neutral plant 4. All the options A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
17	217	Which of the following is NOT a significant contributor to greenhouse gas emissions from livestock farming? 1. Carbon dioxide 2. Methane 3. Nitrous oxide 4. Ammonia A1 : 1 A2 : 2 A3 : 3	4.0	1.00

A4 : 4

Objective Question

18	218	Fe deficiency is mostly seen in crops growing on 1. Calcareous or alkaline soils 2. Salt affected soils 3. Acidic soils 4. Neutral soils A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

19	219	EDV (Essentially Derived Varieties) are those which are derived from: 1. crossing two commercially known varieties 2. hybrid introduced from other countries 3. existing variety through genetic engineering or mutation 4. crossing commercially known variety with its wild relative A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

20	220	What is the role of "companion planting" in agriculture? 1. Enhancing soil fertility through crop rotation 2. Growing different crop species together to deter pests 3. Cultivating plants in hydroponic system 4. Increasing soil compaction through cover cropping A1 : 1 A2 : 2 A3 : 3	4.0	1.00
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		A4 : 4		
Objective Question				
21	1901	Technically, liquid obtained on removal of fat and casein from milk is termed as: 1. Milk plasma 2. Butter milk 3. Milk serum 4. Skim milk A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
22	1902	Pycnometer is used to determine _____ of milk 1. Density 2. Vapour Pressure 3. Surface Tension 4. Viscosity A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
23	1903	Milk appears white due to the presence of _____ 1. Whey proteins 2. Soluble calcium hydrogen phosphate 3. Colloidal calcium caseinate 4. Lactose A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00

Objective Question				
24	1904	The major deterioration in skim milk powder during storage is due to _____ 1. Development of acidity 2. Oxidation of fat 3. Denaturation of proteins 4. Maillard browning A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
25	1905	Lactometers, as per BIS specifications are calibrated at 1. 27 °C 2. 30 °C 3. 28 °C 4. 37 °C A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
26	1906	Headquarter of WTO is at 1. Geneva 2. Belgium 3. Netherland 4. Rome A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
27	1907		4.0	1.00

		How many principles are there to develop HACCP system ? 1. 5 2. 8 3. 7 4. 6 A1 : 1 A2 : 2 A3 : 3 A4 : 4		
Objective Question				
28	1908	Methylene of Blue Reduction Test (MBRT) is conducted to know 1. Indication of bacterial load in milk 2. Efficiency of sterilization of milk 3. Efficiency of Pasturization of milk 4. Efficiency of UHT treatment of milk A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
29	1909	Lactometer reading is used to determine 1. Protein content in milk 2. SNF % in milk 3. Fat % in Milk 4. Viscosity of milk A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
30	1910		4.0	1.00

		Which of the following is an indigenous breed of cattle		
		1. Holstein Friesen 2. Karan Fries 3. Sahiwal 4. Karan Swiss		
		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

31	1911	Which of the following statement about polypropylene is wrong?	4.0	1.00
		1. It is a linear polymer with lower density 2. It is used only in rigid forms as in bottles. 3. It has a higher softening point. 4. It can be blown and injection moulded to produce closures and thin-walled containers		
		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

32	1912	The maximum levels of permitted preservative sulphur dioxide in fruit juice is ppm.	4.0	1.00
		1. 50 2. 70 3. 95 4. 120		
		A1 : 1		
		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

33	1913		4.0	1.00
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Which of the following benefits are associated with High Pressure Processing (HPP) technology in food preservation?

- (A) Reduction of food spoilage by inhibiting enzymatic activity.
- (B) Enhancement of food safety by eliminating all types of microorganisms.
- (C) Retention of food texture, color, and flavor.
- (D) Shortening of the shelf life of perishable foods.

Choose the **correct** answer from the options given below:

- 1. (A), (B) only
- 2. (A), (C) only.
- 3. (A), (B), (C) and (D).
- 4. (B), (C) and (D) only.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

34 1914

At triple point of water the values of temperature..... And pressure.....?

- 1. Temperature: 0.01°C; Pressure: 611.657 pascals
- 2. Temperature: 0.01°F; Pressure: 611.657 pascals
- 3. Temperature: 0.01°C; Pressure: 611.657 Mega pascals
- 4. Temperature: 0.01°F; Pressure: 611.657 Mega pascals

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

35 1915

Which of the following is best suited for evaporating tomato puree?

