Total No. of Questions : 4]

P4674

SEAT No. :

[Total No. of Pages : 2

[5822]-101 F.Y.B.Sc. MATHEMATICS MT-111 : Algebra (2019 Pattern) (Semester - I) (11111)

Time : 2 Hours]

[Max. Marks : 35

[5]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.

Q1) Attempt any five of the following.

- a) Find g.c.d. of 35 and 49.
- b) Define equivalence relation on z.
- c) Let $f : \mathbb{R} \to \mathbb{R}$, $g : \mathbb{R} \to \mathbb{R}$ defined as f(x) = x + 1 and $g(x) = x^2$, find fog.
- d) If w is a cube root of unity then find the value of $1 + w + w^2$.
- e) Is $R_1 = \{(1, 1), (1, 2), (2, 2), (3, 3), (4, 4), (2, 1), (2, 3)\}$ reflexive relation on the set $A = \{1, 2, 3, 4\}$? Justify?
- f) Find the value of $\overline{100}$ in Z_3 .
- g) Find the modulus of $z = 1 + \sqrt{3}\hat{z}$.
- **Q2**) A) Attempt any one of the following.
 - i) State and prove De-Moivre's theorem for an integer indices.
 - ii) Prove that there are n distinct residue classes modulo n in integer.

P.T.O.

[5]

- B) Attempt any one of the following.
 - a) Find the g.c.d. 'd' of integers 357 and 2210 and express d = 2210x + 357y for some $x, y \in z$.
 - b) Find the remainder of 7^{486} when divided by 13.
- Q3 A) Attempt any one of the following. [5]
 - a) Prove that every partition of non empty set X defines an equivalence relation on X.
 - b) Prove that any two equivalence classes are either identical or disjoint.
 - B) Attempt any one of the following. [5]
 - a) If a, b, c are integers such that a|bc and (a, b) = 1 then show that a|c.
 - b) Which elements of z_6 satisfies $x^2 = x$?
- Q4) A) Attempt any one of the following.
 - a) Let $z_1, z_2 \in c$ then prove that $|z_1 + z_2| \le |z_1| + |z_2|$
 - b) State and prove Euclid's lemma.
 - B) Attempt any one of the following. [5]
 - a) Find the expression for $\cos^5\theta$ in terms of cosine of multiple of θ .
 - b) Express z = 1 + i in polar form.

\bigcirc \bigcirc \bigcirc

[5]

[5822]-102 F.Y. B.Sc. MATHEMATICS MT - 112 : Calculus - I (CBCS) (2019 Pattern) (Semester - I) (Paper - II) (11112)

Time : 2 Hours] Instructions to the candidates: [Max. Marks : 35

[Total No. of Pages : 3

SEAT No. :

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- **Q1)** Attempt any <u>Five</u> of the following:
 - a) Determine the set A = $\left\{ x \in \mathbb{R} / x < \frac{1}{x}, x > 0 \right\}$.
 - b) Find first four terms of the sequence (x_n) where $x_n = \frac{1}{n(n+1)}$.
 - c) Define monotone sequence of real numbers.

d) Find domain of the function $f(x) = \frac{1}{x-3}$.

- e) State boundedness theorem for continuous function on an interval.
- f) At what points the function $f(x) = \frac{x}{(x-2)(x-4)}$ is discontinuous?

Q2) a) Attempt any one of the following:

- i) State and prove triangle inequality for real numbers. Hence, prove that $|a-b| \ge ||a| |b||$, for all $a, b \in \mathbb{R}$.
- ii) Define limit of sequence of real numbers and prove that if limit of sequence exists then it is unique.

[5]

[6]

b) Attempt any <u>one</u> of the following:

i) Evaluate:
$$\lim_{n \to \infty} \frac{2n^2 + 3}{5n^2 + 1}$$
.

ii) Discuss the continuity of the function f(x) at origin,

where
$$f(x) = \frac{e^{1/x}}{1 + e^{1/x}}$$
; for $x \neq 0$
= 0 ; for $x = 0$

- *Q3*) a) Attempt any <u>one</u> of the following:
 - i) Show that the sequence (x_n) defined by $x_1=1$ and $x_{n+1} = \sqrt{2 + x_n}, \forall n \in N$ is monotonic and bounded.
 - ii) Find the values of α and β , if the function f(x) is continuous in (-3, 3) where, $f(x) = x + \alpha$; -3 < x < 0 $= 2x + 1; \quad 0 \le x > 2$ $= \beta - x; \quad 2 \le x < 3$
 - b) Attempt any <u>one</u> of the following:

i) Find the infimum and supremum of the set $S = \left\{ 1 - \frac{(-1)^n}{n} / n \in N \right\}.$

ii) Let $f : A \to \mathbb{R}$ and *c* be the cluster point of A. If $\lim_{x \to c} f(x) = L$ and the sequence (x_n) converges to '*c*' such that $x_n \neq c$, for all $n \in N$ then prove that $(f(x_n))$ converges to L.

Q4) a) Attempt any one of the following: [6]
i) State squeeze theorem and hence show that
$$\lim_{x \to 0} x \cdot \cos\left(\frac{1}{x}\right) = 0.$$

[5822]-102 2

[6]

[4]

- Let $f: I \to \mathbb{R}$ be continuous on I = [a, b]. If $K \in \mathbb{R}$ satisfies ii) f(a) < K < f(b) then prove that there exist a point $c \in I$ between a and b such that f(c) = K.
- Attempt any <u>one</u> of the following: b)
 - If $A \subseteq \mathbb{R}$ and $f : A \to \mathbb{R}$ has limit at $x = c \in \mathbb{R}$, then prove that *f* is i) bounded on some neighbourhood of 'c'.

[4]

 + R. If,

 (f+g and f·g a)

 Let $A \subseteq \mathbb{R}$ and $f, g: A \to \mathbb{R}$. If f and g are continuous functions ii) at $c \in A$ then prove that f+g and $f \cdot g$ are also continuous functions at



Total No. of Questions : 5]

P4676

[5822]-103

F.Y. B.Sc. (Physics)

PHY - 111 : MECHANICS AND PROPERTIES OF MATTER (CBCS 2019 Pattern) (Semester - I) (Paper - I) (2 Credits) (11121)

Time : 2 Hours]

Instructions to the candidates:

- **1**) Que. 1 is compulsory.
- 2) Solve any three questions from Que. 2 to Que. 5.
- Questions 2 to 5 carry equal marks. 3)

Q1) Solve any five of the following.

- State Newton's First law of motion. a)
- State work-energy theorem. b)
- Give physical significance of Reynold's number. c)
- d) What is surface Tension. Give its CGS unit.
- A 3 cm long copper wire is streched to increase its length by 0.3 cm. e) Find the longitudinal strain produced in the wire.
- Force of 5 Nacts on a body of weight 9.8N. What is acceleration f) produced?

Q2) a)	i)	Define Youn'g modulus, bulk modulus and Poission's ratio.	[3]
	ii)	Calculate the workdone by constant force.	[3]

b) The position of a particle moving along straight line is given by, $x = 5t^3 - 2t^2 + 4$. Find, Average acceleration between $t = 2 \sec and t = 4 \sec a$. [4]

Q3) a)	i)	What is gravitational force? Give its properties.	[3]
	ii)	Show that in any type of strain workdone per unit volume	is equal
		to $\frac{1}{2} \times$ stress \times strain.	[3]

b) What will be workdone in blowing a soap bubble of radius 2cm, the surface tension of soap solution is 0.035 N/m? [4]

[5]

[3]

P.T.O.

[Total No. of Pages : 2

[Max. Marks : 35]

SEAT No. :

- *Q4*) a) If Y, *n* & K represent Young's modulus, modulus of rigidity & bulk modulus respectively then prove that $\frac{9}{Y} = \frac{3}{n} + \frac{1}{K}$. [6]
 - b) Calculate Poission's ratio for aluminium, if Young's modulus of aluminium is 7×10^{10} N/m² and modulus of rigidity is 2.5×10^{10} N/m². [4]

Q5) Write short notes on any four of the following. [10]

a) Describe in detail Jaeger's method to determine surface tension of a liquid.

- b) Distinguish between conservative force and non-conservative force.
- c) Give any five applications of elasticity.
- d) Obtain the relation between volume strain and longitudinal strain.
- e) Obtain equation of continuity.
- f) What is electromagnetic force? Give its properties.

Total No. of Questions : 5]

P4677

[5822]-104

F.Y. B.Sc.

PHYSICS

PHY - 112 : Physics Principles and Applications (CBCS 2019 Pattern) (Semester - I) (Paper - II) (11122)

Time : 2 Hours]

Instructions to the candidates:

- 1) Q.1 is compulsory.
- Solve any three questions from Q.2 to Q.5. 2)
- 3) *Questions 2 to 5 carry equal marks.*
- 4) Figures to right indicates full marks.

Q1) Attempt any five of the following.

- What is stimulated emission? a)
- Give any two properties of ionic bond. b)
- The radius of first Bohr orbit is 0.52A°. Calculate radius of 2nd (second) c) Bohr orbit.
- What do you mean by photon? d)
- What are different types of solar cell? e)
- What is the frequency of a wave with a wavelength of 200 cm? f)
- Draw energy level diagram of hydrogen atom and hence explain Lyman *Q2*) a) and Balmer Series. [6]
 - [4] Explain in brief the characteristics of a laser beam. b)
- What is X-ray radiography? State its applications. *O3*) a) [6]
 - The vibration frequency for a diatomic molecule HF is 1.24×10^{14} Hz. b) The mass of hydrogen atom and fluorine atom are 1.67×10^{-27} kg and 3.15×10^{-26} kg. Find [4]
 - i) Force constant k for the interatomic force,
 - The energies in ground state and first excited state. ii)

[5]

P.T.O.

[Total No. of Pages : 2

[Max. Marks : 35]

SEAT No. :

- *Q4*) a) Explain rotational energy levels of a diatomic molecule. Draw the rotational energy level diagram. [6]
 - b) Given the energy level of 6.624×10^{-18} J imparted an electron stream by X-ray device. Calculate frequency in MHz and wavelength. [4]
- *Q5*) Write short notes on any four of the following.
 - a) Applications of UV-Radiations.
 - b) Source of Electromagnetic waves.
 - c) Ruby Laser.
 - d) Optical Pumping.
 - e) Absorption spectrum.
 - f) Ruther Ford's Atomic Model.

