Total No. of Questions : 4]

SEAT No. :

P4714

[Total No. of Pages : 2

[5822]-201

F.Y. B.Sc.

MATHEMATICS

MT - 121 : ANALYTICAL GEOMETRY

(2019 Pattern) (Semester - II) (Paper - I) (12111)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Attempt any five of the following : **[5]**

a) If the origin is shifted to the point (–4, –7), the axes remaining parallel to the original set of axes, find the co-ordinates of the point (–2, 5) with reference to the new set of axes.

b) If the axes are rotated through an angle 60° then write down equations of rotation.

c) If direction ratios of the line are 1, 2, 2 then find its direction cosines.

d) Write equation of a plane parallel to XY-plane.

e) Find equations of the line passing through (2, –3, 5) and whose direction ratios are 1, –2, 2.

f) Find the centre of the sphere
$x^2 + y^2 + z^2 + 2x + 2y - 2z + 3 = 0$.

Q2) a) Attempt any one of the following : **[6]**

i) Reduce the equation $5x^2 + 6xy + 5y^2 - 10x - 6y - 3 = 0$ to its standard form.

ii) Show that the equation
$(ax + by + cz + d) + \lambda (a_1 x + b_1 y + c_1 z + d_1) = 0$ represents the system of planes through the line of intersection of the planes $ax + by + cz + d = 0$ and $a_1x + b_1y + c_1z + d_1 = 0$.

b) Attempt any one of the following : **[4]**

i) Discuss nature of the conic
$5x^2 + 4xy + 3y^2 + 2x + y = 0$. Also find its centre if it is a central conic.

ii) Show that every equation of first degree in x, y, z represents a plane.

P.T.O.

Q3) a) Attempt any one of the following : **[6]**

i) Let the axes be rotated through an angle θ without shifting origin. Let p(x,y) and p(x', y') be the points with respect to original axes and new axes respectively. Show that

$x = x' \cos\theta - y' \sin\theta$, $y = x' \sin\theta + y' \cos\theta$.

ii) Show that equation of a plane which makes intercepts a, b, c on the co-ordinate axes is given by $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$.

b) Attempt any one of the following : **[4]**

i) Find the co-ordinates of the point of intersection of the line $\frac{x+1}{1}=\frac{y+3}{3}=\frac{z-2}{-2}$ with the plane $3x + 4y + 5z = 5$.

ii) Find equation of the sphere through the circle $x^2 + y^2 + z^2 = 9$, $2x + 3y + 4z = 5$ and the point (1, 2, 3).

Q4) a) Attempt any one of the following : **[6]**

i) Find length of the perpendicular from the point (1, 2, 3) to the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$.

ii) Prove that the plane section of a sphere is a circle.

b) Attempt any one of the following : **[4]**

i) Find direction ratios of the line

$ax + by + cz + d = 0$

$a_1x + b_1y + c_1z + d_1 = 0$.

ii) Find the value of 'a' for which the plane $x + y + z = a\sqrt{3}$ touches the sphere $x^2 + y^2 + z^2 - 2x - 2y - 2z - 6 = 0$.

Total No. of Questions : 4]

SEAT No. :

P4715

[Total No. of Pages : 2

[5822]-202

F.Y. B.Sc.

MATHEMATICS

MT-122 : Calculus - II

(2019 Pattern) (Semester - II) (Paper - II) (12112)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Attempt any Five of the following : **[5]**

a) Whether every continuous function is differentiable? Justify

b) State Lagrange's Mean Value Theorem.

c) Determine whether the differential equation $(2x + y)dx + (y + 2x)dy = 0$ is exact or not.

d) Find the general solution of equation $\frac{dy}{dx} = -\frac{x}{y}$.

e) Find an integrating factor, so that $y\,dx - x\,dy = 0$ is an exact differential equation.

f) Evaluate, $\lim_{x \to 1} \frac{\ln x}{x-1}$.

g) Find n^{th} derivative of the function $y = a^{3x}$, $a > 0$.

Q2) a) Attempt any ONE of the following : **[5]**

i) State and prove Cauchy's Mean Value Theorem.

ii) Show that, n^{th} derivative of $y = e^{ax} \cos(bx + c)$ is $y_n = r^n e^{ax} \cos(bx + c + n\theta)$,

where $r = \sqrt{a^2 + b^2}$ and $\theta = \tan^{-1}\left(\frac{b}{a}\right)$.

P.T.O.

b) Attempt any ONE of the following : **[5]**

i) The function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) & , if\ x \neq 0 \\ 0 & , if\ x = 0 \end{cases}$

show that, f is differentiable at $x = 0$.

ii) By using Taylor's series expansion, expand $x^3 + 7x^2 - 6$ in powers of $(x - 3)$.

Q3) a) Attempt any ONE of the following : **[5]**

i) State and prove Leibnitz theorem for n^{th} derivative of the product of two differentiable functions.

ii) If $p(x)$ is continuous on (a, b) then the general solution of the homogeneous equation $\frac{dy}{dx} + p(x)y = 0$ on (a, b) is $y = c.\ e^{-Q(x)}$, where $Q(x) = \int p(x)\,dx$, $a < x < b$.

b) Attempt any ONE of the following : **[5]**

i) Evaluate, $\lim_{x \to 0}\left(\frac{1}{x} - \frac{1}{\sin x}\right)$.

ii) Solve the differential equation,
$(6xy^2 + 2y)\,dx + (12x^2y + 6x + 3)\,dy = 0$.

Q4) a) Attempt any ONE of the following : **[5]**

i) Explain the method of solving Homogeneous nonlinear equation $\frac{dy}{dx} = \frac{f(x,y)}{g(x,y)}$.

ii) Define exact differential equation. Explain the method of solving exact differential equation.

b) Attempt any ONE of the following : **[5]**

i) Solve the Bernoulli's equation, $x^2\frac{dy}{dx} + 2xy = y^3$.

ii) Verify Rolle's theorem for the function,

$f(x) = 2x^3 + x^2 - 4x - 2$ on $\left[-\sqrt{2}, \sqrt{2}\right]$.

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Total No. of Questions : 5]

SEAT No. : ____

P4716

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[5822]-203

F.Y. B.Sc.

PHYSICS (Paper - I)

PHY - 121 : Heat and Thermodynamics

(CBCS) (2019 Pattern) (Semseter - II) (12121)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question one is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Questions two to five carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logtable and calculator is allowed.***
6) ***Neat diagrams must be drawn wherever necessary.***

Q1) Solve any Five of the following : **[5]**

a) State principle of liquid thermometer.

b) Define Indicator Diagram.

c) What is Entropy?

d) Define heat Engine.

e) Find the efficiency of the carnot's engine working between the steam point and the ice point.

f) Calculate work done when a gram molecule of a gas expands isothermally at 27°C to double its original volume. (Give R = 8.3 joules degree^{-1} mole^{-1})

Q2) a) Derive an expression for work done during an isothermal process. **[6]**

OR

What is carnot's cycle? Explain it with suitable Diagram. **[6]**

b) State and Explain second Law of Thermodynamics. **[4]**

P.T.O.

Q3) a) Derive the First latent heat equation in the form $\frac{dp}{dt} = \frac{LJ}{T(V_2 - V_1)}$ **[6]**

OR

Describe principle and applications of air conditioning. **[6]**

b) The resistance of platinum wire at 0°C is 5.5Ω and at temperature t, it is 7.5Ω. Find temperature of wire if coefficient of temperature for platinum is 0.0039 / °C. **[4]**

Q4) a) Distinguish between isothermal and adiabatic changes. Show that for an adiabatic change in perfect gas, PV^r = constant. **[6]**

OR

Explain construction and working of gas filled thermometer. **[6]**

b) Calculate the increase in entropy of 5kg of water at 100°C when it changes to vapour. **[4]**

Q5) Attempt any four of the following : **[10]**

a) State first law of thermodynamics. Give it's physical significance.

b) Describe Vapour-compression refrigerator.

c) Explain principle and working of platinum resistance thermometer.

d) State Zeroth law of thermodynamics.

e) Write applications of bimetallic thermometer.

f) State conditions for good refrigerator.

Total No. of Questions : 5]

SEAT No. :

P4717

[Total No. of Pages : 3

[5822]-204

F.Y. B.Sc.