- 1. Jacketed open kettle evaporator
- 2. Climbing film evaporator
- 3. Falling film evaporator
- 4. Plate type evaporator

A1 : 1

A2 : 2

4.0 1.00

		A3 : 3		
		A4 : 4		

Objective Question

36	1916	Who is known as the Father of Canning? 1. Nicolas Appert 2. Leistner 3. Louis Pasteur 4. Kary Mullis A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

37	1917	Which of the following diseases can be diagnosed at ante-mortem examination of animals at lairage? 1. Cirrhosis 2. Tuberculosis 3. Brucellosis 4. Rabies A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

38	1918	Cottage cheese belong to which of the following categories? 1. Soft and unripened 2. Hard and ripened 3. Mold-ripened 4. Soft and ripened A1 : 1 A2 : 2 A3 : 3	4.0	1.00
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		A4 : 4		
Objective Question				
39	1919	The year of establishment of National Dairy Development Board, Anand, Gujarat is _____ 1. 1955 2. 1960 3. 1965 4. 1970 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
40	1920	Clarified butter fat is known as _____ 1. Srikhand 2. Cheese 3. Ghee 4. Curd A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
41	1921	Which of the following thermotolerant bacteria in raw milk shows a 100% survival rate during pasteurization of milk? 1. Microbacterium 2. Coliforms 3. Micrococci 4. Bacillus A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00

Objective Question

42	1922	Which of the following bacteria is known to be indicator organism for personnel hygiene? 1. Enterobactericea 2. <i>E.coli</i> 3. <i>Staphylococcus aureus</i> 4. <i>Enterococcus faecalis</i> A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

43	1923	Which of the following bacteria are known to be zoonotic dairy pathogens? (A). <i>Listeria monocytogenes</i> (B). <i>Campylobacter jejuni</i> (C). <i>Lactobacillus bulgaricus</i> (D). <i>Lactococcus diacetylactis</i> (E). <i>Salmonella</i> species Choose the correct answer from the options given below: 1. (A), (B) and (C) only. 2. (A), (B) and (D) only. 3. (A), (B), and (E) only. 4. (B), (C) and (D) only. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

44	1924		4.0	1.00
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Match List-I with List-II

List-I	List-II
(Bacteria)	(Microbial defects)
(A) Bitty Cream	(I). <i>Serratia marcescens</i>
(B) Sweet Curdling	(II) <i>Bacillus cereus</i>
(C). Fruity flavour	(III). <i>Pseudomonas fragi</i>
(D). Red discoloration	(IV) <i>Bacillus subtilis</i>

Choose the **correct** answer from the options given below:

- (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
- (A) - (III), (B) - (III), (C) - (IV), (D) - (I)
- (A) - (III), (B) - (IV), (C) - (III), (D) - (I)
- (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

45 1925

4.0 1.00

Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A) : Khoa and khoa-based sweets are more prone to *Staphylococcus aureus* contamination and food poisoning problems.

Reason (R) : Dairy Equipments are major source of entry of *Staphylococcus aureus* during preparation of khoa and khoa-based sweets.

In light of the above statements, choose the correct answer from the options given below.

- Both (A) and (R) are true and (R) is the correct explanation of (A).
- Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (A) is true but (R) is false.
- (A) is false but (R) is true.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

46	1926	One of the following is used as an indicator of faecal contamination. 1. <i>E. coli</i> 2. <i>Salmonella</i> 3. <i>Listeria monocytogenes</i> 4. <i>Staphylococcus aureus</i> A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

47	1927	Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R). Assertion (A) : Mastitis does not usually cause a decrease in milk production in milch animals. Reason (R) : Microorganisms such as <i>Staphylococcus aureus</i> cause mastitis in milch animals. In light of the above statements, choose the <i>most appropriate</i> answer from the options given below . 1. Both (A) and (R) are correct and (R) is the correct explanation of (A). 2. Both (A) and (R) are correct but (R) is NOT the correct explanation of (A). 3. (A) is correct but (R) is not correct. 4. (A) is not correct but (R) is correct. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

48	1928	One of the following is NOT an antimicrobial substances produced by Starter culture in fermented milks 1. Organic acid 2. Phenols 3. Bacteriocins 4. Hydrogen peroxides A1 : 1 A2 : 2	4.0	1.00
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		A3 : 3		
		A4 : 4		

Objective Question

49	1929	Given below are two statements: Statement (I): All the bacteria in the <i>Enterobacteriaceae</i> family are Gram negative. Statement (II): Most of the bacteria in the <i>Enterobacteriaceae</i> family are pathogens. In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. 1. Both Statement (I) and Statement (II) are true. 2. Both Statement (I) and Statement (II) are false. 3. Statement (I) is true but Statement (II) is false. 4. Statement (I) is false but Statement (II) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