HHH

[10]

SEAT No. :

[Total No. of Pages : 2

[Max. Marks: 35

[5822]-105

First Year B.Sc. CHEMISTRY - I

CH - 101 : Physical Chemistry

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11131) (Regular)

Time : 2 Hours]

P4678

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to Question 5 carry equal marks.
- 4) Figures to the right indicates full marks.
- 5) Draw neat diagrams wherever necessary.
- 6) Use of logarithm tables and calculator is allowed.

Q1) Attempt the following (Any Five):

- a) Define the 'exothermic reaction'.
- b) Explain 'Intensive properties'.
- c) What is degree of dissociation?
- d) State the law of mass action.
- e) What is the pH of 0.1 M HNO_3 ?
- f) Calculate the value of C_p when $C_v = 23.846$ J k⁻¹ mole⁻¹ and R = 8.314 J k⁻¹ mole⁻¹.
- *Q2*) a) Attempt the following (Any Two):
 - i) State and explain the types of thermodynamic systems.
 - ii) Derive an equation for relation between reaction quotient and Gibb's free energy.
 - iii) Define Buffer and explain mechanism of 'Basic Buffer'.
 - b) State and explain common ion effect with suitable example. [4]
- Q3) a) Attempt the following (Any Two):

i) Derive
$$k_h = \frac{k_w}{k_b}$$
.

P.T.O.

[6]

[5]

[6]

- ii) State third law of thermodynamics and give its importance.
- iii) Explain types of chemical equilibrium.
- b) Calculate the enthalpy change for the reaction: [4]

 $H_{2(g)} + Cl_{2(g)} \rightarrow 2 HCl_{(g)}$, Given that, the bond energies of H – H, Cl – Cl and H – Cl are 435 kJ mole⁻¹, 242 kJ mole⁻¹, and 431 kJ mole⁻¹ respectively.

- *Q4*) a) Attempt the following (Any Two):
 - i) What is the pH scale? Give the range of pH scale and Justify your answer.
 - ii) Derive the Kirchhoff's equation.
 - iii) Draw the plots of Gibb's free energy against progress of reaction.
 - b) Attempt the following:
 - i) Solubility product of $Fe(OH)_3$ is 1.1×10^{-38} in water calculate the solubility of $Fe(OH)_3$ in mole per litre.
 - ii) Calculate K_c for reaction:

$$\mathrm{NH}_{3(g)} \xleftarrow{1}{2} \mathrm{N}_{2(g)} + \frac{3}{2} \mathrm{H}_{2(g)}$$

 $(\text{Given } [N_2]^{\frac{1}{2}} = 3.1 \times 10^{-2} \text{ mol } L^{-1}, [H_2]^{\frac{3}{2}} = 8.5 \times 10^{-1} \text{ mol } L^{-1},$

$$[NH_3] = 3.1 \times 10^{\circ} \text{ mol } L^{-1}).$$

- *Q5*) Attempt the following (Any Four):
 - a) Write short note on heat of ionization.
 - b) State and explain Le-Chatliers principle.
 - c) Explain the responce of equilibria to concentration.
 - d) What conclusions can be drown about equilibriun constant.
 - e) Explain the hydrolysis of salt of weak acid and weak base.
 - f) Give applications of solubility product.

$$\rightarrow \rightarrow \rightarrow$$

[10]

[6]

[4]

[5822]-106

F.Y. B.Sc.

CHEMISTRY

CH - 102 : Organic Chemistry

(CBCS 2019 Pattern) (Semester - I) (Paper - II) (11132)

Time : 2 Hours]

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Answer any Five of the following:

- a) Define electrophile.
- b) What is chain isomerism?
- c) Define Saytzeff's rule.
- d) Define racemic mixture.
- e) Explain n-pentane boils at higher temperature than neo-pentane.

25

- f) Draw cis and trans isomer of 2-pentene.
- *Q2*) a) Attempt the following:
 - i) Chloroacetic acid is stronger than acetic acid. Explain.
 - ii) What is hydrocarbon? Give classification of hydrocarbons.
 - b) Answer the following:
 - i) Assign R/S configuration of the following compound.



ii) Assign E/Z configuration of the following compound.



[5]

[6]

[4]

[Max. Marks: 35]

[Total No. of Pages : 2

SEAT No. :

Q3)	a)	Atte	mpt t	he following:	[6]
		i)	Exp	lain hyperconjugation effect with suitable example.	
		ii)	Wha	at the action of O_3 on	
			1)	Propene	
			2)	2-butene	
	b)	Ans	wer tl	ne following:	[4]
		i)	Drav	w structural isomers for molecular formula C_5H_{12} .	
		ii)	How	w will you prepare cis-2-butene from 2-butyne.	
<i>04</i>)	a)	Ans	wer tl	ne following:	[6]
		i)	State	e Huckel's rule with suitable examples.	
		ii)	How	will you prepare n-butane from ethyl chloride?	
	b)	Ans	wer tl	ne following:	[4]
		i)	Drav	w resonance structure of phenoxide ion.	
		ii)	Defi	ine the terms -	
			1)	Dihedral angle	
			2)	Specific rotation	
Q5)	Answer any two of the following: [10]		[10]		
	a)	Wha	at is c	onformational isomerism? Discuss conformational isom	nerism
		in et	hane.		
	b)	Defi	ne Ei	rythro and threo isomer. Draw erythro and threo structur	e of
		i)	2, 3	- dibromobutane	

- ii) 2, 3 butane diol
- c) Identify the products:
 - i) $CH_3 CH_2 Mg Br \xrightarrow{H_2O} A$
 - ii) $CH_3 CH = CH_2 \xrightarrow{HBr}_{H_2O_2} A$
 - iii) $CH_3 C \equiv C H \xrightarrow{\text{NaNH}_2} A$
 - iv) $CH_3 CH = CH CH_3 \xrightarrow{alk.}{KMnO_4} A$
 - v) $CH_3 CH_2 C \equiv C^{\ominus} Na^{\oplus} \xrightarrow{CH_3 Br} A$



[5822]-107 First Year B.Sc. BOTANY

BO : 111 : Plant Life and Utilization - I (CBCS 2019 Pattern) (Semester - I) (Paper - I) (11141)

Time : 2 Hours] Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Attempt any three questions from Q. 2 to Q. 5.
- 3) Questions 2 to 5 carry equal marks.
- 4) Figures to right indicates full marks.
- 5) Draw neat labelled diagrams wherever necessary.

Q1) Attempt any five of the following.

- a) What are phanerogams?
- b) Give any one general character of Algae.
- c) What is phycobiont?
- d) What is mycelium?
- e) Give any one general characters of Hepaticae.
- f) Enlist any two-sub-divisions of eumycota proposed by Ainsworth (1973).
- (Q2) a) Describe thallus structure and lateral conjugation in <u>Spirogyra</u>. [6]
 - b) Write any four general characters of dicotyledons. [4]
- Q3) a) Define mycelium? Explain structure of Gill of basidiocarp of <u>Agaricus</u>.[6]
 b) Describe fruticose Lichen. [4]
- (Q4) a) Describe structure of antheridium and archegonium in <u>Riccia</u> [6]
 - b) Write any four utilization of fungi. [4]

P.T.O.

SEAT No. :

[Total No. of Pages : 2

[5]

[Max. Marks : 35

Q5) Write short notes on any four of the following.

- Cell structure of Spirogyra. a)
- b) Algae as fodder.
- Algae as food. c)
- Types of thalli in <u>Agaricus</u>. d)
- Sporophyte of <u>Riccia</u>. e)
- Bryophytes in Medicines. f)



[10]

[5822]-107

SEAT No. :

[Total No. of Pages : 1

P4681

[5822]-108

First Year B.Sc. BOTANY - II

BO - 112 : Plant Morphology and Anatomy (CBCS - 2019 Pattern) (Semester - I) (Paper - II) (11142)

Time Instri	:2	Hours]	[Max. Marks : 35
	1) 2) 3) 4) 5)	Q.1 is compulsory. Attempt any three questions from Q.2 to Q.5. Questions 2 to 5 carry equal marks. Figures to the right indicate full marks. Draw neat labeled diagrams wherever necessary.	
Q1)	At a) b) c) d) e) f)	tempt <u>any five</u> of the following: What is descriptive morphology? Define anatomy. What is aggregate fruit? Write any one function of collenchyma. What is indehiscent fruit? What is acropetal succession?	[5]
Q2)	a) b)	What are vascular tissue? Describe various types of v Write short note on Uniparous cyme.	ascular bundle.[6] [4]
Q 3)	a) b)	What is adelphy? Describe the types of adelphy. Describe stomata in detail.	[6] [4]
Q4)	a) b)	Describe primary internal structure of monocot root with l Define flower. Describe the parts of typical flower.	abeled diagram. [6] [4]
Q5)	W1 a) b) c) d) e) f)	rite short notes on any four of the following: Importance of morphology in plant classification. Motor cells. Compound gynoecium. Mesophyll tissue of Dicot leaf. Legume fruit. Importance of anatomy in pharmacognosy.	[10]



[5822] - 109 F.Y. B.Sc. ZOOLOGY ZO - 111 : Animal Diversity - I (CBCS 2019 Pattern) (Semester - I) (11151)

Time : 2 Hours]

Instructions to the candidates:

- 1) Question No.1 is compulsory.
- 2) Solve any three Questions from Q.No. 2 to Q.No. 5.
- 3) Q2 to Q5 carry equal marks.

Q1) Solve any five of the following.

- a) Define Gamma taxonomy.
- b) Define Metazoa.
- c) Describe Trematoda.
- d) Define Polymorphism.
- e) Give two examples of Protozoa.
- f) Define Regeneration.

Q2) a) Give the salient features of Porifera.

OR

Define the term binomial nomenclature. Add a note on its significance.

- b) Write a note on useful Protozoa <u>Trichonympha</u>. [4]
- Q3) a) With a neat labelled diagram explain the process of conjugation in <u>Paramoecium</u>. [6]

OR

Describe the general characters of Kingdom Animalia.

b) Explain Polymorphism in Cnidaria.

[4]

P.T.O.