PHYSICS (Paper - II)

PHY-122: Electricity and Magnetism

(CBCS) (2019 Pattern) (Semester - II) (12122)

Time : 2 Hours] *[Max. Marks : 35*

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) ***Figures to the right indicate full marks.***
5) ***Use of log table and calculator is allowed.***
6) ***Neat diagrams must be drawn wherever necessary.***

Q1) Solve any five of the following : **[5]**

a) What do you mean by electric flux?

b) What do you mean by non-polar molecule?

c) State Ampere's circuital law.

d) What do you mean magnetic permeability?

e) An aluminium wire of diameter 0.4 cm carries a current of 2.5 ampere. Find the magnetic field at the surface of wire, if the permeability of free space is $4\pi \times 10^{-7}$ Wb/A-m.

f) Two point charges in a dielectric medium having dielectric constant is 2 interact with a force of 4×10^{-3}N. What would be the force if the charges were in free space?

P.T.O.

Q2) Attempt the following :

a) State Gauss's law in electrostatics. Obtain an expression for electric intensity at an external point due to uniformly charged non-conducting sphere. **[6]**

OR

State principle of superposition in electrostatics. Obtain an expression for force on any one charge due to all other charges.

b) Obtain an expression for torque on a dipole placed in an uniform electric field. **[4]**

Q3) Attempt the following :

a) State Biot-Savart's law and obtain an expression for magnetic induction $\bar{B}$ at a point on the axis of current carrying loop. **[6]**

OR

What do you mean by diamagnetic materials? Give properties of diamagnetic material.

b) An electric dipole consisting of two opposite charges each of magnitude 2 μc is separated by a distance of 2 cm. The dipole is placed in an electric field of intensity 1×10^5 N/C. Calculate the maximum torque on the dipole. **[4]**

Q4) Attempt the following :

a) What is hysteresis? Using hysteresis curve explain hard and soft ferromagnet. **[6]**

OR

Explain in detail magnetization $(\bar{M})$, magnetic intensity $(\bar{H})$ and magnetic induction $(\bar{B})$.

b) A solenoid of 100 turns/m is carrying a current of 2A. If the core is made of iron which has relative permeability of 1000, determine the magnitude of the magnetic intensity, magnetization and magnetic induction inside the core. (Given: $\mu_0 = 4\pi \times 10^{-7}$) **[4]**

Q5) Write short note on any Four of the following : **[10]**

a) Concept of electric field and electric intensity due to point charge.

b) Electric field in dielectric material.

c) Advantages of Ampere's law.

d) Bohr Magneton.

e) Antiferromagnetic materials.

f) Electric dipole and dipole moment.

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Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[5822]-205

F.Y. B.Sc.

CHEMISTRY

CH - 201 : Inorganic Chemistry - I

(CBCS) (2019 Pattern) (Paper - I) (Semester - II) (12131)

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.***
3) ***Question 2 to 5 carry euqal marks.***

Q1) Answer any five of the following : **[5]**

a) State Heisenbergs uncertainty principle.

b) State the de Broglies hypothesis.

c) Define Ionic bond.

d) Define chemical bond.

e) Define Ionisation potential.

f) Where is the position of d-block elements in long form of periodic table?

Q2) a) Answer any two of the following : **[6]**

i) Write limitations of Bohr's theory.

ii) What is effective nuclear charge? Calculate effective nuclear charge of lithium element? (Given: At. No. 3, screening constant value 1.7)

iii) Explain bonding and shape of ClF_3 molecule on the basis of VSEPR theory.

b) Calculate the wave number of the spectral line in the Balmer seris, when electrons jumps from n = 3 ? **[4]**

(Given : $n_1 = 2$, $n_2 = 3$, R = log 677.6 cm^{-1})

P.T.O.

Q3) a) Answer any Two of the following : **[6]**

i) Explain the Bohr's model of atom.

ii) What is Exchange energy? Explain it with reference to cu-atom?

iii) Explain co-ordinate covalent bond with suitable example.

b) Answer the following : **[4]**

i) Sketch and explain the shapes of p_{xi} p_{yi} p_z orbitals.

ii) Draw the structure of the following molecules.

I) $[Ni(CN)_4]^{2-}$ II) Pcl_5

Q4) a) Answer any Two of the following : **[6]**

i) Define the term's

I)Threshold frequency II) Threshold Energy

ii) State 'Modern periodic law' and Explain the trend of electronegativity along the group & across the period.

iii) What are assumptions of Heitler-London theory?

b) Answer the following : **[4]**

i) Define the term

I) Nodal plane II) Atomic orbital

ii) Define lattice energy? Write born-lande equations.

Q5) Write Note on any Four of the following : **[10]**

a) Significance of Quantum Numbers.

b) Shapes of Atomic orbitals of d-type.

c) Long form of Periodic Table.

d) Black Body radiation.

e) Aufban principle and Paulies exclusion principle.

f) Hybridization and their types.

Total No. of Questions : 5]

SEAT No. :

P4719

[Total No. of Pages : 3

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F.Y. B.Sc.

CH - 202 : ANALYTICAL CHEMISTRY

(2019 Pattern) (CBCS) (Semester - II) (12132)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Solve any three questions from Q.No. 2 to Q.No. 5.***
3) ***Draw a neat diagrams wherever necessary.***
4) ***Use of log tables and calculators is allowed.***

Q1) Answer the following (Any Five) : **[5]**

a) Define Analytical Chemistry.

b) Define the term Molarity.

c) List the different types of organic compounds.

d) Define the term R_f.

e) State the equation for operational definition of p^H.

f) Which solvents are used as mobile phase for super critical-fluid Chromatography?

Q2) a) Answer the following : **[6]**

i) How will you separate Phenol-Neutral Mixtures? Give chemical reactions involved in it.

ii) An organic compound contains 34.80% oxygen, 52.20% carbon and 13.00% Hydrogen. Calculate empirical formula and molecular formula for the compound.

[Given : Molecular Weight = 92 g/mole, Molar Mass of C = 12, H = 1 and O = 16 g/mole].

P.T.O.

b) Answer the following : **[4]**

i) Give applications of p^H meter.

ii) Give the classification of chromatography on the basis of physical state of phase.

Q3) a) Answer the following : **[6]**

i) Give the applications of paper chromatography.

ii) Calculate p-functions for each ion in following solutions

1) 0.045 M NaBr.

2) 0.0250 M in $MgBr_2$.

b) Answer the following : **[4]**

i) How will you detect presence of phosphorous element in an organic compound by Lassigne's test?

ii) Give the applications of gas chromatography.

Q4) a) Answer the following : **[6]**

i) Describe the construction of Calomel electrode.

ii) Distinguish between mass and weight.

b) Answer the following : **[4]**

i) Discuss the common analytical problems.

ii) How is Tollen's reagent prepared? Where is it used?

Q5) Answer the following (Any Two) : **[10]**

a) What is TLC? What are various types of TLC? Give advantages of TLC.

b) i) Calculate the number of moles and millimoles of salicylic acid that are contain in 5.00 g of the pure salicylic acid.

[Given : Molar Mass of Salicylic acid = 138 g/mole]

ii) Indicate how many significant figures are each of the following numbers.

1) 0.045050.

2) 1.2638×10^6.

c) Explain paper chromatography with reference to -

i) Stationary and Mobile phase.

ii) Development of Chromatogram.

iii) Identification of components.

Total No. of Questions : 5]

SEAT No. :

P4720

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[5822]-207
F.Y. B.Sc.
BOTANY
BO-121 : Plant Life and Utilization - II
(2019 Pattern) (CBCS) (Semester - II) (Paper - I) (12141)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Attempt any Three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt any Five of the following : **[5]**

a) What are spermatophyte?

b) Enlist two characters of Gymnosperm.

c) Define - Pomology.

d) What is Apogamy?

e) Define - Pollination.

f) What is Corolloid Root?

Q2) a) What are pteridophytes? Give classification of pteridophytes as per sporne upto classes with Reasons. **[6]**

b) Explain - Angiosperm value on a fodder. **[4]**

Q3) a) Give systematic position of Cycus and Add note on Reproduction in cycus. **[6]**

b) Give the General characters of Angiosperm. **[4]**

P.T.O.

Q4) a) Give the Difference between Angiosperm & Gymnosperm. State various causes of evolutionary success of Gymnosperms. **[6]**

b) Explain T. S. of Root of Nepherolepis. **[4]**

Q5) Write short note on any Four of the following : **[10]**

a) Economic Importance of Gymnosperm.

d) Prothallus in Nepherolepis.

c) Pteridophyte as biofertilisers.

d) Cycus Ovule.

e) General Characteristics of Angiosperm.

f) Horticultural value of Angiospermic plants.