50	1930	Which one among the following products may have the highest bacterial counts? 1. Skim milk powder 2. Sweetened condensed milk 3. Butter 4. Raw Milk A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

51	1931		4.0	1.00
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Match List-I with List-II

List-I	List-II
Rheological Classification	Example
(A). Newtonian fluid	(I). Yoghurt
(B). Shear thickening	(II). Milk upto 20% TS
(C). Thixotropic	(III). Cheese
(D). Viscoelastic	(IV). Concentrated starch suspension

Choose the **correct** answer from the options given below:

- (A) - (III), (B) - (IV), (C) - (I), (D) - (III)
- (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
- (A) - (III), (B) - (IV), (C) - (III), (D) - (I)
- (A) - (III), (B) - (I), (C) - (IV), (D) - (III)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

52 1932

4.0 1.00

Given below are two statements:

Statement (I): Mozzarella cheese is rennet coagulated cheese.

Statement (II): Acid can be used in Mozzarella cheese for pH reduction.

In light of the above statements, choose the *most appropriate* answer from the options given below.

- Both Statement (I) and Statement (II) are correct.
- Both Statement (I) and Statement (II) are incorrect.
- Statement (I) is correct but Statement (II) is incorrect.
- Statement (I) is incorrect but Statement (II) is correct.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

53	1933	Emulsifying salts are added in processed cheese to _____ 1. Prevent free fat formation 2. To induce saltiness 3. To increase shelf life 4. Increase free fat formation A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

54	1934	Which of the following is used for evaluation of strength of pectin gels? 1. Ridgelimeter 2. Puncture tester 3. Consistometer 4. Bloom gelometer A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

55	1935	Main driving force in the dialysis process is _____ 1. Pressure 2. Electric potential 3. Concentration 4. Chemical potential A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

56	1936		4.0	1.00
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If an emulsifier is soluble in oil phase, then it is most suitable for _____ kind of emulsion preparations.

1. Oil-in-water emulsions
2. Water-in-oil emulsions
3. Water-in-air emulsions
4. Air-in-water emulsions

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

57 1937

Ultrasonic cleaners used for membrane cleaning operate at a frequency of _____

1. 1-5 kHz
2. 20-40 kHz
3. 1000-2000 kHz
4. 1-5 Hz

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

58 1938

Which of the following parameters is a fundamental rheological property?

1. Adhesiveness
2. Chewiness
3. Hardness
4. Fracture stress

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

59 1939

4.0 1.00

A novel ice cream cake was prepared by filling a portion of vanilla ice crema into chocolate flavoured cake. Overrun of the product is 90% and protein content of the product is 4% w/w. What shall be the total solids content of the product?

1. More than 27% w/w
2. More than 30% w/w
3. More than 36% w/w
4. More than 25% w/w

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

60 1940

Which of the following laxative is formed when lactose is heated at high temperatures?

1. Sucralose
2. Lactulose
3. Lactobionic acid
4. Trehalose

A1 : 1

A2 : 2

A3 : 3

A4 : 4

4.0 1.00

Objective Question

61 1941

Out of the following identify valid geometry for fins

- (I) Longitudinal fins of rectangular cross section attached to a wall
- (II) Cylindrical tubes with radial fins
- (III) Conical rod protruding from a wall

Choose the **correct** answer from the options given below:

1. (I), (II) and (III)
2. (I) and (II) only
3. (I) and (III) only
4. (II) and (III) only

A1 : 1

A2 : 2

4.0 1.00

A3 : 3

A4 : 4

Objective Question

62 1942

4.0 1.00

Arrange the following in order of increasing magnitude of their numerical value only

A. Stefan Boltzmann Constant ($\text{kg s}^{-3} \text{K}^{-4}$)

B. Planck's Constant (J s)

C. Speed of Light in Vacuum (m / s)

D. Universal Gas Constant ($\text{J mol}^{-1} \text{K}^{-1}$)

Choose the **correct** answer from the options given below:

1. B, A, D, C

2. D, A, B, C

3. B, D, A, C

4. D, B, A, C

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

63 1943

4.0 1.00

Which of the following is a type of expansion valve

(I) Capillary tube

(II) Thermostatic

(III) High side float valve

Choose the **correct** answer from the options given below:

1. (I) only

2. (I), (II) and (III)

3. (II) only

4. (II) and (III) only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

641944

4.01.00

Match **List-I** with **List-II**

List-I	List-II
(A). Centrifugal compressor	(I). Heat Exchanger
(B). Rotary compressor	(II). Expansion valve
(C). Metering device	(III). Positive displacement
(D). Evaporator	(IV). Compression ratio about 4.5