[Total No. of Pages : 2

SEAT No. :

[5]

[6]

[Max. Marks : 35

Q4) a	a)	Describe in detail the characters of class Cestoda.	[6]				
		OR					
		Describe the types of Spicules in Sponges.					
ł	b)	Explain in detail the characters of five Kingdoms.	[4]				
Q5) V	Writ	e short notes on any four of the following.	[10]				
6	a)	Morphological adaptation in Platyhelmenthes.					
ł	b)	Class Hydrozoa.					
C	c)	Regeneration in Sponges.					
C	d)	Amoeboid locomotion in Protozoa.					
6	e)	Alpha level of taxonomy.					
f	f)	Economic importance of coral reefs.					

Total No. of Questions : 5]

P4683

SEAT No. :

[Total No. of Pages : 2

[Max. Marks : 35]

[5]

[6]

[5822]-110 F.Y. B.Sc.

ZOOLOGY

ZO - 112 : Animal Ecology (CBCS 2019 Pattern) (Semester - I) (11152)

85

Time : 2 Hours]

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Question No.2 to Question No.5.
- 3) Question No.2 to Question No.5 carry equal marks.

Q1) Solve any five of the following.

- a) Define Eutrophication
- b) Define Food chain
- c) Define Species dominance
- d) Define Secondary Succession
- e) Define Commensalism
- f) Define Predation
- **Q2**) a) Explain in detail terrestrial Ecosystem.

OR

Explain the two types of growth curves.

- b) Explain the concept of Biosphere. [4]
- **Q3**) a) Explain interspecific and intraspecific competition in animals. [6]

OR

Explain the process of Primary Succession.

b) Explain any two examples of Parasitism. [4]

P.T.O.

Q4) a) Explain in brief desert ecosystem. Add a note on different types of deserts.

[6]

OR

Explain the effect of Fecundity and dispersal on Population.

b) Explain the concept of species diversity. [4]

Q5) Write short notes on any four of the following. [10]

- a) Food Web
- b) Mortality
- c) Ecotone and Edge effect
- d) Beneficial association
- e) Decomposers
- f) Gause's principle.

Les.

SEAT No. :

[Total No. of Pages : 1

[5822]-111 F.Y.B.Sc GEOLOGY

GL-111: Fundamentals of Geology and Understanding the Planet Earth (2019 Pattern) (Semester - I) (Paper - I) (11161)

Tim	Time : 2 Hours] [Max. Marks :				
Inst	ructi	ons to the candidates:			
	<i>1</i>)	Qestion no. 1 is compulsory.			
	2)	Solve any three questions from Q.2 to Q.5.			
	3)	Questions No.'s 2 to 5 carry equal marks.			
Q1)) Ar	swer the following in 2-3 lines (any five):	[5]		
	a)	Define structural Geology.			
	b)	What is the name of our galaxy?			
	c)	Define Climate change.			
	d)	Define crust.			
	e)	Define Asthenosphere.			
	f)	Enlist the gaseous products of volcano.			
Q^{2}) Ar	swer the following.			
~	a)	Describe the various products of volcano.	[6]		
	b)	Explain the fold, fault and joint with neat labeled diagram.	[4]		
03) Ar	swer the following			
2°)	, 11 (a)	Describe the structure & composition of lithosphere	[6]		
	h)	Describe the importance of Geological time scale	[4]		
	0)	Deserve the importance of Geological time searc.	[-]		
Q4)) Ar	swer the following.			
	a)	Explain Nebular hypothesis with the help of neat labeled diagram.	[6]		
	b)	Explain the various conditions necessary for fossilization.	[4]		
Q 5)) W1	rite short note on <u>any four</u> of the following.	[10]		
	a)	Petrification.			
	b)	Geological time scale.			
	c)	Carbon dating method.			
	d)	Oceanic crust.			
	e)	Causes of volcano.			
	f)	meteorite.			
	,				
		\diamond \diamond \diamond			

[5822] - 112 First Year B.Sc. GEOLOGY - II

GL - 112T : Mineralogy and Crystallography (2019 Pattern) (Semester - I) (Paper - II) (11162)

Time : 2 Hours]

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to 5 carry equal marks.
- 4) Neat diagrams must be drawn wherever necessary.

Q1) Solve any five of the following.

- a) What is plane of symmetry.
- b) Define covalent bond.
- c) What is isotropic mineral.
- d) Draw cyclosilicate structure of mineral.
- e) What is luminescence.
- f) Define Atoms and Ions.
- **Q2**) Answer the following.
 - a) Explain any six physical properties of mineral. [6]
 - b) Describe the forms of Hexagonal system type Beryl. [4]
- **Q3**) Answer the following.
 - a) Give tabular classification of minerals based on silicate structure. [6]
 - b) Explain process of crystalusation of minerals from solution. [4]

[Max. Marks : 35

[5]

P.T.O.

SEAT No. :

[Total No. of Pages :2

- *Q4*) Anwer the following.
 - a) Define indices of crystal face. Explain Index system of miller. [6]
 - b) Describe the minerals used in manufracturing of paints. [4]

[10]

- Q5) Write short notes on any Four.
 - a) Pseudomorphism.
 - b) Law of rational indices.
 - c) Branches of mineralogy.
 - d) Oridation and supergene enrichment.
 - e) Jolly's spring balance.
 - f) Enlist the factors related to geometrical and electrical stability of mineral.



Total No. of Questions : 4]

P4686

[5822]-113

F.Y. B.Sc.

STATISTICS

ST-111 : Descriptive Statistics-I (2019 Pattern) (Semester - I) (Paper-I) (11171)

Time : 2 Hours] [Max. Marks: 35 Instructions to the candidates: All questions are compulsory. 1) 2) Figures to the right indicate full marks. 3) Use of calculator and statistical table is allowed. *Q1*) A) Choose the correct alternative from each of the following. [1 each] i) The unprocessed data is called_ Raw data b) Secondary data a) c) Processed data d) Formated data The odd order central moments of are zero. ii) Positively skewed distribution a) b) Negatively skewed distribution Symmetric distribution c) Bernoulli distribution d) With the help of ogive curve, one can determine iii) Median a) **b**) Mean Mode d) Geometric Mean c) State whether following statements are true or false. [1 each] B) CSO stands for Central Service Office. i) Honesty is an example of attribute. ii) Q2) Attempt any two of the following. [5 each] Define kurtosis and explain different types of it. a) Distinguish between SRSWR and SRSWOR. b) For two observations a and b arithmetic mean and geometric mean are c)

SEAT No. :

[Total No. of Pages : 2

- Q3) Attempt any two of the following.
 - a) What is box plot. state its uses.
 - If $Q_{AB} = 0$ then prove that (AB)N=(A) (B). b)
 - Compute mean and coefficient of variation for the data given below. c) 54,61,64,69,58,56,49,57,55,50.

Q4) Attempt any one of the following.

- i) Define raw and central moments. Express first four central moments a) in terms of raw moments. [6]
 - [4] ii) Examine the consistency of data: N=100, (A)=30, (B)=80, (AB)=40
- State and prove any two properties of arithmetic mean. b) i) [6]
 - If N=100, (A)=47, (B)=62, (AB)=32 find the coefficient of ii) association between A and B and interpret it. [4]



[5 each]

[10 each]



SEAT No. :

[Total No. of Pages : 2

[5822]-114 F.Y.B.Sc.

STATISTICS

ST-112: Discrete Probability and Probability Distributions - I (CBCS 2019 Pattern) (Semester - I) (Paper-II) (11172)

Time : 2 Hours]

[Max. Marks : 35

[1 each]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of statistical tables and calculator is allowed.
- 4) Symbols have their usual meaning.

Q1) A) Choose the correct alternative for the following:

i) If random variable (r.v.) X follows discrete uniform distribution on 1,2,3,....,10 then mean of X is

a)
$$\frac{9}{4}$$
 b) $\frac{11}{2}$
c) $\frac{9}{2}$ d) $\frac{11}{4}$

ii) If X is discrete r.v. then

a) $E(X^2) \ge [E(X)]^2$	b) $E(X^2) = [E(X)]^2$
c) $E(X^2) \leq [E(X)]^2$	d) $E(X^2) \ge E(X)$

- iii) If $P(A \cap B) = 0$, then the two events A and B are
 - a) exhaustive events
 - b) dependent events
 - c) mutually exclusive events
 - d) independent events
- B) State whether the following statements are true or false: [1 each]
 - i) A discrete r.v. cannot take negative values.
 - ii) The variance of a r.v. is never negative.

- **Q2)** Attempt any **Two** of the following:
 - a) Define moment generating function(m.g.f) of r.v. X. State and prove its additive property.
 - b) Explain with one illustration each of the following.
 - i) Equiprobable sample space.
 - ii) Deterministic experiment.
 - iii) Simple event.
 - c) If X and Y are independent binomial variates with $X \rightarrow B(5,\frac{1}{2})$ and $Y \rightarrow B(8,\frac{1}{2})$ find $p\left[\frac{X+Y}{2} \ge 1\right]$ and P[X+Y=5].
- **Q3)** Attempt any **Two** of the following:
 - a) State and prove Baye's theorem.
 - b) Let $X \to B(n_1, p)$ and $Y \to B(n_2, p)$. Further X and Y are independent. Obtain the conditional distribution of X given X+Y=n.
 - c) The probability mass function(p.m.f.) of a r.v. is

P(X=x) = Kx; x=1,2,3.

= 0; o.w.

Find the value of K and variance of X.

- Q4) Attempt any ONE of the following.
 - a) i) Define partition of sample space [2]
 - ii) State properties of distribution function. [4]
 - iii) Let A and B be two events defined on a sample space Ω such that

$$P(A) = \frac{3}{4}$$
 and $P(B) = \frac{5}{8}$ then show that $\frac{3}{8} \le P(A \cap B) \le \frac{5}{8}$. [4]

- b) i) Derive mean and variance of a discrete uniform distribution. [5]
 - ii) A group of 20 cricket players contains 7 Maharashtrians and remaining non-Maharashtrians. An Indian team of 12 player's is to be formed. What is the probability that one fourth of the players in the team are Maharashtrians? [5]



[5 each]

[5 each]

[5822] - 115 F.Y.B.Sc. GEOGRAPHY - I

Gg - 111 : Introduction to Physical Geography - I (Geomorphology) (2019 CBCS Pattern) (Semester - I) (Paper - I) (11181)

Tim	e : 2 1	lours]	didatoo.	[Max. Marks : 35
Inst	1) 2) 3)	ns to the car All questions Neat diagram Use of map s	adades: s are compulsory. ns must be drawn wherever necessary. stencils is allowed.	
Q1)	Ans	wer the foll	lowing questions in twenty words (Any Five)	[5]
	a)			
	b)	What do y	ou mean by normal fault?	
	c)	What do y	you mean by Gutenburg discontinuity?	
	d)	What is m	eant by plate Boundaries?	
	e)			
	f)	Define Ma	ass Movement.	
Q2)	A)	Explain th	e following in 50 words each (Any Two):	[6]
		a) Com	ponents of earth system.	
		b) Bloc	k mountain.	
		c) Effec	ets of earthquakes.	
	B)	Answer th	ne following questions in two to three sentence	es. [4]
		a) Wha	t do you mean by volcanoes?	
		b) Give	the characteristics of Metamorphic rocks.	