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Total No. of Questions : 5]

SEAT No. :

P4721

[Total No. of Pages : 2

[5822]-208
F.Y. B.Sc.
BOTANY - II
BO-122 : Principles of Plant Science
(2019 Pattern) (Semester - II) (Paper - II) (CBCS) (12142)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Attempt any THREE questions from Q.2 to Q.5.***
3) ***Questions. 2 to Q.5 carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt any Five of the following : **[5]**

a) Define plant physiology.

b) Write any two factors affecting diffusion.

c) What is plasmolysis?

d) Define molecular biology.

e) Enlist nitrogen bases.

f) Who proposed fluid mosaic model of plasma membrane?

Q2) a) Explain phase - II of meiosis **[6]**

b) Describe chargaff's rule. **[4]**

Q3) a) Explain watson and Crick's model of DNA. **[6]**

b) Describe applications of Auxins (any four) **[4]**

Q4) a) Explain types of DNA Replication. **[6]**

b) Describe types of Solutions. **[4]**

P.T.O.

Q5) Write short notes on any Four of the following : **[10]**

a) Central dogma of molecular biology.

b) Characteristics of chromosomes.

c) Components of plasma membrane.

d) Scope of molecular biology.

e) Functions of plant cell wall.

f) Prokaryotic cell.

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Total No. of Questions : 5]

SEAT No. :

P4722

[Total No. of Pages : 2

[5822]-209

F.Y. B.Sc. (Semester - II)

ZOOLOGY

ZO - 121 : Animal Diversity - II

(2019 Pattern) (CBCS) (Paper - I) (12151)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Write any two examples of Oligochaeta.

b) Define endoparasite.

c) Write examples of Mandibulate type mouth parts.

d) Define Shell.

e) Write any two characters of Echinodermata.

f) Define Pedicellaria.

Q2) a) Give salient features of Phylum Aschelminthes. **[6]**

OR

Describe the characters of class Polychaeta.

b) Enlist salient features of Class Crustacea. **[4]**

Q3) a) Describe piercing and sucking type of mouthpart. **[6]**

OR

Enlist salient features of Phylum Mollusca.

b) Earthworm is called "friend of farmers". Explain. **[4]**

P.T.O.

Q4) a) Describe the water Vascular System in Asterias rubens. **[6]**

OR

Enlist salient features of class Holothuroidea with any two examples.

b) Give an outline classification of Phylum Mollusca. **[4]**

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

a) Give economic importance of Silkworm.

b) Describe the process of pearl formation.

c) Describe cross type pedicellaria.

d) Write any five characters of class Diplopoda.

e) Write the functions of Pyloric Caeca.

f) With suitable examples write any two characters of class Gastropoda.

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Total No. of Questions : 5]

SEAT No. :

P4723

[Total No. of Pages : 2

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F.Y. B.Sc. (Semester - II)

ZOOLOGY

ZO-122 : Cell Biology

(CBCS) (2019 Pattern) (Paper - II) (12152)

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.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Solve any five of the following : **[5]**

a) Define compound microscope.

b) What is osmosis?

c) What are desmosomes?

d) Define euchromatin.

e) What is cisternae?

f) Explain the term chromatin.

Q2) a) Draw well labelled diagram of typical animal cell. **[6]**

OR

Describe the structure of nucleolus and give its functions.

b) Give the functions of mitochondria. **[4]**

Q3) a) Explain the active transport across plasma membrane. **[6]**

OR

Describe the structure of Golgi apparatus.

b) Give the functions of Golgi apparatus. **[4]**

P.T.O.

Q4) a) What is cell cycle? Discuss the different phases of cell cycle. **[6]**

OR

Give the applications of cell biology.

b) What is cytoplasmic stain? Explain it with suitable example. **[4]**

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

a) What is centrifugation?

b) Describe the prophase of mitosis.

c) What is Gap junction?

d) Give the principles of electron microscope

e) Explain the zygotene of meiosis

f) What are peroxisomes? Explain.

Total No. of Questions : 5]

SEAT No. :

P4724

[Total No. of Pages : 2

[5822]-211
F.Y. B.Sc.
GEOLOGY
GL - 121T : Principles of Stratigraphy and Sedimentation
(2019 Pattern) (Semester - II) (12161)

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.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following in 2-3 lines (Any Five) : **[5]**

a) Define weathering.

b) Define lithification.

c) Clastic texture.

d) Enlist chronostratigraphic units.

e) Siltstone.

f) What is Porosity?

Q2) a) Define stratigraphy. Explain Lithostratigraphy and Biostratigraphy. **[6]**

b) Explain the concept of Cement and Matrix. **[4]**

Q3) a) Enlist penecontemporaneous sedimentary structures. Explain any two of them. **[6]**

b) Explain Arenaceous and Argillaceous sedimentary rocks along with two examples. **[4]**

P.T.O.

Q4) a) Explain sedimentary rock formation process. **[6]**

b) Explain sedimentary structures. **[4]**

i) Ripple Marks

ii) Graded Bedding

Q5) Write a note on (Any Four) : **[10]**

a) Principles of stratigraphy.

d) Carbonaceous Deposits.

c) Define competence and capacity of sediments.

d) Laterite.

e) Enlist transitional sedimentary environments. Explain any one of them.

f) Cross Bedding.

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Total No. of Questions : 5]

SEAT No. :

P4725

[Total No. of Pages : 2

[5822]-212

F.Y. B.Sc.

GEOLOGY

GL - 122 T : Petrology and Geochemistry

(2019 Pattern) (Paper - II) (Semseter - II) (12162)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 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) Answer the following in 2-3 lines (any 5) **[5]**

a) Define lithology

b) Define magma

c) Define petrogenesis

d) State agents of metamorphism

e) State major costituents of igneous rocks

f) What are pyrogenetic minerals?

Q2) Answer the following

a) Enlist structures of igneous rocks, explain formation of any three structures. **[6]**

b) Describe Rock cycle **[4]**

Q3) Answer the following

a) Give the classification of igneous rocks based on depth of formation. **[6]**

b) Explain formation of crystals and glass. **[4]**

P.T.O.

Q4) Answer the following

a) What are metamorphic facies? Explain any two types of metamorphic facies. **[6]**

b) Explain Nucleosynthesis. **[4]**

Q5) Write notes on any five of the following **[10]**

a) Equigranular Texture

b) Components of magma

c) Thermal metamorphism

d) Contact metamorphism

e) Salic minerals

f) Stellar Evolution

Total No. of Questions : 4]

SEAT No. :

P4726

[Total No. of Pages : 3

[5822]-213

F.Y. B.Sc. (Semester - II)

STATISTICS

ST-121 : Descriptive Statistics - II

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

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figurest to the right indicates full marks.***
3) ***Use of statistical tables and calculator is allowed.***
4) ***Symbols have their usual meanings.***

Q1) A) Choose correct alternative : **[1 each]**

a) If X and Y are independent variables, then corr. (X, Y) is ;

i) 1 ii) -1

iii) 0 iv) cannot be obtained

b) Base year of index number is ;

i) any convenient year ii) preceeding year

iii) year of stability iv) succeeding year

c) The two regression lines intersect at :

i) (0, 0) ii) $(\overline{X}, \overline{Y})$

iii) (σ_x, σ_y) iv) none

B) State true or false : **[1 each]**

a) The regression of Y on X is always linear

b) Index numbers are unitless

P.T.O.

Q2) Attempt any <u>two</u> of the following : **[5 each]**

a) Define the term correlation. Explain different types of correlations with two real life examples of each.

b) Define standard error of regression estimate. Derive an expression for standard error of regression estimate.

c) Given that, r = 0.4, $\sum(X-\bar{X})(Y-\bar{Y})=108$, σ_y = 3 and $\sum(X-\bar{X})^2=900$. Find the number of pairs of observations.

Q3) Attempt any two of the following : **[5 each]**

a) Define Spearman's rank correlation coefficient. Derive an expression for it in case of notices.

b) Explain the procedure of fitting exponential growth model, $Y = a.b^x$, $a>0$, $b>1$.

c) A family enquiry of middle class families in a certain city gave the following data :

Item	Price in 2018	Price in 2019	Expenditure in Percentages
Food	250	274	35
House Rent	150	160	15
Clothing	100	125	20
Fuel	120	125	10
Others	160	190	20

Find cost of living index number for the year 2019 an compared to 2018.

Q4) Attempt any <u>one</u> of the following :

a) i) Derive an expression for regression line of Y on X, by the method of least squares. **[8]**

ii) Splice the following series of index number continuing series B backward. **[2]**

Year	2011	2012	2013	2014	2015	2016
Series A	100	120	150	-	-	-
Series B	-	-	100	135	170	200

b) i) The profit (in lakh of ₹) earned by company in x^{th} year is tabulated below : **[8]**

Year (X)	1	2	3	4	5
Profit (Y)	24	27	32	38	45

Fit a second degree curve $y = a + bx + cx^2$. Also estimate profit in 7^{th} year.

ii) Define Index number and state any two uses of index number. **[2]**

Total No. of Questions : 4]

SEAT No. :

P4727

[Total No. of Pages : 3

[5822]-214

F.Y. B.Sc.