Choose the **correct** answer from the options given below:

1. (A) - (III), (B) - (I), (C) - (II), (D) - (IV)

2. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

3. (A) - (I), (B) - (III), (C) - (IV), (D) - (III)

4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

65	1945	Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R). Assertion (A) : Ductility is an essential requirement in steel for use in a high-pressure vessel. Reason (R) : Ductility is a mechanical property commonly described as a material's amenability to drawing. In light of the above statements, choose the correct answer from the options given below - Both (A) and (R) are true and (R) is the correct explanation of (A) - Both (A) and (R) are true but (R) is NOT the correct explanation of (A) (A) is true but (R) is false (A) is false but (R) is true A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

66	1946	In Maxwell model, 1. Strains are additive 2. Stresses are additive 3. Parallel system 4. Modeling of creep A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

67	1947	Arrange the following steps in the correct sequence for the operation of an evaporator: Step 1: Preheating the feed solution. Step 2: Vaporization of the solvent from the feed solution. Step 3: Condensation of the vaporized solvent to produce distillate. Step 4: Removal of concentrated solution or residue. Step 5: Heating the feed solution to its boiling point. 1. 1 - 5 - 2 - 3 - 4 2. 5 - 1 - 2 - 3 - 4 3. 1 - 5 - 2 - 4 - 3 4. 5 - 1 - 2 - 4 - 3 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

68	1948		4.0	1.00
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Read the following statements

- A. The permeability coefficient increases as the pressure increases
- B. Diffusion coefficient increases with an increase in temperature
- C. Highly polar polymers are excellent water vapour barriers
- D. Non-polar polymers have excellent water barrier properties

Choose the correct answer from the options given below:

- 1. A,B,C only
- 2. A,B,D only
- 3. A,B only
- 4. B,C only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

69 1949

4.0 1.00

Match the following

A. Strain Gauge	I. Converts mechanical deformation into an electrical signal
B. Thermocouple	II. Measures temperature by the voltage difference between two dissimilar conductors
C. LVDT	III. Utilized for measuring linear displacement with high accuracy
D. Piezoelectric Transducer	IV. Generates an electrical charge when subjected to mechanical pressure or vibration

Choose the correct answer from the options given below:

- 1. A-I, B-III, C-II, D-IV
- 2. A-I, B-II, C-III, D-IV
- 3. A-III, B-I, C-II, D-IV
- 4. A-III, B-II, C-IV, D-I

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

70	1950	Given below are two statements. One is labelled as assertion (A) and other one is labelled as reason (R). Assertion (A): BPE of the concentrated solution must be known for evaporator design Reason (R): BPE of the concentrated liquor reduces the effective temperature driving force compared to the boiling of pure solvent In light of the above statements, choose the most appropriate answer from the options given below - Both A and R are correct and R is the correct explanation of A - Both A and R are correct but R is NOT the correct explanation of A - A is correct but R is not correct - A is not correct but R is correct A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

71	1001951	Which of these statements is/are true with respect to available energy as can be described by thermodynamics? (I) Available energy is the maximum portion of energy which could be converted into useful work by ideal process. (II) System drops to a dead state after extraction of available energy (III) Available energy is the maximum portion of energy which could be converted into useful work by real process. Choose the correct answer from the options given below: (I) Only (I) and (II) only (I) and (III) only (II) and (III) only A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

72	1001952		4.0	1.00
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A counterflow double pipe heat exchanger using superheated steam is used to heat the water at a rate of 3 kg/s. The steam enters the exchanger at 180°C and leaves at 130°C. The inlet and exit temperatures of water are 30°C and 80°C, respectively. Calculate the heat transfer area required. Take $U = 820 \text{ W/m}^2\text{K}$, $C_{p,\text{Water}} = 4.187 \text{ kJ/kgK}$.

1. 7.66 m²
2. 8.41 m²
3. 9.85 m²
4. 6.77 m²

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

73	1001953	Given below are two statements: Statement (I): Thermal Conductivity is always higher in the purest form of a metal. Statement (II): A fin is an attachment that protrudes from the surface of a large body dissipating heat to the surroundings. In light of the above statements, choose the <i>most appropriate</i> answer from the options given below. 1. Both Statement (I) and Statement (II) are true. 2. Both Statement (I) and Statement (II) are false. 3. Statement (I) is true but Statement (II) is false. 4. Statement (I) is false but Statement (II) is true.	4.0	1.00
		A1 : 1 A2 : 2 A3 : 3 A4 : 4		