SEAT No. :

[Total No. of Pages :2

<i>Q</i> 3)	A)	Exp	lain the following in 50 words each (Any Two):	[6]			
~ /	,	a)	Evidences of Wegener's Continental Drift Theory.				
		b)	Types of Volcanoes.				
		c)	Types of Mass Movement.				
	B)	Ans	wer the following questions in two to three sentences:	[4]			
		a)	What do you mean by applied geomorphology?				
		b)	What is Earthquake?				
Q4)	Writ	te sho	ort notes on any two of the following:	[10]			
	a)	Nati	Nature of Geomorphology.				
	b)	Тур	Types of folding.				
	c)	Mec	Mechanical weathering.				

Total No. of Questions : 5]

P4689

SEAT No. :

[Total No. of Pages : 2

[5822]-116

F.Y. B.Sc.

GEOGRAPHY

Gg -112 : Introduction to Physical Geography-II (Geography of Atmosphere and Hydrosphere) (2019 CBCS Pattern) (Semester-I) (Paper-II) (11182)

Time	:2	Hours]		[Max. Marks : 35
Instri	ıctio	ons to the	he candidates:	
1	l)	Questi	on no. 1 is compulsory.	
2	2)	Attemp	ot any three questions from questions No. 2 to 5.	
3	3)	Questi	ons No. 2 to 5 carry equal marks.	
4	4)	Use of	map stencils is allowed.	
Q1)	An	swer tl	he following questions in 20 words (Any Five)	[5]
	a)	Defi	ine the term 'Atmosphere'.	
	b)	Wha	at is insolation?	
	c)	Wha	at do you mean by conduction?	
	d)	Defi	ne planetary winds.	
	e)	Wha	at do you mean by monsoon winds?	
	f)	Defi	ne hydrological cycle?	
Q2)	a)	Ans	wer the following questions in 100 words (Any Two) [6]
		i)	Describe the elements of weather and climate.	
		ii)	Describe 'Polar winds'.	
		iii)	State the causes of Tides.	
	b)	Ans	wer the following questions in 150 words (Any One	·) [4]
		i)	Describe any four factors affecting on the horizonta temperature.	l distribution of
		ii)	Describe the concept of pressure gradiant.	

Q3)	a)	Ansv	wer the following questions in 100 words (Any Two)	[6]
		i)	Explain the water vapour as a component of earth atmosphere.	
		ii)	Discuss sub-tropical high pressure belts on the earth.	
		iii)	Explain effect of ocean currents.	
	b)	wer the following questions in 150 words (Any One)	[4]	
		i)	Explain the concept of 'Lapse rate'.	
		ii)	Describe 'Antitrade winds.	
04)	a)	Ansv	wer the following questions in 100 words (Any Two)	[6]
~ /		i)	Describe the ozonosphere of earth atmosphere.	
		ii)	Describe the equatorial low pressure belt.	
		iii)	Describe 'albedoof the earth'.	
	b)	Ansv	wer the following questions in 150 words (Any One)	[4]
		i)	Describe the Gaseous component of earth atmosphere.	
		ii)	Explain the vertical distribution of temperature.	
Q5)	Writ	e sho	rt notes on the following (Any Four)	10]
~	a)	Strat	tosphere.	
	b)	Heat	t budget of the earth.	
	c)	Sout	h-West monsoon winds.	
	d)	Mou	intain winds.	
	e)	Cont	tinental shelf.	
	f)	Туре	es of ocean currents.	

* * *

Total No. of Questions : 5]

P4690

SEAT No. :

[Total No. of Pages : 2

[5822]-117

F.Y. B.Sc.

MICROBIOLOGY

MB - 111 : Introduction to Microbial World (2019 Pattern) (CBCS) (Semester - I) (Paper - I) (11191)

Time : 2 Hours]

Instructions to the candidates:

- Q.1 is compulsory. 1)
- 2) Solve any three questions from Q.2 to Q.5.
- Questions 2 to 5 carry equal marks. 3)

Q1) Solve any five of the following:

- What was Aristotle's notion? a)
- **b**) Name any two plant pathogens.
- Name any two food borne diseases. c)
- d) Carl Woese classified bacteria based on _____.
- e) State True or False : Actinomycetes are filamentous bacteria.
- Name any two solvents produced by industrial fermentation. f)
- Describe Any three of the following: *Q2*) a)
 - i) Koch's Postulates.
 - Edward Jenner's contribution. ii)
 - Five domain system of classification. iii)
 - Role of Probiotics in human health. iv)
 - Explain in detail Antony Van Leewenhoek's contributions in Microbiology. **b**) [4]

P.T.O.

[5]

[6]

[Max. Marks : 35]

Q3)	a)	Exp	lain Any three of the following: [6]
		i)	Discovery of penicillin.	
		ii)	Human Microbiome.	
		iii)	Differentiating characters of Algae.	
		iv)	Any two bacterial diseases with causative agent.	
	b)	Expl	lain in detail contributions of Martinus Beijerinck in Microbiology.[[4]
Q4)	a)	Disc	cuss any three of the following: [6]
		i)	Role of contaminants in Industrial fermentation.	
		ii)	Components of first line of defense mechanisms.	
		iii)	Swan neck flask experiment.	
		iv)	The use of biocontrol agents in agriculture.	
	b)	Writ	te differentiating characters of Eubacteria.	4]
Q5)	Writ	e sho	ort notes on any four of the following: [1	0]
	a)	Disc	covery of viruses.	
	b)	Cha	racters of Protozoa.	
	c)	Prio	ns.	
	d)	Eutr	ophication.	
	e)	Use	of vaccines.	
	f)	Disc	covery of Streptomycin.	

 \rightarrow \rightarrow \rightarrow

[5822]-118 F.Y. B.Sc. MICROBIOLOGY

MB-112: Basic Techniques in Microbiology (2019 Pattern) (Semester-I) (CBCS) (Paper-II) (11192)

Time : 2 Hours]

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5
- 3) Questions 2 to 5 carry equal marks.
- *Q1*) Solve any five of the following.
 - a) Name the method used for flagella staining.
 - b) $1 \text{ ml} = ___ \mu \text{l}$
 - c) Name any two types of condensors used in microscopy.
 - d) Write any one example of biological indicator used to check efficiency of sterilization.
 - e) Define Sterilization.
 - f) Name any two gaseous agents used as disinfectants.
- *Q2*) a) Describe any three of the following.
 - i) Mode of action of U.V. rays.
 - ii) Functions of eye-piece
 - iii) Role of accentuator
 - iv) Applications of Heavy metals as disinfectants
 - b) Name the method used to check efficiency of disinfectant and describe it. [4]

[Total No. of Pages : 2

[Max. Marks : 35]

[5]

[6]

P.T.O.

SEAT No. :

Q3)	a)	Explain any Three of the following.				
		i)	Numerical aperture of compound microscope			
		ii)	Role of mordents in staining			
		iii)	Mode of action of Aldehydes as disinfectants			
		iv)	Applications of Dyes as disinfectants.			
	b)	Dese	cribe spore staining by using any one method.	[4]		
Q4)	a)	cuss any Three of the following.	[6]			
		i)	Write any two applications of phase contrast microscope.			
		ii)	What are acidic stains? write about their role in staining.			
		iii)	Halogens as disinfectants.			
		iv)	Sterilization by millipore filters.			
	b)	b) Describe Acid - Fast Staining				
Q5)	Writ	Vrite Short notes on any Four of the following.				
	a)	Ster	terilization by moist Heat			
	b)	Characteristics of Ideal disinfectants				
	c)	TEM				
	d)	Spherical aberrations				
	e)	Quaternary ammonium compounds used for disinfection				



Total No. of Questions : 5]

P8395

[5822] - 119A

F.Y.B.Sc. (Nanoscience and Nanotechnology) N.S. - 111 : FUNDAMENTALS OF NANOSCIENCE (2019 Pattern) (Semester - I) (Paper - I) (11261)

Time : 2 Hours]

Instructions to the candidate:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Question 2 to 5 carry equal marks.
- 4) Draw neat and labelled diagram wherever necessary.
- 5) Figures to the right indicate full marks.

Q1) Attempt any <u>FIVE</u> of the following.

- a) What is standard?
- b) What is Nanomanufacturing?
- c) What are 'Documentary Standards'?
- d) Give classification of Nanomaterials.
- e) Define 'Bioluminescence'.
- f) Why total surface area of Gecko's Feet is large?

<i>Q2</i>) A)	Attempt any ONE	E of the following.

- a) Explain in detail 'Nanoscopic colours'.
- b) Explain in detail surface plasma resonance.
- B) Explain the term scanning electron micro scope. [4]

<i>Q3</i>) A)	Attempt any <u>ONE</u> of the following.		
	a)	Describe 'Zero-dimensional nanomaterials' with examples.	
	b)	Explain in detail X-ray diffraction method.	

B) Explain in detail quantum confinement (auantum size effect). [4]

[Max. Marks : 35

[5]

[6]

P.T.O.

SEAT No. :

[Total No. of Pages :2
<i>Q4</i>) A)	Attempt any <u>ONE</u> of the following.		
	a)	Explain in detail carbon nanotubes.	
	b)	Explain in detail classification of Nanomaterials.	
B)	Exp	plain the term detail Nanomechanical tool.	[4]

[10]

Q5) Attempt any FOUR of the following.