STATISTICS

ST-122 : Discrete Probability and Probability Distributions - II

(2019 Pattern) (Semester - II) (Paper - II) (12172)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory***
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 second central moment of Poisson distribution with mean 3 is _____

A) 9 B) 6

C) 3 D) 2

ii) If a random variable (r.v.) X $\rightarrow$ Geometric $\left(\frac{2}{5}\right)$ with probability mass function (p.m.f.) $p(x) = p(X = x) = \frac{2}{5}\left(\frac{3}{5}\right)^x$; x = 0, 1, 2, ... then mode of x is ..... = 0 ; otherwise.

A) $\frac{2}{5}$ B) $\frac{3}{5}$

C) 1 D) 0

iii) If corr (x, y) = 0.75 then corr($2x$, $3y$) = _____

A) 1.5 B) 0.50

C) 0.75 D) 1

P.T.O.

b) State whether the following statements are true or false : (1 each)

i) If x and y are two independent Poisson random variables then $(x - y)$ is also Poisson r.v.

ii) If correlation coefficient between x any y is zero, then we conclude that x and y have same probability distribution.

Q2) Attempt any two of the following : **[5 each]**

a) State and prove additive property of two independent Poisson random variables.

b) Obtain moment generating function (m.g.f.) of geometric distribution with parameter p, hence obtain its mean.

c) The joint probability distribution of (x, y) is

X \ Y	0	1	2
−1	$\frac{1}{6}$	0	$\frac{1}{12}$
1	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{6}$

Obtain cov. $(2x - 1, 1 - y)$

Q3) Attempt any two of the following : **[5 each]**

a) State and prove lack of memory property of a geometric distribution. Also state its interpretation.

b) Following are the marginal p.m.f.'s of X and Y

x	−1	0	1
p(x)	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{2}{5}$

y	1	2	3
p(y)	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$

Assuming x and y are to be independent, obtain the joint probability distribution of x any y.

c) For a bivariate r.v. (x, y) prove the following :

i) Independence $\Rightarrow$ uncorrelatedness

ii) Uncorrelatedness $\Rightarrow$ Independence.

Q4) Attempt any one of the following : **[10]**

a) i) Obtain cumulant generating function (c.g.f.) of Poisson distribution; hence find the first four central moments. **[6]**

ii) The joint p.m.f. of (x, y) is

$p(x, y) = kxy$; $x = 1, 2, 3$

$y = 1, 2, 3$

$= 0$; otherwise

Obtain the constant k occurs in the p.m.f. of (x, y) and find $p(x + y \geq 5)$. **[4]**

b) i) Prove that $U = x + y$ and $V = x - y$ are uncorrelated if and only if $\text{var}(x) = \text{var}(y)$. **[6]**

ii) The joint probability distribution of (x, y) is

X \ Y	1	2	3
0	0.1	0.2	0.3
1	0.1	0.1	0.2

Obtain conditional mean of Y given (X = 0) **[4]**

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Total No. of Questions : 4]

SEAT No. :

P4728

[Total No. of Pages : 2

[5822]-215

F.Y. B.Sc. (Regular)

GEOGRAPHY

GG - 121 : Introduction to Human Geography

(2019 Pattern) (Semester - II) (Paper-IV) (CBCS) (12181)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Use of map stencils is allowed.***

Q1) Answer the following questions in twenty words [Any Five]: **[5×1=5]**

a) Define Human Geography.

b) What do you mean by Population Geography?

c) Write any two bases of Human Race.

d) Write dress of Naga.

e) Write occupations of tribes of Maharashtra.

f) What do you mean by language?

Q2) a) Explain the following in 50 words each [any two]: **[6]**

i) Scope of Human Geography.

ii) Concept of mixed races.

iii) Dress and festivals of Bill.

b) Answer the following questions in two to three sentences: **[4]**

i) Write settlement of Gond.

ii) Give distribution of languages in India.

P.T.O.

Q3) a) Explain the following in 50 words each [any two]: **[6]**

i) Skin colour as base of race.

ii) Food of Gond.

iii) Hinduism religion distribution in India.

b) Answer the following questions in two to three sentences: **[4]**

i) What is meant by Economic Geography.

ii) Write locations of Maharashtra tribal people.

Q4) Write short notes on any two of the following: **[10]**

a) Nature of Human Geography.

b) Definition and meaning of Human Race.

c) Buddhism religion distribution in India.

Total No. of Questions : 5]

SEAT No. :

P8390

[Total No. of Pages : 2

[5822]-215A

F.Y. B.Sc. (Semester - II)

GEOGRAPHY

Gg-121 : Introduction to Human Geography

(2019 Pattern) (CBCS)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Attempt any three questions from 2 to questions 5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Use of map, stencil is allowed.***

Q1) Answer the following questions in 20 words (Any Five) : **[5]**

a) Define Human Geography.

b) Give branches of Human Geography.

c) Write any two stages of Human evaluation.

d) Which are the location of PYGMY.

e) Write economic activities of ESKIMO.

f) Write examples of secondary activities.

Q2) a) Answer the following questions in 100 words (Any Two) : **[6]**

i) Describe the branch of Economic Geography.

ii) Describe hair colour as a base of human race.

iii) Explain food and clothing of ESKIMO.

b) Answer the following questions in 150 words (Any one) : **[4]**

i) Explain the scope of human Geography.

ii) Describe Griffith Taylor' theory of human Geography.

P.T.O.

Q3) a) Answer the following questions in 100 words (Any Two) : **[6]**

i) Discuss pure race

ii) Write economic activities of PYGMY

iii) Discuss the fishing primary activity

b) Answer the following questions in 100 words (Any Two) : **[4]**

i) Describe nature of Human Geography.

ii) Describe tertiary activities.

Q4) a) Answer the following questions in 100 words (Any Two) : **[6]**

i) Explain head form as base of Human Geography.

ii) Discuss geographical environment of PYGMY.

iii) Explain High-Tech software based activities.

b) Answer the following questions in 150 words (Any one) : **[4]**

i) Explain importance of Human Geography.

ii) Write meaning of Human race.

Q5) Write short on the following. (Any four) : **[10]**

a) Meaning of Human Geography.

b) Height as a base of Human race.

c) Physical traits of PYGMY.

d) Geographic environment of ESKIMO

e) Paturing and mining as a primary activity.

f) Tourism as a tertiary activity.

Total No. of Questions : 5]

SEAT No. :

P4729

[Total No. of Pages : 2

[5822]-216

F.Y. B.Sc.

GEOGRAPHY - II

Gg 122 : Population and Settlement Geography

(2019 Pattern) (CBCS) (Semester - II) (Paper - V) (12182

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Use of map stencil is allowed.***

Q1) Answer the following questions in 20 words (any five) : **[5]**

a) Define population Geography.

b) How many times national censuses of the India conducted till 2011?

c) Name any two states of India having high population density.

d) Define Literacy.

e) What is meant by settlement?

f) Name the two planned cities in India.

Q2) a) Answer the following questions in 100 words (Any two) : **[6]**

i) Describe scope of population Geography.

ii) Explain physical factors affecting on population distribution.

iii) Explain types of rural settlement.

b) Answer the following question in 150 words (Any one) : **[4]**

i) Write importance of Indian census.

ii) Describe the types of urban settlement.

P.T.O.

Q3) a) Answer the following questions in 100 words (any two) : **[6]**

i) Give details about vital statistics.

ii) Explain the stages of Demographic Transition Theory.

iii) Explain any two pattern of rural settlement.

b) Answer the following questions in 150 words (Any one) : **[4]**

i) Give an brief account of settlement Geography.

ii) Explain the functions of Urban centers.

Q4) a) Answer the following questions in 100 words (any two) : **[6]**

i) What are the sources of population data? Give detail information of population register.

ii) Explain economic problems of urban settlement.

iii) Write characteristics of scattered settlements.

b) Answer the following question in 150 words (Any one) : **[4]**

i) Describe in detail morphology of rural settlement.

ii) Explain the environmental problems of urbanisation.

Q5) Write short notes on the following (Any four) : **[10]**

a) Population density.

b) Age-Sex structure.

c) National sample survey.

d) Patterns of rural settlement.

e) Nucleated settlement.

f) Trend of Urbanisation in Maharashtra.