Objective Question

74	1001954	What are modes of heat transfer in evaporators? (I) Conduction (II) Convection (III) Radiation Choose the correct answer from the options given below: 1. (I) Only 2. (I) and (II) only 3. (I) and (III) only 4. (II) and (III) only	4.0	1.00

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

75 1001955

4.0

1.00

Match **List-I** with **List-II**

List-I	List-II
(A). Zeroth Law of Thermodynamics	(I). Entropy
(B). First Law of Thermodynamics	(II). Absolute Entropy
(C). Second Law of Thermodynamics	(III). Temperature
(D). Third Law of Thermodynamics	(IV). Internal Energy

Choose the **correct** answer from the options given below:

- (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
- (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
- (A) - (I), (B) - (III), (C) - (IV), (D) - (III)
- (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

76 1001956

4.0

1.00

Find the mass of ice required to lower the temperature of 500 g of water at 20°C to water at 0°C. Given, Specific latent heat of ice is 336 J/g, the Specific heat capacity of water is 4.2 J/ g°C.

- 225 g
- 125 g
- 100 g
- 250 g

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

77 1001957

4.0 1.00

Arrange the following in decreasing order of efficiency when maximum pressure is kept constant along with constant heat input

- A. Diesel Cycle
- B. Dual Combustion Cycle
- C. Otto Cycle

Choose the **correct** answer from the options given below:

- 1. C, B, A
- 2. A, B, C
- 3. B, A, C
- 4. C, A, B

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

78 1001958

4.0 1.00

Match **List-I** with **List-II**

List-I	List-II
(A). Latent Heat	(I). 1°C
(B). Diffusion Coefficient	(II). W/mK
(C). Mass Fraction	(III). J/kg
(D). Thermal Conductivity	(IV). m^2/s

Choose the **correct** answer from the options given below:

- 1. (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
- 2. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
- 3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
- 4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

		A2 : 2		
		A3 : 3		
		A4 : 4		

Objective Question

79	1001959	Out of the following, identify the reasons for the selection of stainless steel as a material of construction for the fabrication of food processing equipments. (I) It is corrosion resistant and durable material (II) Can be polished to smooth surface and good appearance (III) Weldability to produce seamless equipment Choose the correct answer from the options given below: 1. (I), (II) only 2. (I) only 3. (I), (II) and (III) 4. (II), (III) only A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

80	1001960	Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R). Assertion (A) : Dissimilar metals in immediate contact or connected by a conductive path should be used only when the functional design or other imp considerations render them unavoidable. Reason (R) : Appropriate shape to the component, the concentration of stresses due to loading, the surface conditions and precautions in fabrication will help to prevent corrosion. In light of the above statements, choose the correct answer from the options given below. 1. Both (A) and (R) are true and (R) is the correct explanation of (A). 2. Both (A) and (R) are true but (R) is NOT the correct explanation of (A). 3. (A) is true but (R) is false. 4. (A) is false but (R) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question				
81	1001961	Perfering design with dished shape instead of flat head is a corrosion control method of 1. Material Selection 2. Engineering design of component 3. Anodic and cathodic protection 4. Control of process environment A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
82	1001962	For a pressure vessel to be classified under 'thick' shell vessel, the ratio of its diameter to wall thickness is 1. < 10 2. > 10 3. > 20 4. < 20 A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
83	1001963	UFPV stands for 1. Uniform Force Pressure Vessel 2. Unified Fixed Pressure Vessel 3. Unfired Pressure Vessel 4. Unfilled Pressure Vessel A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				

84	1001964	Heat exchangers with floating head are used for the 1. Heat transfer between corrosive fluids 2. Cases where temperature difference between the shell and the tubes is more ($>50^{\circ}\text{C}$) 3. Co-current heat transfer systems 4. Counter-current heat transfer systems A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

85	1001965	Vortex formation during agitation process can be avoided by providing 1. Baffles 2. More number of blades 3. Higher speed of agitation 4. Turbine type of agitator A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

86	1001966	The methods of design of pressure vessel are primarily based on 1. Elastic analysis 2. Thermal analysis 3. Shear forces analysis 4. Factor of safety A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

87	1001967		4.0	1.00
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Match **List-I** with **List-II**

List-I	List-II
(A). Air conditioning	(I). Reducing temperature below the surrounding temperature
(B). Cooling	(II). Bringing temperature down near freezing temperature
(C). Chilling	(III). Reducing temperature
(D). Refrigeration	(IV). Control of environmental conditions

Choose the **correct** answer from the options given below:

1. (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
2. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

88 1001968

The correct sequence of components of a VCRS refrigeration system in the direction of the flow of refrigerant starting with the moving part is