- Insect wings. a)
- 2D Nanomaterial. b)
- c) Microelectronics.
- d) Nanoplasmonics.
- Bioluminescence. e)
- Bucky Balls. f)

[5822] - 119A

P4693

[5822] - 120

F.Y.B.Sc. (Nano Science & Nanotechnology) NS - 112 : Materials Science (2019 Pattern) (Semester - I) (Paper-II) (11262)

Time : 2 Hours]

Instructions to the candidates:

- 1) Question.1 is compulsory.
- 2) Solve any THREE questions from Q.2 to Q.5.
- 3) Questions.2 to 5 carry equal marks.
- 4) Draw neat labeled diagram wherever necessary.
- 5) Figures to the right indicate full marks.

Q1) Attempt any <u>FIVE</u> of the following.

- a) What is solidus line?
- b) Calculate Miller indices of crystal plane which cut through the crystal axes at (2a, 3b, c).
- c) Define alloy
- d) What is mean by basis?
- e) Define microporosity of material.
- f) What is mean by eutectic point?
- **Q2)** A) Attempt any <u>ONE</u> of the following
 - a) What is atomic radius? obtain an expression of atomic radius for simple cubic & BCC & FCC crystal structure.
 - b) State & explain Gibb's phase rule.
 - B) Explain three dimension crystal structure. [4]

P.T.O.

[Total No. of Pages : 2

[Max. Marks: 35

[5]

[6]

[Total No

SEAT No. :

Q3)	A)	Attempt any <u>ONE</u> of the following. [6]				
		a) Derive an expression for interplaner distance for cubic system.				
	b) Give the classification of bonding in solid in brief.					
	B)	Exp	lain core - shell nano particles in detial.	[4]		
Q4)	A)	Atte	mpt any <u>ONE</u> of the following.	[6]		
		a)	Define solubility limit. With neat labeled diagram explain Cu-Ni pha diagram.	ise		
		b)	Explain porous materials. Also explain types of porous material	s.		
	B)	Exp	lain covalent bond & ionic bond in solids.	[4]		
Q5)	Writ	e a sl	hort note on any <u>FOUR</u> of the following. [1	0]		
	a)	Met	allic soilds.			
	b)	Aero	ogels.			
	c)	Prin	nitive translation vectors.			
	d)	Туре	es of phase diagram.			
	e)	Nun	nber of atoms in unit cell.			
	f)	Brav	vais lattices.			

\$ \$ \$

P4694

[5822]-121

F.Y. B.Sc.

ELECTRONICS SCIENCE

EL - 111 : Basics of Applied Electronics

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11221)

Time : 2 Hours]

[*Max. Marks : 35*]

Instructions to the candidates:

- 1) Q.1 is compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- Questions 2 to 5 carry equal marks. 3)

Q1) Solve any five of the following:

- Evaluate the value of the resister having colour code : Yellow, Violet, a) Brown, Gold.
- List the fuses used in domestic appliances. **b**)
- What is capacitive reactance? c)
- State Kirchoff's current law. d)
- What is GPS feature in smart phone? e)
- Give the two names of Electronic System. f)
- *O2*) a) Answer the following:
 - What are different characteristics of switch? i) [2]
 - State working principle of an inductor. State its specifications & ii) applications in electronics. [4]
 - State & prove maximum power transfer theorem. [4] **b**)

P.T.O.

[Total No. of Pages : 2

[5]

SEAT No. :

- *Q3*) a) Answer the following:
 - i) What is the effective value of two capacitors, if they are connected in series & parallel. [2]
 - ii) What are the ideal current & ideal voltage sources? Explain practical voltage & current source. [4]
 - b) Find Norton's equivalent circuit for the following network. [4]



Q4) a) Answer the following:

i)	State Thevenin's theorem	& explain term	"open circuit voltage"	&
	Equivalent resistance.		[2]

- ii) What is electronic system? Explain any one with example. [4]
- b) What is smart phone system? Discuss its features in brief. [4]

Q5) Write short notes on any four of the followings: [10]

- a) Applications of Electronics.
- b) Inductors.
- c) Thevenin's theorem.
- d) CCTV system.
- e) Public Adress System.
- f) Thermostat.



P4695

[5822]-122

F.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 112 : Electronic Devices & Circuits

(2019 Pattern) (Semester - I) (Paper - II) (11222)

Time : 2 Hours]

Instructions to the candidates:

- 1) Q1 is compulsory.
- 2) Solve any three questions from Q2 to Q5.
- Questions 2 to 5 carry equal marks. 3)

Q1) Solve any five of the following.

- Draw circuit symbol of zener diode. a)
- What is Voltage required at point A in the following circuit to make diode b) (Si) ON?



- State relation between $\alpha \& \beta$ of a transistor. c)
- BJT is called current controlled device comment. d)
- Why Si & Ge are not used in fabrication of LED? e)
- Draw circuit symbol of optocoupler. f)
- *Q2*) a) i) Give circuit symbol of LDR & phototransistor. [2]
 - Draw circuit diagrams of forward & reverse bias p-n function & ii) explain its working. [4]
 - In the following circuit of $\alpha = 0.96$, calculate collector emitter voltage & b) [4] base current.



[Max. Marks: 35

[5]

P.T.O.

SEAT No. :

[Total No. of Pages : 2

- *Q3*) a) Draw circuit diagram to study I-V characteristics of FET. [2] i) Describe working of zener diode as voltage regulator. ii) [4] Explain working of photodiode with suitable circuit. b) [4] *Q4*) a) Draw circuit diagram of full wave rectifier. [2] i) Explain working of MOSFET as switch. [4] ii) Describe application of LDR in street light controller. b) [4]
- *Q5*) Attempt any four of the following.

[10]

- a) Define rectifier compare efficiency & ripple factor of half and full wave rectifier.
- b) Discuss effect of temp on current in reverse bias diode.
- c) Define junction capacitance. How it varies with voltage.
- d) Explain working of BJT as switch.

- e) Draw circuit diagram of single stage transistor amplifier.
- f) Describe use of LED as an indicator in 5V regulated power supply.

жжж

SEAT No. :

[Total No. of Pages : 1

P4696 [5822]-123 First Year B.Sc. **PSYCHOLOGY PSY - 111 : Foundations of Psychology** (2019 Pattern) (Semester - I) (11201) *Time : 2 Hours]* [Max. Marks : 35] Instructions to the candidates: *1*) Q.1 is compulsory. Solve any Three questions from 0.2 to 0.5. 2) 3) Questions 2 to 5 carry equal marks. Q1) Solve <u>any five</u> of the following: [5] Define Attention. a) Write the formula of I.Q. b) Ś Define Sensation. c) What is Psychology? d) Define Motivation. e) Define Learning. f) Explain the goals of Psychology. (80 words) *Q2*) a) [6] Explain any two biological Motives. (50 words) [4] b) *Q3*) a) Explain the experiment on classical conditioning. (80 words). **[6]** State the divisions of mind. (50 words) [4] b) Explain the basic emotions. (80 words) **Q4**) a) [6] State the causes of forgetting. (50 words) **b**) [4] *Q5*) Write short notes (Any Four): [10] Id. a) b) Educational Psychology. Emotional Intelligence. c) Industrial Psychology. d) Big Five Model. e) Gestalt Psychology. f)

 \rightarrow \rightarrow \rightarrow

P4697

[5822] - 124 First Year B.Sc. **PSYCHOLOGY PSY - 112 : Experimental Psychology** (2019 Pattern) (Semester - I) (11202)

Time : 2 Hours] Instructions to the candidates:

Q.1 is compulsory. 1)

- Solve any three questions from Q.2 to Q.5. 2)
- Q. 2 to Q. 5 carry equal marks. 3)

Q1) Solve any five of the following.

- Define independent variable. a)
- Name any two areas where psychological experimentation can be applied. b)
- Who established the first psychological laboratory? c)
- Write down the definition of hypothesis. d)
- State the fechner's law. e)
- Define experimental psychology. f)
- Describe the nature of experimental psychology. (80 words) [6] *Q2*) a)
 - b) Discuss the necessity of defining research problems. (50 words) [4]
- **Q3**) a) What is mean by 'Quasi experimental method'? (80 words) [6]
 - Differenciate between active & attribute variables. (50 words) [4] b)
- Discuss basic concepts of psycho-physics. (80 words) [6] **Q4**) a)
 - Discuss the applications of research in learning process. (50 words) [4] b)

P.T.O.

SEAT No. :

[Total No. of Pages :2

[Max. Marks : 35

[5]

Q5) Write short notes on any Four.

- Non-equivalent quasi-experimental design. a)
- Extroneous variable. b)
- c) Sensitivity.
- Randomization. d)
- Point of subjective equality. e)
- Contribution of 'wundt' in experimental psychology. f)



[5822]-125

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE EVS - 111 : Fundamental of Environmental Biology (2019 Pattern) (Semester - I) (11241) (Paper-I) (Revised)

Time : 2 Hours

Instructions to the candidates:

- 1) Question 1 is compulsory.
- Solve any three questions from Q. 2 to Q. 5. 2)
- 3) Neat and labeled diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.
- Questions 2 to 5 carry equal marks. 5)

Q1) Solve any five of the following.

- Define : Biological Diversity. a)
- Write the difference between Era and Period. b)
- What is Speciation? c)
- Define : Taxonomy. d)
- What is mimicry? e)
- What are Bioresources? Give one example. f)

Q2) Answer the following: [10] Describe some notable events in the evolution of life through geological a) time. [6] Explain various factors responsible for current mass extinction. Add a b) note on current mass extinction. [4]

Q3) Answer the following: [10] Describe Taxonomic objectives and hierarchy. [6] a)

Discuss various Biogeographic Profile of world. b) [4]

[5]

P.T.O.

SEAT No. :

[Total No. of Pages : 2

[Max. Marks : 35

Q4)) Answer the following:					
	a) Explain Linnaeus system of classification.					
	b)	Give detailed account of major varieties of Livestock of India.	[4]			
Q5)	Writ	e short notes on any four of the following.	[10]			
	a)	Write Paleontological evidences of mass extinction.				
	b)	Write ecological adaptations in Hydrophytes.				
	c)	What is vestigiability? Explain with example.				
	d)	Write about the concept of species.				
	e)	Mention unique faunal biodiversity of India.				
	f)	Describe in brief Biogeographical profile of world.				
		C3C3 EDED				

P4699

SEAT No. :

[Total No. of Pages : 2

[5822]-126

F.Y. B.Sc.