Total No. of Questions : 5]

SEAT No. :

P4730

[Total No. of Pages : 2

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F.Y. B.Sc.

MICROBIOLOGY

MB - 121 : Bacterial Cell and Biochemistry

(2019 Pattern) (CBCS) (Semester - II) (Paper - I) (12191)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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 labelled diagrams wherever necessary.***

Q1) Solve any five of the following : **[5]**

a) Name two rod shaped bacteria.

b) LPS stands for _____.

c) Define covalent bond.

d) Draw the structure of Glucose.

e) Spores are produced under starvation condition. State True or False.

f) Name any two aromatic amino acids.

Q2) a) Describe the following any three : **[6]**

i) Diagramatically describe Gram positive cell wall.

ii) Functions of PHB.

iii) Primary structure of protein.

iv) Different linkages in biomolecules.

b) Explain composition and function of bacterial capsule. **[4]**

P.T.O.

Q3) a) Explain the following any three : **[6]**

i) Structure of ribosome.

ii) Functions of Gas vesicles.

iii) Different classes of amino acids.

iv) Structure of lactose.

b) Give the classification of RNA with its function. **[4]**

Q4) a) Discuss the following any three : **[6]**

i) Functions of chlorosomes.

ii) Bacterial plasmid.

iii) Simple lipids with any one example.

iv) Functions of cytoskeletal protein.

b) Describe the structure and function of DNA **[4]**

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

a) Mycoplasma.

b) Magnetosome.

c) Bergey's manual for bacterial classification.

d) Classification of monosaccharides.

e) Spheroplast and protoplast.

f) Noncovalent bonds.

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Total No. of Questions : 5]

SEAT No. :

P4731

[Total No. of Pages : 2

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F.Y. B.Sc.

MICROBIOLOGY

MB - 122 : Microbial Cultivation and Growth

(2019 Pattern) (CBCS) (Paper - II) (Semester - II) (12192)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) What are chemoheterotrophs?

b) A Quantative chemical analysis of bacterial nitrogen is done by _____ method.

c) Define : Oligodynamic effect.

d) What are alkaliphiles?

e) The phase of growth curve of bacteria where a rapid growth is observed is known as _____.

f) What is TVC?

Q2) a) Describe any three of the following : **[6]**

i) Lag phase of growth curve of bacteria.

ii) Effect of temperature on growth of bacteria.

iii) Enrichment medium with one example.

iv) Lyophilization.

b) Justify : Mac conkey's Agar is both selective and differential medium.**[4]**

P.T.O.

Q3) a) Explain any three of the following : **[6]**

i) Role of NaCl in bacteriological medium.

ii) Photoautotrophs.

iii) Cultivation of fungi by using any one suitable medium.

iv) Use of Neubauer's chamber in enumeration of microorganisms.

b) Describe Diauxic growth of bacteria. **[4]**

Q4) a) Discuss any three of the following : **[6]**

i) Role of culture collection centre.

ii) Measurement of bacterial growth by PCV.

iii) Effect of solute concentration on bacterial growth.

iv) Kinetics of bacterial growth.

b) Describe pour plate method for isolation of bacteria. **[4]**

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

a) Role of peptone in bacteriological medium.

b) Enriched medium.

c) Cultivation of photosynthetic bacteria.

d) Turbidimetric method for bacterial growth measurement.

e) Generation Time.

Total No. of Questions : 5]

SEAT No. :

P4732

[Total No. of Pages : 2

[5822]-219

F.Y. B.Sc. (Nanoscience and Nanotechnology)

NANOSCIENCE - I

NS - 121 : Chemical and Biological Techniques for Synthesis of Nanomaterials

(2019 Pattern) (Paper - I) (Semester - II) (12261)

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.***
3) ***Questions 2 to 5 carry euqal marks.***

Q1) Solve any five of the following : **[5 × 1 = 5]**

a) Define 'sol-gel method.'

b) In langmuir-Blodgett (L-B) method which molecule are used?

c) Give the steps involved in SILAR method.

d) State the kirkindall effect.

e) What are colloids?

f) Which nanoparticles are synthesized using DNA?

g) Define 'Hydrothermal synthesis.'

Q2) a) Answer the following (Any Two) : **[2 × 3 = 6]**

i) Explain synthesis of semiconductor nanoparticle by colloidal routes.

ii) Explain 'spray pyrolysis method.'

iii) Explain 'Vapour-Liquid-Solid (VLS) method.

b) Explain synthesis of nanomaterials using microorganisms. **[4]**

P.T.O.

Q3) a) Answer the following (Any Two) : **[2 × 3 = 6]**

i) Explain 'chemical vapour deposition.'

ii) Explain 'Electrodeposition technique.'

iii) Explain 'colloids' and properties of colloids.

b) Explain 'SILAR method' in detail. **[4]**

Q4) a) Answer the following (any Two) : **[2 × 3 = 6]**

i) Explain 'Lab-on-chip' method.

ii) Explain 'sonochemical synthesis method.'

iii) Explain 'Metal-oxide Framework. (MOF)

b) Explain in detail S-layer synthesis of nanoparticles using DNA. **[4]**

Q5) Write short Note on any four of the following : **[10]**

a) Colloids in solution.

b) Solvothermal synthesis

c) Synthesis of nanomaterials using plant extract.

d) 'Metallorganic chemical vapour deposition.

e) Langmuir-Blodgett method.'

f) 'Microwave synthesis.'

Total No. of Questions : 5]

SEAT No. : ____

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[Total No. of Pages : 2

[5822]-220
F.Y. B.Sc.
Nanoscience and Nanotechnology
NANOSCIENCE - II
NS - 122 : Introduction to Characterization Techniques
(2019 Pattern) (Semester - II) (Paper - II) (12262)

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.***
3) ***Draw neat & labeled diagram wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Attempt any FIVE of the following : **[5]**

a) Draw the block diagram of PL Spectrometer.

b) Define molarity of solution.

c) What is elastic scattering?

d) Write down the properties of secondary standard solution.

e) What is mean by 'k-ratio'?

f) Define luminescence.

g) What is mean by spectroscopy.

Q2) Answer the following questions : **[10]**

a) With block diagram explain UV-Vis absorption spectroscopy. **[6]**

OR

Explain any four types of characterization methods.

b) Explain electron - matter interaction. **[4]**

P.T.O.

Q3) Answer the following questions : **[10]**

a) Explain particle size determination in brief. **[6]**

OR

With neat labeled diagram explain scanning Electron Microscopy.

b) Explain any four methods of concentration expressions. **[4]**

Q4) Answer the following questions : **[10]**

a) Explain Thermogravimetric Analysis of nanomaterials. **[6]**

OR

Explain Fourier transform infra Red Spectrometer with suitable diagram.

b) Explain nano perspectives in detail. **[4]**

Q5) Write short notes on ANY FOUR of the following : **[10]**

a) Nano-optics.

b) Porosity.

c) Electroluminescence.

d) Fluorescence analysis method.

e) Principle of volumetric analysis.

f) Acid-Base titration.

Total No. of Questions : 5]

SEAT No. :

P4734

[Total No. of Pages : 2

[5822]-221

F.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 121 : Fundamentals of Digital Electronics

(2019 Pattern) (Paper - I) (Semester - II) (12221)

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.***
3) ***Questions from 2 to 5 carries euqal marks.***

Q1) Solve any five of the following : **[5]**

a) $(A12F)_{16} = (?)_{10}$

b) Draw the block diagram of decimal to BCD encoder.

c) Show the block diagram of full adder.

d) Construct SR flipflop by using NAND gate.

e) Give the logic diagram of AND and OR gate by using NAND gate.

f) Show the timing diagram of decade counter.

Q2) Attempt the following :

a) i) Subtract $(1100)_2$ from $(1111)_2$ using 2's complement. **[2]**

ii) Simplify the logic expression $y=\left[A\overline{B}(C+BD)+\overline{A}\,\overline{B}\right]C$ using laws of boolean algebra and draw the simplified logic circuit. **[4]**

b) Construct 4 : 1 multiplexer using AND, OR and NOT gates. Explain its working. **[4]**

P.T.O.