- A. Evaporator
- B. Condenser
- C. Expansion Valve
- D. Compressor

Choose the **correct** answer from the options given below:

1. A, B, C, D
2. D, B, C, A
3. B, A, D, C
4. C, B, D, A

A1 : 1

A2 : 2

A3 : 3

4.0 1.00

		A4 : 4		
Objective Question				
89	1001969	Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R). Assertion (A) : Subcooling is always desirable to reduce the operating cost of the refrigeration system. Reason (R) : The sub-cooling of the refrigerant increases the refrigerating effect per kg of refrigerant circulated in the system without any change in the work of compression. In light of the above statements, choose the correct answer from the options given below. - Both (A) and (R) are true and (R) is the correct explanation of (A). - Both (A) and (R) are true but (R) is NOT the correct explanation of (A). (A) is true but (R) is false. (A) is false but (R) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
90	1001970	Given below are two statements: Statement (I): The Bypass factor of the coil increases as the velocity of air through the coil increases. Statement (II): The Bypass factor of the coil decreases as the number of rows in the flow direction increases. In light of the above statements, choose the most appropriate answer from the options given below. - Both Statement (I) and Statement (II) are true. - Both Statement (I) and Statement (II) are false. - Statement (I) is true but Statement (II) is false. - Statement (I) is false but Statement (II) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
91	1001971		4.0	1.00

If $td_1 = 44^\circ\text{C}$, $td_2 = 26^\circ\text{C}$ and $td_3 = 19^\circ\text{C}$; Find the contact factor for cooling coil?

1. 0.12
2. 0.72
3. 0.78
4. 0.18

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

92 1001972

4.0 1.00

Given below are two statements:

Statement (I): Vapour absorption refrigeration systems using water-lithium bromide operate under vacuum.

Statement (II): Vapour absorption refrigeration systems using water-lithium bromide are used in large air conditioning systems.

In light of the above statements, choose the *most appropriate* answer from the options given below.

1. Both Statement (I) and Statement (II) are true.
2. Both Statement (I) and Statement (II) are false.
3. Statement (I) is true but Statement (II) is false.
4. Statement (I) is false but Statement (II) is true.

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

93 1001973

4.0 1.00

Which of the following statements can be classified as refrigeration

(I) Maintaining a closed space at a temperature of 100 F when surroundings are at a temperature 50 °C

(II) Reducing the temperature of a body from 50 °C to 40 °C when the surrounding temperature is 35 °C.

(III) Reducing the temperature of a food item in open atmospheric conditions from some initial temperature to 15 °C when the surrounding temperature is 0 °C.

(IV) Decreasing the temperature of a room from 37 °C to 20 °C when the outdoor temperature is 40 °C.

Choose the **correct** answer from the options given below:

1. (I), (III) and (IV) only
2. (II) and (IV) only
3. (II), (III) and (IV) only
4. (I), (II), (III) and (IV)

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

94	1001974	Arrange the following in order of their increasing numerical values A) Effective energy ratio for heating by a heat pump B) COP of simple VCRS C) Overall COP of simple VARS Choose the correct answer from the options given below: 1. A, B, C 2. C, B, A 3. B, C, A 4. C, A, B A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

95	1001975		4.0	1.00
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		Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R). Assertion (A) : Operation of the refrigeration plant at higher condensing temperature/pressure is not desirable. Reason (R) : Higher condensing temperature/pressure adversely affects the COP of the system as refrigerating effect decreases and work of compression increases. In light of the above statements, choose the correct answer from the options given below. - Both (A) and (R) are true and (R) is the correct explanation of (A). - Both (A) and (R) are true but (R) is NOT the correct explanation of (A). (A) is true but (R) is false. (A) is false but (R) is true. A1 : 1 A2 : 2 A3 : 3 A4 : 4		
Objective Question				
96	1001976	Centrifugal pumps are used for - Large discharge through large heads - Small discharge through large heads - Large discharge through smaller heads - Small discharge through small heads A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
97	1001977		4.0	1.00

Which of the following statements are 'TRUE'

- A. In freezing, the heat of fusion is removed
- B. Osmotic changes of cell fluids happening during freezing
- C. Supercooling yields better-quality foods
- D. Shape of temperature -time curve during freezing varies with product composition

Choose the correct answer from the options given below:

- 1. A,B,C only
- 2. A,B,C,D
- 3. A,C,D only
- 4. A,B only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

98	1001978	Example of ideal solid material 1. Gold 2. Steel 3. Copper 4. Silver A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

99	1001979		4.0	1.00
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Which of the following statements are 'TRUE'