ENVIRONMENTAL SCIENCE

EVS - 112 : Fundamentals of Environmental Chemistry and Physics (2019 Pattern - New) (Semester - I) (11242)

Time : 2 Hours]

Instructions to the candidates:

- *1*) Question no. 1 is compulsory.
- Solve any three questions from Q.2 to Q.5. 2)
- Questions 2 to 5 carry equal marks. 3)
- 4) Neat labeled diagrams must be drawn wherever necessary.
- Figures to the right indicate full marks. 5)

Q1) Answer any Five of the following:

- Define Environmental Physics. a)
- Enlist any 2 scope of Environmental Chemistry. **b**)
- Define Food Adulteration. c)
- Enlist Oxides of Nitrogen. d)
- Define Normality. e)
- Enlist any 2 harmful effects of Lead on Human Health. f)

Q2) Answer the following: **[10]** Explain Sulphur Oxide Chemistry. [6] a) Discuss Harmful effects of Arsenic on Human Health. **b**) [4]

P.T.O.

[5]

[Max. Marks : 35]

Q3)	Ansv	wer the following: [10]
	a)	Enlist and Define Surfactants and types of Surfactants. [6]
	b)	Explain Food adulteration with example. [4]
Q4)	Ansv	wer the following: [10]
	a)	Explain with neat labelled diagram principle and working of pH meter.[6]
	b)	Explain Climate change. [4]
Q5)	Ans	wer any 4 of the following: [10]
	a)	Short note on Titrimetric methods.
	b)	Explain Green Chemistry.
	c)	Explain characteristics of Chemical reaction in Atmosphere.
	d)	Explain Impacts of Soaps and Detergents on Environment and Human Health.
	e)	Discuss scope of Environmental Physics.
	f)	Explain Food additives.

 $\rightarrow \rightarrow \rightarrow$

SEAT No. :

P4700

[5822]-127

First Year B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 101 : India's National Security : Key Concept

(2019 Pattern) (Semester - I) (Paper-I) (11231)

Time : 2½ Hours][Max. Mar		ks : 35	
Instru	ucti	ons to the candidates:	
1	1)	All questions are compulsory.	
2	2)	Figures to the right indicate full marks.	
Q1)	De	fine the following questions.	[5]
	a)	Define National Security	
	b)	Define Collective Security	
	c)	State the Meaning of Terrorism	
	d)	What is the meaning of Human Trafficking	
	e)	State the role of media in security issue	
Q2)	Wr	ite short notes on (any two)	[10]
	a)	India's National Security	
	b)	Water and Food Security	
	c)	Cyber Crime	
Q3)	Att	empt the following questions (any two)	[10]
	a)	Explain the Meaning Elements of State	
	b)	Explain the Conceptual framework of India's National Security	
	c)	State the role of civil society in Tackling security challenges	
Q4)	An	swer in details (any one)	[10]
	a)	Explain in detail India and South Asian Problems and Prospects	
	b)	Discuss in brief the concept of National Power and National Secur	rity



[Total No. of Pages : 1

SEAT No. :

[Total No. of Pages :2

P4701

[5822] - 128

First Year B.Sc.

DEFENCE AND STRATEGIC STUDIES DS - 102 : Evolution of Defence Organization in India (2019 Pattern) (Semester - I) (11232) (paper - I)

Tim Inst	e : 2 1 ructio	Hours] [ons to the candidates:	Max. Marks : 35
	1) 2)	All questions are compulsory. Figures to the right indiacte full marks.	
Q1)	Def	ine the following questions.	[5]
	a)	State the role of central Reserve Police Force (CRPF).	
	b)	Define Intelligence.	
	c)	Explain the Organization setup of Indian Air Forces.	
	d)	Explain the Structure of Indian Army.	
	e)	Define National Security.	
Q2)	Wri	te short notes on (any two)	[10]
	a)	National Security Guard (NSG).	
	b)	Indo - Tibetan Border Police (ITBP)	
	c)	Coast Guard.	
	d)	Indian Navy.	
Q3)	Atte	empt the following questions (any two)	[10]
	a)	Discuss the Objective of Higher Defence Organization.	
	b)	Explain the India's Nuclear Doctrine.	
	c)	Explain the functions of Chiefs of staff committee.	
	d)	Discuss the functions of Assam Rifle (AR).	
0 4)	And	swer in details (any one)	[10]
ריצ)		Explain the functions of Border Security Force (BSE)	
	a)	Displain the functions of Border Security Force (BSF).	C
	D)	Discuss the power of president in relation to the armed f	forces.



SEAT No. :

[Total No. of Pages : 1

P4702

[5822]-129

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 103 : India and its Neighbours

(2019 Pattern) (Semester - I) (11233)

Time	2:2	Hours]	[Max. Marks : 35
Instr	1) 2)	All questions are compulsory. Figures to the right indicate full marks.	
Q1)	De	efine the following questions:	[5]
	a)	What do you mean by landlocked countries?	
	b)	What do you mean by foreign policy?	
	c)	Define Maritime security.	
	d)	Define Bureaucracy.	
	e)	What do you mean by public opinion.	
Q2)	W	rite short notes on (any two):	[10]
-	a)	India - Myanmar relations.	
	b)	India - Russia relations.	
	c)	India - United States relations.	
Q3)	At	tempt the following questions (any two):	[10]
	a)	Explain the India - China border issues.	
	b)	Explain the India - Maldives relations.	
	c)	State the Indian role of Bhutan Development.	
Q4)	Ar	nswer in details (any one):	[10]
	a)	Explain India and Sri Lanka relation with special reference	nce to ethnic crisis.

b) Explain India and Bangladesh relation with special reference to Tin Bigha Corridor.

 $\rightarrow \rightarrow \rightarrow$

P4703

SEAT No. :

[Total No. of Pages : 4

[5822]-130

F.Y. B.Sc.

RESTRUCTURING PATTERN Foundation Course : RE - A-FC - 101 (2019 Pattern) (Semester - I) (Paper - I) (11601)

Time : 2 Hours]

Instructions to the candidates:

[Max. Marks: 35

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Section-A : Theory & Section-B: Practical based activity.

SECTION - A

Q1) Write short notes on any three of the following in each 150 words. [15]

- a) Nationalism
- b) Socialism
- c) Liberty
- d) Globalization
- e) Privatization

Q2) Write the answer of any one in following questions in 150 words. [5]

- a) Write a brief note on farmer movement in Maharashtra.
- b) Explain the challenges facing liberalization.

SECTION - B

- *Q3*) Solve any one of the following for the given data.
 - a) Calculate the percent male population and sex ratio of the Nashik district tahsils for the given data (Supplement I).

Sr.No.	Name of the Tahsil	Male Population	Female Population	Total Population
1	Nashik	922060	833431	1755491
2	Igatpuri	128999	124514	253513
3	Sinnar	180001	166389	346390
4	Niphad	254768	238483	493251
5	Yevla	139990	131156	271146

(Source : Nashik District Census Handbook - 2011)

[5]

b) Calculate the sex ratio and percent female population of the Nashik district tahsils for the given data (Supplement - II)

Sr.	Name of the Tahsil	ST Male	ST Female	Total Scheduled
No.		Population	Population	Tribe Population
1	Nashik	94667	88317	182984
2	Igatpuri	51851	50757	102608
3	Sinnar	23711	22538	46249
4	Niphad	48544	47266	95810
5	Yevla	14582	14489	29071

(Source : Nashik District Census Handbook - 2011)

- *Q4*) Solve any one of the following the given data and interpret the same. [10]
 - a) Calculate the following demographic characteristics of the given data of Nashik district Tahsils-2011 and interpret the same. (supplement III)
 - i) Population density of 2001
 - ii) Population density of 2011
 - iii) Sex ratio of 2011

OR

- b) Calculate the following demographic characteristics of the given data of Nashik district Tahsils-2011 and interpret the same. (supplement III)
 - i) Female percent population
 - ii) Male percent population,
 - iii) Population Growth rate of 2001 to 2011.

Sr.	Name of the	Area	ST Population	ST Population	Scheduled Tribe		Tribe
No.	Tahsil		in 2001	in 2011	Ma	le and Fe	emale
					Pop	oulation	in 2011
					Male	Female	Total
1	Niphad	1053.65	79751	95810	48544	47266	95810
2	Sinnar	1352.61	35456	46249	23711	22538	46249
3	Igatpuri	846.32	86370	102608	51851	50757	102608
4	Trimbake-	874.70	106315	135078	67836	67242	135078
	shwar						
5	Deola	568.00	21354	30115	15344	14771	30115

(Source : Nashik District Census Handbook 2001 and 2011)

 $\mathbf{\hat{v}}$ $\mathbf{\hat{v}}$ $\mathbf{\hat{v}}$ $\mathbf{\hat{v}}$

P4703

[5822]-130 F.Y. B.Sc. RESTRUCTURING PATTERN Foundation Course : RE - A-FC - 101 (2019 Pattern) (Semester - I) (Paper - I) (11601)

(मराठी रूपांतर)

वेळ : 2	तास/		/ एकूण गुण : 35
सूचनाः-	- 1)	सर्व प्रश्न सोडविणे आवश्यक आहे.	
	2)	उजवीकडील अंक गुण दर्शवितात.	
	3)	विभाग-अ: थेअरी व विभाग-ब: प्रॅक्टीकल	
		<u>विभाग – अ</u>	
प्र. 1) ख	ालील टि	पा प्रत्येकी 150 शब्दांत लिहा. (कोणतेही तीन)	[15]
3	।) राष्ट्र व	त्राद	
ब) समा	जवाद	
व	5) स्वाल	तंत्र्य	
ड) जाग	ातिकीकरण	
इ) खा <u>र</u>	नगीकरण	
प्र. 2) ख	ालीलपैर्व	h कोणत्याही एका प्रश्नाचे उत्तर 150 शब्दांत लिहा. (कोणताही एक)	[5]
3	।) महा	राष्ट्रातील शेतकरी चळवळीवर थोडक्यात टीप लिहा.	
ब) उदा	रीकरणा समोरील आव्हाने स्पष्ट करा.	
		विभाग – ब	
प्र. 3) ख	ालीलपैर्व	h कोणताही एक प्रश्न दिलेल्या सांख्यिकी माहितीच्या आधारे सोडवा.	[5]
3	।) दिले	ल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून पुरूष	लोकसंख्या टक्केवारी
	व वि	नंग प्रमाण काढा. (परिशिष्ट – I)	
O M	NT		(1D 1)

Sr.No.	Name of the Tahsil	Male Population	Female Population	Total Population
1	Nashik	922060	833431	1755491
2	Igatpuri	128999	124514	253513
3	Sinnar	180001	166389	346390
4	Niphad	254768	238483	493251
5	Yevla	139990	131156	271146

(Source : Nashik District Census Handbook - 2011)

किंवा

ब) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून लिंग प्रमाण व स्त्री लोकसंख्या टक्केवारी काढा. (परिशिष्ट – II)

Sr.	Name of the Tahsil	ST Male	ST Female	Total Scheduled
No.		Population	Population	Tribe Population
1	Nashik	94667	88317	182984
2	Igatpuri	51851	50757	102608
3	Sinnar	23711	22538	46249
4	Niphad	48544	47266	95810
5	Yevla	14582	14489	29071

(Source : Nashik District Census Handbook - 2011)

प्र.4) खालीलपैकी कोणताही एक प्रश्न दिलेल्या सांख्यिकी माहितीच्या आधारे सोडवा व त्याचे स्पष्टीकरण करा.