Q3) Attempt the following :

a) i) Draw logic diagram of 1:4 demultiplexer using NOT and AND gates. Give its truth table. **[2]**

ii) Define pair, Quad in k-map. Give the format for 2 variable, 3 variable and 4-variable k-map. **[4]**

b) Explain 4-bit binary counter with suitable circuit diagram, truth table and timing diagram. **[4]**

Q4) Attempt the following :

a) i) What is common anode display? Draw the arrangement of LEDs in common anode mode. **[2]**

ii) Convert the expression $y = AB + A\overline{C} + BC$ in the standard SOP form. **[4]**

b) Show the types of data movement in 4-bit shift register symbolically. **[4]**

Q5) Solve any four of the following : **[10]**

a) Draw circuit of 2 input transistor OR gate and explain its working with help of truth table.

b) Draw circuit diagram of two input AND gate by using diode and explain its working.

c) Explain 3 to 8 decoder with truth table and logic circuit.

d) Define parity - construct odd parity generator.

e) Write note on concept of triggering level.

f) Explain hand J-K flipflop is converted into D-flipflop.

Total No. of Questions : 5]

SEAT No. :

P4735

[Total No. of Pages : 2

[5822]-222

F.Y. B.Sc.

ELECTRONIC SCIENCE

EL - 122 : Analog & Digital Device Applications

(2019 Pattern) (Semester - II) (Paper - II) (12222)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

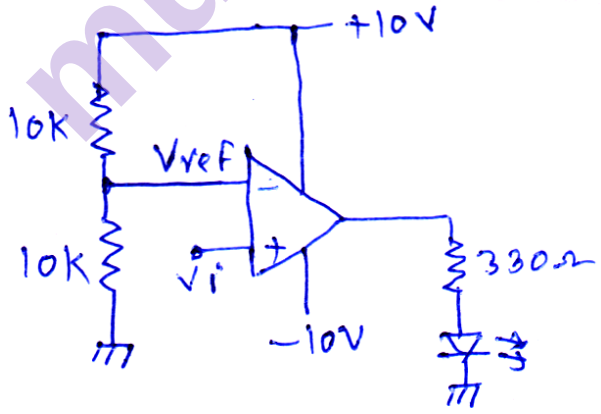
1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q. 2 to Q. 5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Attempt any five of the following : **[5]**

a) Define slew rate of opamp.

b) Draw equivalent circuit of opamp.

c) Determine input voltage Vi of comparator to make output LED on in the following circuit.



d) 'Astable multivibrator is also called as free running multivibrator' Comment.

e) Define resolution of DAC.

f) What do you mean by Accuracy of ADC.

P.T.O.

Q2) Answer the following : **[10]**

a) i) Draw circuit diagram of 4 bit binary R.ZR ladder. **[2]**

ii) Obtain an expression for gain of opamp in inverting mode. **[4]**

b) Describe construction & working of an integrator using opamp. **[4]**

Q3) Answer the following : **[10]**

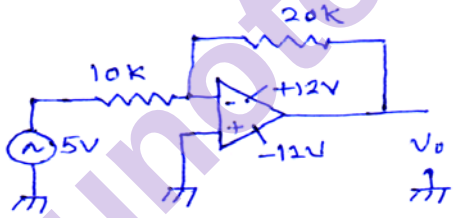
a) i) A non-inverting opamp has input resistance of 6.8 kΩ and feedback resistor of 68kΩ. If the input voltage is 0.5v, What will be output voltage. **[2]**

ii) Draw block diagram of IC 555 & explain it. **[4]**

b) Explain sucessive Approximation method of A to D conversion. **[4]**

Q4) Answer the following : **[10]**

a) i) Identify following configuration of opamp & find output voltage. **[2]**



ii) Design a monostable multivibrator circuit for a pulse width of lons using IC555 with c = 0.1μf. **[4]**

b) Describe construction & working of counter type ADC. **[4]**

Q5) Write a short note on any four of the following : **[10]**

a) Virtual ground of opamp.

b) Pin configuration of IC741.

c) Schmitt trigger using opamp.

d) Moist detector using IC555.

e) Binary weighted type DAC.

f) Thermister thermometer.

Total No. of Questions : 5] **SEAT No. :**

P4736 **[Total No. of Pages : 2**

[5822]-223

F.Y. B.Sc.

PSYCHOLOGY

PSY - 121 : Introduction to Social Psychology

(2019 Pattern) (Semester - II) (12201)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any Five of the following. **[5]**

a) Define Attitude.

b) What is group?

c) Define self - presentation.

d) Define social psychology.

e) What is Interpersonal Attraction?

f) Define social cognition.

Q2) a) Explain the increase our helping nature. (80 words) **[6]**

b) State the types of aggression. (50 words) **[4]**

Q3) a) Explain the scope of social psychology. (80 words) **[6]**

b) State the nature of self-concept. (50 words) **[4]**

Q4) a) Explain the factors influencing self-presentation. (80 words) **[6]**

b) State the causes of group conflicts. (50 words) **[4]**

P.T.O.

Q5) Write short notes (Any Four) : **[10]**

a) Social psychology and Industry.

b) Cooperation.

c) Individual behavior

d) Compliance

e) Child Abuse

f) Obedience

Total No. of Questions : 5]

SEAT No. :

P4737

[Total No. of Pages : 2

[5822]-224

F.Y. B.Sc.

PSYCHOLOGY

PSY - 122 : Psychological Testing

(2019 Pattern) (Semseter - II) (12202)

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.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Define Psychological Test.

b) What is mean by item analysis?

c) Defination of reliability.

d) Wha is validity?

e) In which field we can use psychological test? (Any Two)

f) What is correlation?

Q2) a) Explain the characteristics of good Psychological Test. (80 words) **[6]**

b) Explain the purpose of item analysis. (50 words) **[4]**

Q3) a) What is the meaning of reliability? Explain the types of reliability. (80 words) **[6]**

b) Explain any four ethical issues in Psychological test. [50 words] **[4]**

P.T.O.

Q4) a) What is item analysis? Describe power and speed test. (80 words) **[6]**

b) Explain the relationship between reliability and validity. (50 words) **[4]**

Q5) Write short notes (Any Four) : **[10]**

a) Validity.

b) Item difficulty.

c) Test-retest reliability.

d) Classical test theory.

e) validity influencing factor.

f) Objectivity in Psychological Test.

♣♣♣

Total No. of Questions : 5]

SEAT No. :

P4738

[Total No. of Pages : 2

[5822]-225

F.Y. B.Sc.

12241 : ENVIRONMENTAL SCIENCE (Paper - I)

EVS 121: Fundamentals of Environmental Geosciences

(2019 Pattern) (Semester - II)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Answer the following. (any five) **[5 × 1 = 5]**

a) Write any two principles of Plate Tectonic theory.

b) What are macronutrients of plants? Write few examples.

c) Define the term : Soil.

d) Differentiate between physical and chemical weathering of rocks.

e) Write the past composition of atomosphere.

f) Define : Evaporation.

Q2) a) Explain continental Drift theory with evidences. **[6]**

b) Describe the factors affecting generation of winds. **[4]**

Q3) a) What is earthquake? Explain the causes of it. **[6]**

b) Write in detail the composition of atmosphere. **[4]**

Q4) a) Explain the concept of human interference in triggering disasters. **[6]**

b) Write any one case study of flood. **[4]**

P.T.O.

Q5) Write short notes on any Four of the following: **[10]**

a) Internal structure of Earth.

b) Characteristics of Igneous rocks

c) Physical properties of soil

d) Factors affecting atmospheric temperature

e) Lape rate and its types.

f) Causes and effects of drought.

Total No. of Questions : 5]

SEAT No. :

P4739

[Total No. of Pages : 2

[5822]-226

F.Y. B.Sc. (Environmental Science)

EVS - 122 : Fundamentals of Environmental Pollution

(CBCS) (2019 Pattern) (Paper - II) (Semester - II) (12242)

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.***
3) ***Questions from 2 to 5 carries equal marks.***

Q1) Solve any five of the following : **[5]**

a) Define noise pollution?

b) What are main sources of air pollution?

c) What are the causes of soil pollution?

d) Define biomagnification?

e) What causes Asian brown cloud?

f) What is the importance of organic farming?

Q2) a) Describe Green house effect with the help of diagram? **[6]**

b) Write causes and effects of acid rain? **[4]**

Q3) a) Explain routes of contamination of soil and its effects on soil? **[6]**

b) What is biological paste management? **[4]**

Q4) a) Discuss major sources of water pollution and its effects? **[6]**

b) What is the importance of lime application to the soil? **[4]**

P.T.O.