- A. Plank's equation considers only the phase change period during the freezing process.
- B. The economics of freeze drying is determined by the efficiency of the condenser
- C. Freeze concentration of liquid foods involves fractional crystallization of water to ice and removal of ice
- D. In freeze concentration, the degree of concentration is lower than the membrane processes

Choose the correct answer from the options given below:

- 1. A,B,C,D
- 2. A,B,C only
- 3. A,B only
- 4. A only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

100	1001980	Frosting on the sides of the cake does not fall off because of its 1. Newtonian nature 2. Yield stress 3. Bingham nature 4. Pseudoplastic nature A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

101	1001981		4.0	1.00
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Match List-I with List-II

List I	List II
A. Creep	I. Normal stress due to forces directed away from the plane on which they act
B. Resilience	II. Stress component tangential to the plane on which the forces act
C. Shear stress	III. Capacity of material to store strain energy in the elastic range
D. Tensile stress	IV. Deformation with time when the material is suddenly subjected to a dead load

Choose the correct answer from the options given below:

1. A-III, B-IV, C-I, D-II
2. A-IV, B-III, C-II, D-I
3. A-IV, B-III, C-I, D-II
4. A-III, B-IV, C-II, D-I

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

102	1001982	Given below are two statements : Statement I: Drying curve is the plot of drying rate verses moisture content Statement II: Moisture sorption isotherm is the plot between moisture content and % relative humidity In light of the above statements, choose the correct answer from the options given below - Both Statement I and Statement II are true - Both Statement I and Statement II are false - Statement I is true but Statement II is false - Statement I is false but Statement II is true A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

1031001983

4.01.00

Match List-I with List-II

List I	List II
A. Jet condenser	I. BPE
B. Surface condenser	II. Mixed type
C. Dühring rule	III. Non-mixed type type
D. Raoult's law	IV. Vapour pressure

Choose the correct answer from the options given below:

1. A-III, B-II, C-I, D-IV

2. A-II, B-III, C-I, D-IV

3. A-II, B-III, C-IV, D-I

4. A-III, B-II, C-IV, D-I

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

104	1001984		4.0	1.00
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Which of the following statements are 'TRUE'

- A. Air conditioning is an example of sensible cooling
- B. During air conditioning, humidity ratio decreases
- C. In an evaporative cooler, cooling and dehumidification happens
- D. During the working of an evaporative cooler, relative humidity increases

Choose the correct answer from the options given below:

- 1. A,B,C,D
- 2. A,C only
- 3. A,C,D only
- 4. B,D only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

105	1001985	Given below are 2 statements. one is labelled as Assertion (A) and other one is labelled as reason (R) Assertion (A) : High solute concentration reduces the rate of moisture movement during drying Reason (R) : High solute concentration increases the viscosity In light of the above statements, choose the most appropriate answer from the options given below 1. Both A and R are correct and R is the correct explanation of A 2. Both A and R are correct but R is NOT the correct explanation of A 3. A is correct but R is not correct 4. A is not correct but R is correct A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

106	1001986		4.0	1.00
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		Most commonly used vapour separator in milk evaporator is 1. Helical baffle type 2. Inverted U type 3. Centrifugal type 4. Spiral type A1 : 1 A2 : 2 A3 : 3 A4 : 4		
Objective Question				
107	1001987	In a vacuum dryer, heat transfer occurs by 1. Conduction and convection 2. Conduction and radiation 3. Conduction only 4. Radiation only A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
108	1001988	Heart of microwave oven is 1. Magnetron 2. Oven cavity 3. Wave guide 4. Power source A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
109	1001989		4.0	1.00

		The film with highest water vapour transmission rate is 1. Nylon 6 2. EVOH 3. PS 4. LDPE A1 : 1 A2 : 2 A3 : 3 A4 : 4		
Objective Question				
110	1001990	Detector film method is used to determine 1. Odour barrier properties of film 2. Water vapour transmission rate of film 3. Permeability of film 4. Oil barrier properties of film A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
111	1001991	The driving force for dialysis is 1. Concentration difference 2. Voltage difference 3. Pressure difference 4. Temperature difference A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
Objective Question				
112	1001992		4.0	1.00

Match List-I with List-II

List I	List II
(Membrane filtration)	(Pressure)
A. Microfiltration	I. 1-10 bar
B. Ultrafiltration	II. 0.2-5 bar
C. Nanofiltration	III. 10-150 bar
D. Reverse osmosis	IV. 5-10 bar

Choose the correct answer from the options given below:

- 1. A-II,B-IV,C-I,D-III
- 2. A-II,B-I,C-IV,D-III
- 3. A-I,B-II,C-IV,D-III
- 4. A-II,B-III,C-I,D-IV

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

113 1001993

4.0 1.00

Arrange the foods in the decreasing order of water activity

- A. Jam
- B. Bread
- C. Cookies
- D. Dried fruit
- E. Aged Cheddar

Choose the correct answer from the options given below

- 1. E, B, A, D, C
- 2. B, E, A, D, C
- 3. B, E, D, A, C
- 4. E, B, D, A, C

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

114	1001994	Given below are 2 statements. one is labelled as Assertion (A) and other one is labelled as reason (R) Assertion (A) : Dynamic characteristics of an instrument are crucial in determining its response time to changes in the measured quantity. Reason(R) : Dynamic characteristics refer to the ability of an instrument to follow rapid changes in the measured quantity over time. In light of the above statements, choose the most appropriate answer from the options given below - Both A and R are correct and R is the correct explanation of A - Both A and R are correct but R is NOT the correct explanation of A - A is correct but R is not correct - A is not correct but R is correct A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

115	1001995	Which of the following statements are true regarding flow transducers? Statement 1: Flow transducers are devices used to measure the rate of fluid flow in a system. Statement 2: Thermal flow transducers operate based on the principle of heat transfer between a heated element and the flowing fluid. Statement 3: Positive displacement flow transducers are suitable for measuring low flow rates accurately. Statement 4: Ultrasonic flow transducers rely on the Doppler effect to measure fluid flow velocity. 1,2,4 only 1,2,3 only 1,2,3,4 1,2 only A1 : 1 A2 : 2 A3 : 3 A4 : 4	4.0	1.00
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Objective Question

116	1001996		4.0	1.00
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Which of the following statements are true regarding recording devices?

Statement 1: Recording devices capture and store data over time, providing a graphical representation of the measured variables.

Statement 2: Chart recorders are mechanical devices that use pens to draw on paper charts to record data.

Statement 3: Data loggers are electronic devices capable of recording and storing data digitally for later analysis.

Statement 4: Strip chart recorders are suitable for applications where continuous monitoring and real-time data display are essential.

1. 2,3,4 ONLY

2. 1,2,3 ONLY

3. 2,3 ONLY

4. 1,2,3,4

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

117 1001997

4.0 1.00

Arrange the following steps in the correct sequence for implementing automatic process control:

Step 1: Measurement of process variables using sensors.

Step 2: Comparison of measured variables with desired setpoints.

Step 3: Adjustment of control parameters based on feedback signals.

Step 4: Actuation of control elements to regulate the process.

Step 5: Monitoring and analysis of process performance.

1. 1 - 2 - 4 - 3 - 5

2. 1 - 3 - 2 - 4 - 5

3. 5 - 1 - 2 - 3 - 4

4. 1 - 2 - 3 - 4 - 5

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

118 1001998

4.0 1.00

Which of the following statements are true regarding humidity transducers?

Statement 1: Humidity transducers measure the moisture content in the air or gas.

Statement 2: Capacitive humidity transducers operate based on the change in capacitance due to the absorption of moisture by a dielectric material.

Statement 3: Resistive humidity transducers utilize the change in resistance of a sensing element in response to variations in humidity.

Statement 4: Humidity transducers are not affected by temperature changes in the environment.

1. 1,2,3 only

2. 1,2 only

3. 1,3 only

4. 1,4 only

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

119 1001999

4.0 1.00

Arrange the following continuous control modes used in control system of instrumentation in the correct sequence based on their algorithm complexity / operational principles:

Mode 1: Proportional Control

Mode 2: Integral Control

Mode 3: Derivative Control

1. Proportional Control → Integral Control → Derivative Control

2. Integral Control → Derivative Control → Proportional Control

3. Derivative Control → Integral Control → Proportional Control

4. Derivative Control → Proportional Control → Integral Control

A1 : 1

A2 : 2

A3 : 3

A4 : 4

Objective Question

120 1002000

4.0 1.00

Given below are 2 statements. one is labelled as Assertion (A) and other one is labelled as reason (R)

Assertion (A) : The static characteristics of an instrument play a crucial role in determining its accuracy and precision.

Reason (R) : Static characteristics describe the behaviour of an instrument under constant operating conditions, including its sensitivity, linearity, and hysteresis.

In light of the above statements, choose the most appropriate answer from the options given below.

1. Both A and R are correct and R is the correct explanation of A.
2. Both A and R are correct but R is NOT the correct explanation of A.
3. A is correct but R is not correct.
4. A is not correct but R is correct.

A1 : 1

A2 : 2

A3 : 3

A4 : 4