अ) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून खालील लोकसंख्याशास्त्रीय वैशिष्ट्ये मोजा व त्यांचे स्पष्टीकरण द्या. (परिशिष्ट – III)

[10]

- i) लोकसंख्या घनता 2001
- ii) लोकसंख्या घनता 2011
- iii) लिंग प्रमाण 2011

किंवा

- ब) दिलेल्या नाशिक जिल्ह्यातील तालुक्यांच्या लोकसंख्या आकडेवारीवरून खालील लोकसंख्याशास्त्रीय वैशिष्ट्ये मोजा व त्यांचे स्पष्टीकरण द्या. (परिशिष्ट – III)
 - i) स्त्री लोकसंख्या टक्केवारी
 - ii) पुरूष लोकसंख्या
 - iii) लोकसंख्या वाढीचा दर: 2001 ते 2011.

Sr.	Name of the	Area	ST Population	ST Population	Scheduled Tribe		Tribe
No.	Tahsil		in 2001	in 2011	Ma	Male and Female	
					Pop	Population in 201	
					Male	Female	Total
1	Niphad	1053.65	79751	95810	48544	47266	95810
2	Sinnar	1352.61	35456	46249	23711	22538	46249
3	Igatpuri	846.32	86370	102608	51851	50757	102608
4	Trimbacke-	874.70	106315	135078	67836	67242	135078
	shwar						
5	Deola	568.00	21354	30115	15344	14771	30115

(Source : Nashik District Census Handbook 2001 and 2011)



[5822]-130

P4704

[5822] - 131

SEAT No. :

[Total No. of Pages :2

F.Y.B.Sc. (Vocational) COMPUTER HARDWARE AND NETWORK ADMINISTRATION CHNA - 111 : Essentials of Computer - I (2019 Pattern) (Semester - I) (Paper - I) (11871)

Tim Inst	e : 2 tructi	Hours]	[Max. Marks : 35
11151	1)	Q.1 is compulsory.	
	2)	Solve any three questions from Q.2 to Q.5.	
	3)	Q. 2 to Q. 5 carry equal marks.	
Q1)) So	lve any five of the following.	[5]
	a)	Define scanner?	
	b)	What is BIOS?	
	c)	List different Input devices of computer.	
	d)	Define Interrupts.	
	e)	What is Device Controller.	
	f)	Write full form of : MICR & ALU.	
Q 2)) a)	Draw block diagram of computer system and Explain it	[6]
		OR	
		Draw block diagram of OFF line UPS and Explain it.	
	b)	Explain the working of DOT matrix printer.	[4]
Q 3)) a)	Explain structure of BUS in CPU.	[6]
~	,	OR	
		Explain working of mouse in details.	
	b)	Explain the generations of microprocessors.	[4]

P.T.O.

Q4) a)	Explain Input output operations of microprocessor.	[6]
	OR	
	What is main and Auxiliary memory.	
b)	Explain the working of laser printer.	[4]
Q 5) Writ	te short notes on any FOUR of the following:-	[10]

Write a note on Instruction cycle in microprocessor. a)

- Write a short note on touch screen. b)
- What is digitizer. c)
- Write a note on Bluetooth. d)
- Explain working of Joystick. e)
- What is USB? f)

[5822] - 131

P4705

[5822] - 132

F.Y.B.Sc. (Vocational) **COMPUTER HARDWARE AND NETWORK ADMINISTRATION** CHNA - 112 : Computer Organisation - I (2019 Pattern) (Semester - I) (Paper - II) (11872)

Tim Inst	e : 2 . ructi	Hours] ons to the candidates:	[Max. Marks : 35
11131	1) 2) 3)	Q.1 is compulsory. Solve any three questions from Q.2 to Q.5. Question 2 to 5 carry equal marks.	
Q1)	Sol	lve any five of the following.	[5]
	a)	Define compiler.	
	b)	What is need of operating system.	
	c)	What is BIOS?	
	d)	What is POST?	
	e)	Explain Internal Commands of DOS.	
	f)	Write notes on LINUX Operating system.	
Q2)	a)	Explain the architecture of 8086.	[6]
		OR	
		Explain the difference between Simulator and Emulator	
	b)	What are the advantages of Windows operating system	n. [4]
Q3)	a)	Explain flow chart with example.	[6]
		OR	
		Explain control panel settings of windows.	
	b)	Compare Hardware and Software.	[4]

P.T.O.

SEAT No. :

[Total No. of Pages :2

Q4) a)	Write notes on system software.	[6]
	OR	
	Explain Desktop in windows.	
b)	Explain any two Instructions of 8086.	[4]
Q 5) Writ	te short notes on any FOUR of the following:-	[10]

- a) Write notes on ANDRUID operating system.
- b) Define the function of BIU of 8086.
- c) Define Editor.
- d) Define PHABLET.
- e) Define Application Software.
- f) Explain RTOS.

SEAT No. :

P4706

[Total No. of Pages :2 [5822] - 133 F.Y.B.Sc. (Vocational) BIOTECHNOLOGY **VBt - 111 : Biological Chemistry** (2019 CBCS Pattern) (Semester - I) (11571)

Time : 2 Hours]

Instructions to the candidates:

- *Q.1 is compulsory.* 1)
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Q. 2 to Q. 5 carry equal marks.
- Draw neat labelled diagrams wherever necessory. *4*)

Q1) Solve any 5 of the following.

- a) Give any 2 examples of reducing sugars.
- Define titration curve. **b**)
- Give any 2 examples of phospholipids. c)
- Name any two covalent interactions. d)
- Give any one function of thiamine. e)
- f) Define molarity.
- Answer any two of the following. *Q2*) a)
 - i) What are biomolecules? Give any two functions of biomolecules in biological systems.
 - Explain the Le-Chaterlier's principle. ii)
 - iii) Give any three properties of water.
 - Answer any one of the following: b)
 - The molecular weight of NaOH is 40. How will you prepare 100ml, i) 2m solution of NaOH.
 - You hove 50X stock solution of buffer. How will you prepare 100ml, ii) 1 X working solution of buffer.

[5]

[6]

[4]

P.T.O.

[Max. Marks : 35

Q3)	a)	Ans	wer any one of the following.	[6]
		i)	Classify carbohydrates with the help of examples.	
		ii)	Give any two functions each of the following.	
			Vitamins :- Vitamin A, Folic acid, Vitamin - B ₁₂ .	
		iii)	Classify lipids with the help of examples.	
	b)	Ans	wer any one of the following:	[4]
		i)	Give any four functions of lipids.	
		ii)	Give any four functions of carbohydrates.	
Q4)	a)	Ans	wer any two of the following.	[6]
		i)	Classify amino-acids on the basis of nutrition.	
		ii)	Explain the concept of mutarotation.	
		iii)	Describe halogenation reaction of lipids.	
	b)	Give	e any two functions of Vitamin E and Vidtamin D.	[4]
Q5)	Write	e sho	rt notes on any four of the following:-	[10]
	a)	Hyd	rogen bond.	
	b)	pH,	pK and their significance.	
	c)	Nor	mality and Molality.	
	d)	Inve	ersion of Sugars.	
	e)	Ster	oids	
	f)	Stru	cture of hemoglobin.	

• • •

[5822] - 133

P4707

[5822] - 134 F.Y.B.Sc. (Vocational) BIOTECHNOLOGY

VBt-112 : Biotechnology : Concepts and Applications (CBCS 2019 Pattern) (Semester - I) (Paper - II) (11572)

Time : 2 Hours]

Instructions to the candidates:

- Question 1 is compulsory. 1)
- 2) Solve any three questions from Q2 to Q5.
- 3) Questions 2 to 5 carry equal marks.
- Neat diagram must be drawn wherever necessary. *4*)
- Figures to the right indicates full marks. 5)

Q1) Answer any five of the following:

- Define GMO. a)
- b) What are Probiotics?
- c) Give the composition of biogas.
- d) What is Medical Biotechnology?
- Give any 1 important milestone in history of biotechnology. e)
- Give two examples of functional foods. f)
- Attempt any two from the following: *O2*) a)
 - Write a short note on Nutraceuticals. i)
 - ii) Discuss the important applications of Biotechnology in day to day life.
 - Explain the concept of Biosensors. iii)
 - Define Biofertilizers. Discuss the types of Biofertilizers with examples.[4] **b**)
- *Q3*) a) Attempt any two from the following:
 - Explain the role of biotechnology in Vaccine production. i)
 - Write a short note on Single Cell protein. ii)
 - Discuss the types of biofuels. iii)
 - Define biotechnology. Discuss the different branches of biotechnology.[4] **b**)

[Total No. of Pages :2

[Max. Marks : 35

[5]

[6]

[6]

P.T.O.

SEAT No. :

- *Q4*) a) Attempt any two from the following:
 - i) Discuss the applications of Biotechnology in Agriculture.
 - ii) Write a short note on Stem cells and regenerative medicine.
 - iii) Discuss the Opportunities in Biotechnology in Industry.
 - a) Define Bioremediation. Mention its types & add a note on its applications. [4]
- *Q5*) Attempt any four from the following.

[10]

- a) Comment on role of Biotechnology in food safety.
- b) What are Prebiotics? Give examples.
- c) Comment on herbicide resistant plants.
- d) What is the role of biotechnology in disease diagnosis.
- e) Comment on the bioreactors used in waste water treatment.
- f) Explain the term 'Bt cotton'.