Q5) Write Short note on any four of the following : **[10]**

a) Eutrophication

b) Soil salinization

c) Marine water pollution

d) Los Angeles smog

e) Desertification

f) Radio active pollutants

Total No. of Questions : 4]

SEAT No. :

P4740

[Total No. of Pages : 1

[5822]-227

F.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS - 201 : Information Warfare

(2019 Pattern) (Semester - II) (Paper-I) (12231)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Define the following questions. **[5]**

a) Define Cyber Crime
b) State the Meaning of C4 ISR
c) What do you mean by Doctrine
d) State the Meaning of Cyber Terrorism
e) What do you mean by Intelligence Based Warfare

Q2) Write short notes on (any two). **[10]**

a) Intelligence
b) Command and Control warfare
c) Information Warfare
d) Cyber Security

Q3) Attempt the following questions (any two) **[10]**

a) Discuss in brief Cyberspace
b) Electronic warfare explain in brief
c) Explain the India's Doctrine of Information warfare

Q4) Answer in details (any one) **[10]**

a) Explain the Information warfare
b) Discuss in Social media and cyber security

Total No. of Questions : 4]

SEAT No. :

P4741

[Total No. of Pages : 2

[5822]-228

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS202 : Homeland Security of India

(2019 Pattern) (Semester - II) (Paper - I) (12232)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Define the following questions : **[5]**

a) Define Terrorism.

b) What is Emergency management?

c) What is Security?

d) What is Homeland Security?

e) What is counterterrorism?

Q2) Write short notes on (any two) : **[10]**

a) International cooperation in Homeland Security.

b) India and its Homeland Security.

c) Approaches of Homeland Security.

Q3) Attempt the following questions (any two) : **[10]**

a) State Strategic Planning.

b) Explain the Understand the conditions that give rise to terrorism.

c) State Homeland Security and Defence in Practice.

P.T.O.

Q4) Answer in details (any one) : **[10]**

a) State Homeland security and emergency management.

b) Explain the Identify and evaluate basic counterterrorism operations.

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Total No. of Questions : 4]

SEAT No. :

P4742

[Total No. of Pages : 2

[5822]-229

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS203 : Disaster Management and National Security

(2019 Pattern) (CBCS) (Semester - II) (12233)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Define the following questions : **[5]**

a) What is Natural Disaster?

b) Define the concept of Hazards.

c) Explain the Concept of Risk?

d) State the full form of EOC.

e) What is NDMA?

Q2) Write short notes on (any two) : **[10]**

a) Flood.

b) Disasters Management.

c) Social awareness of Disaster.

Q3) Attempt the following questions (any two) : **[10]**

a) Explain in brief the types of Natural Disasters.

b) Explain the CBRN Disasters.

c) Write the Importance of Disaster Management policy.

P.T.O.

Q4) Answer in details (any one) : **[10]**

a) Explain in detail the Manmade Disasters.

b) Explain in detail Risk analysis.

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Total No. of Questions : 4]

SEAT No. :

P4743

[Total No. of Pages : 6

[5822]-230

F.Y. B.Sc.

(RE - A - FC - 102) : FOUNDATION COURSE (For Restructure Only)

(2019 Pattern) (Semester - II) (Paper - II) (12601)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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) Modern Direct democracy.

b) Indirect or representative democracy.

c) Aesthetic values.

d) Importance of Indian constitution.

e) National values.

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

a) Briefly write on the creation of the constitution of India.

b) Explain the merits and demerits of democracy.

SECTION - B

Q3) Show any One of the following factors in the given map (Supplement - I) and Attach it with answer sheet. **[5]**

a) Show Uttar Pradesh and Telangana capital.

OR

b) Show Goa and Odisha Capital.

Q4) Show any One of the following factors in the given map (Supplement - II) and Attach it with answer sheet. **[10]**

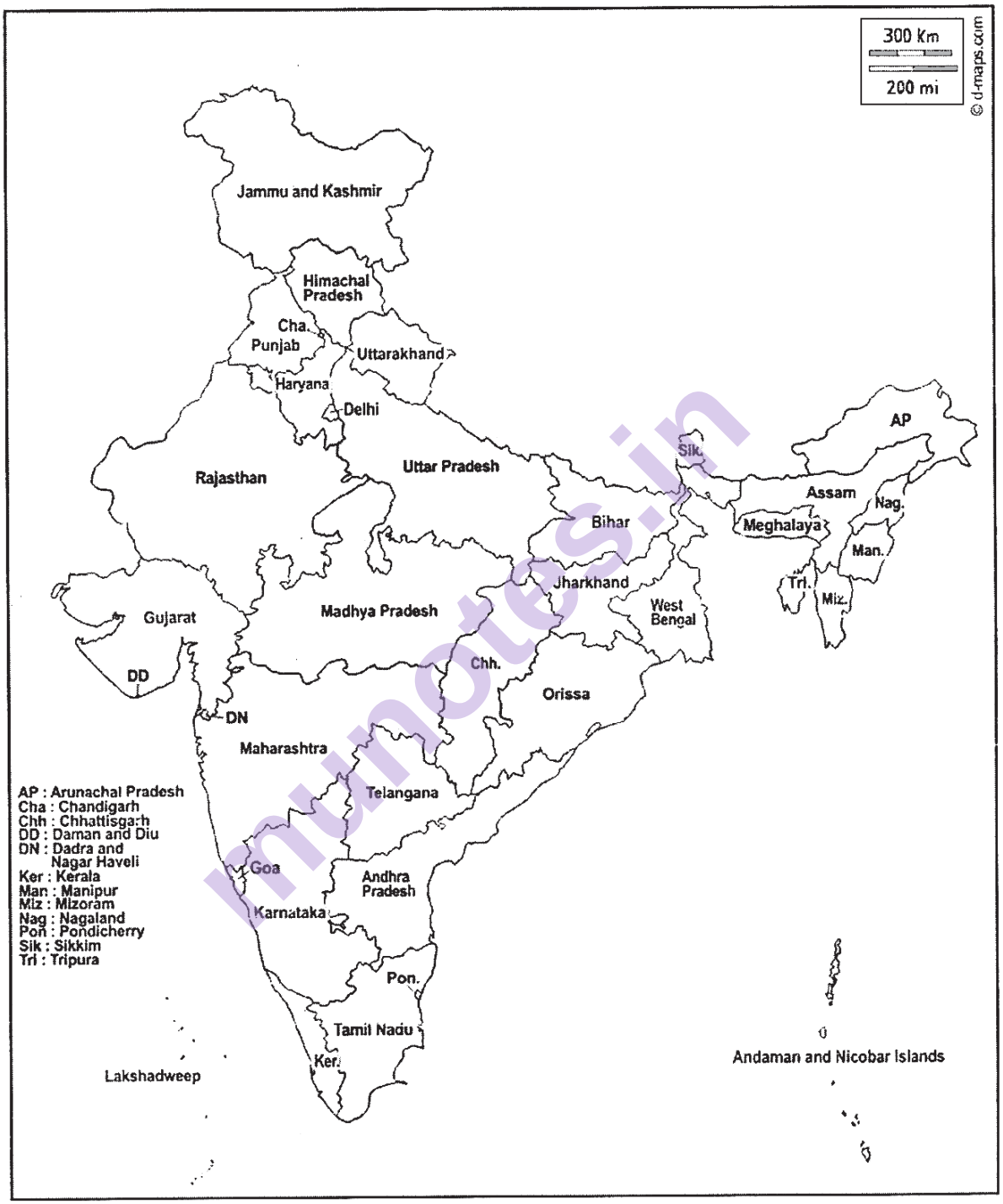
a) Show the Nathpa Jhakri, Bhakra Nangal, Idukki and Hirakud dam.