P4708

[5822]-135

F.Y. B.Sc. (Vocational)

SEED TECHNOLOGY

ST - 1.1 : Morphology

(2019 New Pattern) (Semester - I) (Paper - I) (11891)

Time	:21	Hours]	[Max. Marks : 35
Instr	uctio	ons to the candidates:	
	1)	Q.1 is compulsory.	
	2)	Solve any three questions from Q.2 to Q.5.	
	3)	Questions 2 to 5 carry equal marks.	
Q1)	Sol	lve any five of the following.	[5]
	a)	Define megasporangium.	
	b)	Enlists parts of typical flower.	
	c)	What is grafting?	
	d)	Define fertilization.	
	e)	Give types of endosperm.	
	f)	What are orthodox seeds?	
Q2)	a)	Describe flowers of Fabaceae and liliaceae.	[6]
		OR	
		Explain development of male gametophyte.	
	b)	Give difference between seed and grain.	[4]
Q3)	a)	Comment on process of fertilization in angiosperm.	[6]
		OR	
		Describe types of pollination.	
	b)	Explain structure of ovule.	[4]

[Total No. of Pages : 2

SEAT No. :

Q4)	a)	Give an account of capsule and schizocarpic fruits.	[6]
		OR	
		Discuss types embryo.	
	b)	Comment on flower of solanaceae.	[4]
Q5)	Wri	te short notes on any four of the following.	[10]
	a)	Cutting and budding.	
	b)	L.S. of typical flower.	

- c) Advantages and disadvantages of self pollination.
- d) Self pollinated crop species.
- e) Apomixis.

¥¥X

P4709

[5822] - 136 **F.Y.B.Sc.** (Vocational) **SEED TECHNOLOGY**

ST - 1.2 : Plant Breeding and Testing for Cultiviar Genuineness (New 2019 Pattern) (Semester - I) (Paper - II) (11892)

Time Insti	e : 2 I ructio 1) 2) 3)	Hours] ons to the candidates: Q.1 is compulsory. Solve any three questions from Q.2 to Q.5. Questions 2 to 5 carry equal marks.	[Max. Marks : 35
Q1)	Sol	ve any five of the following.	[5]
	a)	Define pureline selection.	
	b)	What is distant hybridization?	
	c)	Define totipotency.	
	d)	What is clone?	
	e)	Define induced mutation.	
	f)	What is mass selection?	
Q2)	a)	Explain history of plant breeding in India.	[6]
		OR	
		Give an account of hybridization procedure for bajara.	
	b)	Comment on merits and demerits of plant introduction.	[4]
Q3)	a)	Discuss applications of mutation breeding.	[6]
		OR	
		Explain procedure for mass selection.	
	b)	Comment on advantages and disadvantages of mass se	lection. [4]

[Total No. of Pages :2

SEAT No. :

Q4) a)	Explain procedure for clonal selection.	[6]
	OR	
	Give an account of somaclonal variation.	
b)	Comment on difficulties in hybridization.	[4]
Q 5) Wri	te short notes on any four of the following.	[10]
a)	Selection and Evaluation.	
b)	Electrophoresis.	
c)	Anther culture.	
d)	Characters of pureline selection.	
e)	Peroxidase test.	

P4710

[5822]-137

F.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

1 MB - 111 : Introduction to Industrial Microbiology and Microorganisms

(2019 Pattern) (Semester - I) (Paper - I) (Theory) (11821)

Time : 2 Hours]

Instructions to the candidates:

- 1) Q.1 is Compulsory.
- 2) Solve any three questions from Q.2 to Q.5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Solve any five of the following.

- a) Define GMP.
- b) State an example of industrially important proteobacteria.
- c) What is a trademark?
- d) Define process of validation in product development.
- e) State examples for probiotic bacteria.
- f) _____ is an antibiotic producer.

Q2) a) Describe:

i) What are Intellectual properties? List and describe different types of intellectual properties

OR

ii) Support and suspended culture.
b) Write short note on : [4] Role of microbiologist in microbiological industry.

Q3) a) Explain: [6]
i) Detailed process of fermentation. OR
ii) Development of pharmaceutical product.
b) Write short note on: [4]

Characteristics of industrially important microorganisms.

P.T.O.

[5]

[6]

[Total No. of Pages : 2

[Max. Marks : 35]

SEAT No. :

- Q4) a) Discuss :
 - i) WHO classification of microorganisms on the basis of hazard.

OR

- ii) Approach for isolation of industrially important microorganisms.
- b) Write short note on : [4] Preservation of microorganisms.
- Q5) Write short notes on any four of the following. [10]
 - a) 16 SrRNA and Carl Woose system of classification.
 - b) Concept of GRAS.
 - c) Culture collection centre.
 - d) Draw well-labelled diagram for Bioreactor.
 - e) Obsolescence.
 - f) Importance of Fungi in industrial microbiology.

жжж

P4711

[5822] - 138

F.Y.B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

IMB - 112 : Introduction to Industrial Process and Economics (2019 Pattern) (CBCS) (Semester - I) (Paper - II) (11822)

Time : 2 Hours]

Instructions to the candidates:

- O. No. 1 is compulsory. 1)
- 2) Solve any three questions from Q. No. 2 to 5.
- O. No. 2 to 5 carry equal marks. 3)

Q1) Solve any five of the following.

- Explain the term 'seed investment. a)
- What is 'exit route'? b)
- c) What is the role of private investors?
- Write examples of any two microorganisms used for production of d) recombinant proteins.
- Why strain improvement is needed? e)
- Define 'Metabolic engineering'. f)

Attempt any three of the following: *Q2*) a)

- i) Explain the concept of market need in biotechnology company.
- How are the facilities integrated in biotechnology company? ii)
- Explain the process of strain design with help of a suitable example. iii)
- Write importance of process design optimization. iv)
- Explain criteria for design of a fermentation process in details. [4] **b**)
- *Q3*) a) Attempt any three of the following:
 - Explain the concept of competitive advantage'. i)
 - Describe various type of strategies used in process of stain ii) improvement.
 - How operating cost estimates are calculated for a biotechnology iii) company?
 - Explain the role of scientific advisory board in management. iv)
 - Write applications of biotechnology in food industry. [4] b)

P.T.O.

[Total No. of Pages :2

[Max. Marks : 35

SEAT No. :

[5]

[6]

[6]
- *Q4*) a) Answer any three of the following:
 - i) Explain with help of flow diagram hierarchical structure of biotechnology company.
 - ii) Give significance of business plan in a biotechnology company.
 - iii) Describe 'due diligence' in details.
 - iv) With help of flow-chart describe the process of strain selection.
 - b) Describe the significance of design of biotechnology process in its commercial success. [4]
- **Q5**) Write short notes on any four of the following:
 - a) Scientific creativity.
 - b) Investment in biotechnology.
 - c) Design exercise.
 - d) Concept of Biotechnology company.
 - e) Capital cost estimates.
 - f) Criteria for optimization of a fermentation process.

2

[10]

P4712

SEAT No. :

[Total No. of Pages : 2

[5822]-139

F.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE VOC - EEM - 111 : Maintenance of Domestic Equipments - A (Heating appliances)

(CBCS 2019 Pattern) (Semester - I) (Paper - I) (11811)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) Q1 is compulsory.
- 2) Solve any three questions from Q2 to Q5.
- 3) Q. No. 2 to Q. No. 5 carry equal marks.

Q1) Attempt any five of the following.

- a) What are different terminals of MOSFET?
- b) What is forward voltage drop of Silicon diode?
- c) If "No heating" indicator lamp is off, what would be the cause?
- d) What is the range of frequency of microwave oven?
- e) What is typical output current of transformer in microwave oven?
- f) What type of keyboard microwave consists of?

Q2) a) Answer the following. [6] i) How electromagnetic waves cook food? ii) When door of microwave is closed where power reaches first? b) Explain the parts of Geyser. [4]

Q3) a) answer the following.

- i) What is use of nicrome wire? What is it's composition?
- ii) What is cause if water dripping problem persists in geyser?
- b) What are the advantages of using tankless water heater? [4]

P.T.O.

[6]

[5]

- *Q4*) a) Answer the following.
 - i) What are types of induction cooker?
 - ii) What are safety rules while using microwave oven?
 - b) What are the differences in induction cooking and microwave cooking?[4]

Q5) Write short notes on any four of the following.

- a) Advantages of induction cooker technology.
- b) Magnetron.
- c) Troubleshorting steps of microwave oven.
- d) Working of Induction Cooker.
- e) Working of Thermostat in Geysor.
- f) Features of induction Cooking.

HHH H [10]

Total No. of Questions : 5]

P4713

[5822] - 140

F.Y.B.Sc. (Vocational) ELECTRONIC EQUIPMENT MAINTENANCE VOC - EEM- 112 : Elements of Electronic Equipment Design - A (PCB Techniques)

(2019 CBCS Pattern) (Semester - I) (Paper - II) (New) (11812)

Time : 2 Hours]

Instructions to the candidates:

- 1) Question 1 is compulsory.
- 2) Solve any three questions from Que. 2 to 5.
- 3) Questions 2 to 5 carry equal marks.

Q1) Attempt any Five of the following.

- a) How to choose PCB material?
- b) What is routing topology?
- c) What is solderability?
- d) How to solder QFN type IC by hand?
- e) How to solder surface mount resistor?
- f) What is lead free soldering?

Q2) a) Attempt the following:

- i) Mention the tips for successful soldering.
- ii) What are the parameters which requires attentions while recycling a PCB?
- b) Explain with a neat diagram temperature controlled soldering iron. [4]

Q3) a) Attempt the following:

- i) What are the factors affecting PCB cost?
- ii) Draw a flow diagram for sequence of steps required for drawing of network?
- b) Write a short note on SMD work station.

[5]

[6]

[6]

נטן

[4]

SEAT No. :

[Total No. of Pages :2

[Max. Marks : 35]

- *Q4*) a) Attempt the following:
 - i) Enlist the precautions taken while soldering.
 - ii) What are the steps in PCB designing?
 - b) Mention accessories used for soldering. Explain their functions. [4]
- *Q5*) Attempt any four of the following.

[10]

[6]

- a) State different parts of layout & explain their use.
- b) How to decide the shape of PCB antenna for perticular frequency?
- c) Explain different types of soldering techniques.
- d) Distinguish between through hole and surface mount technology.
- e) Discuss the problems with hot air soldering.
- f) Explain types of soldering joints