OR

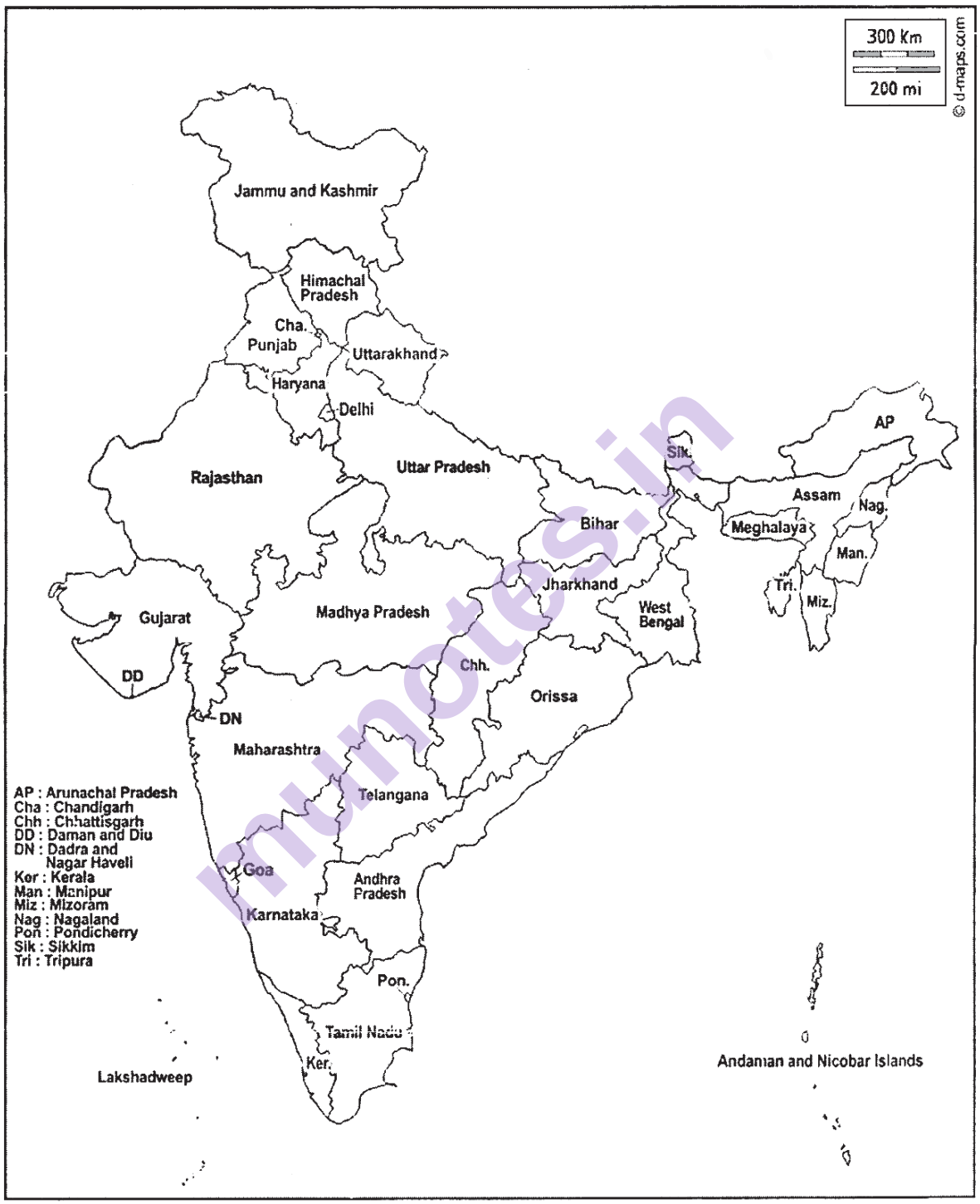
b) Show the Ganga, Narmada and Krishna river.

P.T.O.

(Supplement - I)



(Supplement - II)



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Total No. of Questions : 4]

P4743

[5822]-230
F.Y. B.Sc.
(RE - A - FC - 102) : FOUNDATION COURSE (For Restructure Only)
(2019 Pattern) (Semester - II) (Paper - II) (12601)
(मराठी रूपांतर)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना : 1) सर्व प्रश्न सोडविणे आवश्यक आहे.
2) उजवीकडील अंक गुण दर्शवितात.
3) विभाग – अ: थेअरी व विभाग – ब: प्रॅक्टीकल

विभाग – अ

प्रश्न 1) खालील टिपा प्रत्येकी 150 शब्दात लिहा. (कोणत्याही 3) **[15]**

अ) आधुनिक प्रत्यक्ष लोकशाही.

ब) अप्रत्यक्ष किंवा प्रातिनिधिक लोकशाही.

क) सौंदर्यशास्त्रीय मूल्ये.

ड) भारतीय राज्यघटनेचे महत्व.

य) राष्ट्रीय मुल्ये.

प्रश्न 2) खालील पैकी कोणत्याही एका प्रश्नाचे उत्तर 150 शब्दांत लिहा. (कोणतेही 1) **[5]**

अ) भारतातील राज्यघटनेची निर्मिती यावर थोडक्यात लिहा.

ब) लोकशाहीचे गुण व दोष स्पष्ट करा.

विभाग – ब

प्रश्न 3) तुम्हास दिलेल्या नकाशामध्ये खालीलपैकी एक घटक प्रश्नपत्रिकेसह दिलेल्या परिशिष्ट–१ मध्ये दर्शवा आणि उत्तरपत्रिकेबरोबर जोडा. **[5]**

अ) उत्तरप्रदेश व तेलंगणाची राजधानी दर्शवा.

किंवा

ब) गोवा आणि ओडीशा राज्याची राजधानी दर्शवा.

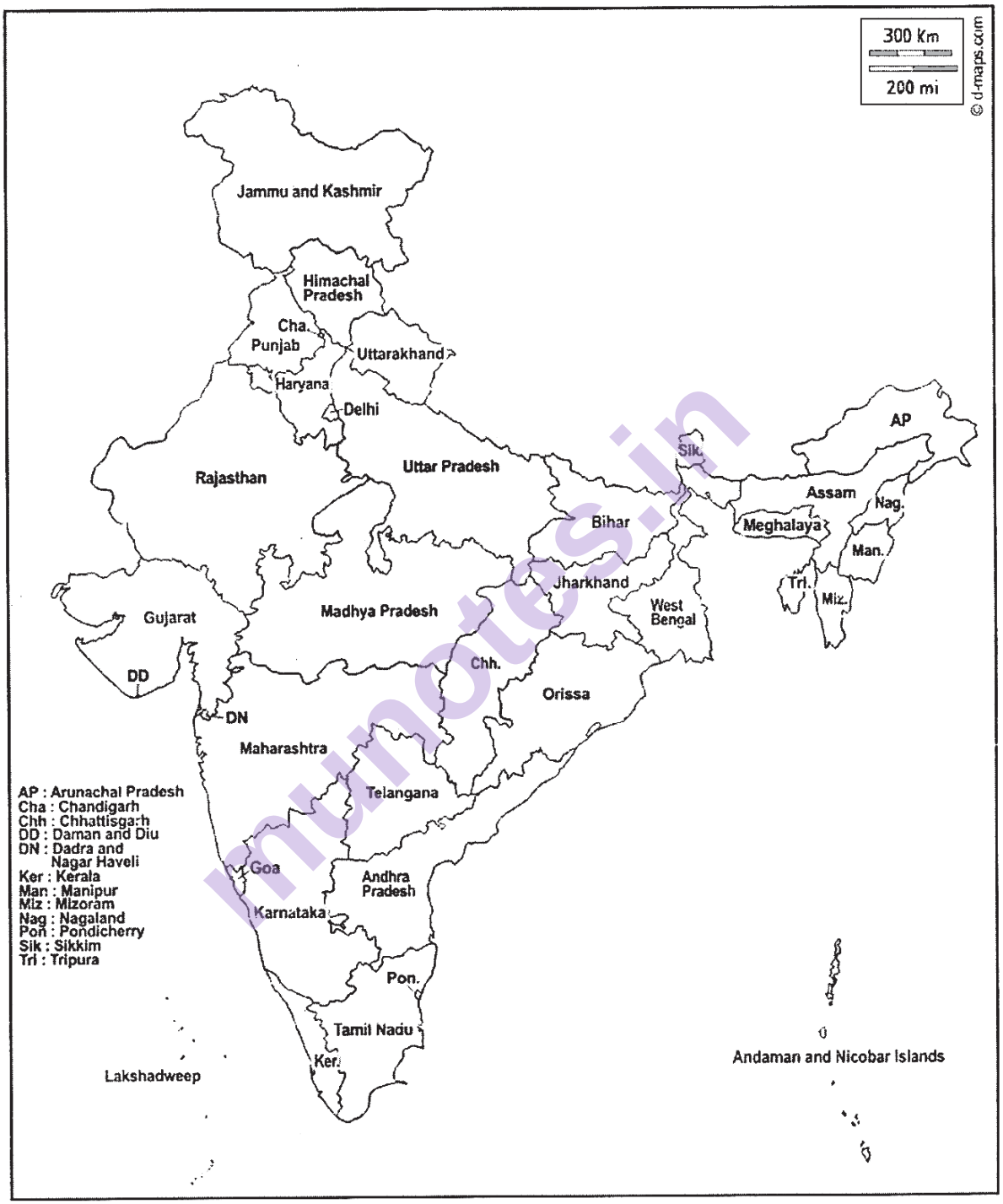
प्रश्न 4) तुम्हास दिलेल्या नकाशामध्ये खालीलपैकी एक घटक प्रश्नपत्रिकेसह दिलेल्या परिशिष्ट–२ मध्ये दर्शवा आणि उत्तरपत्रिकेबरोबर जोडा. **[10]**

अ) नाथवा झाक्री, भाक्रा नांगल, इडुक्की व हिराकूड धरण दाखवा.

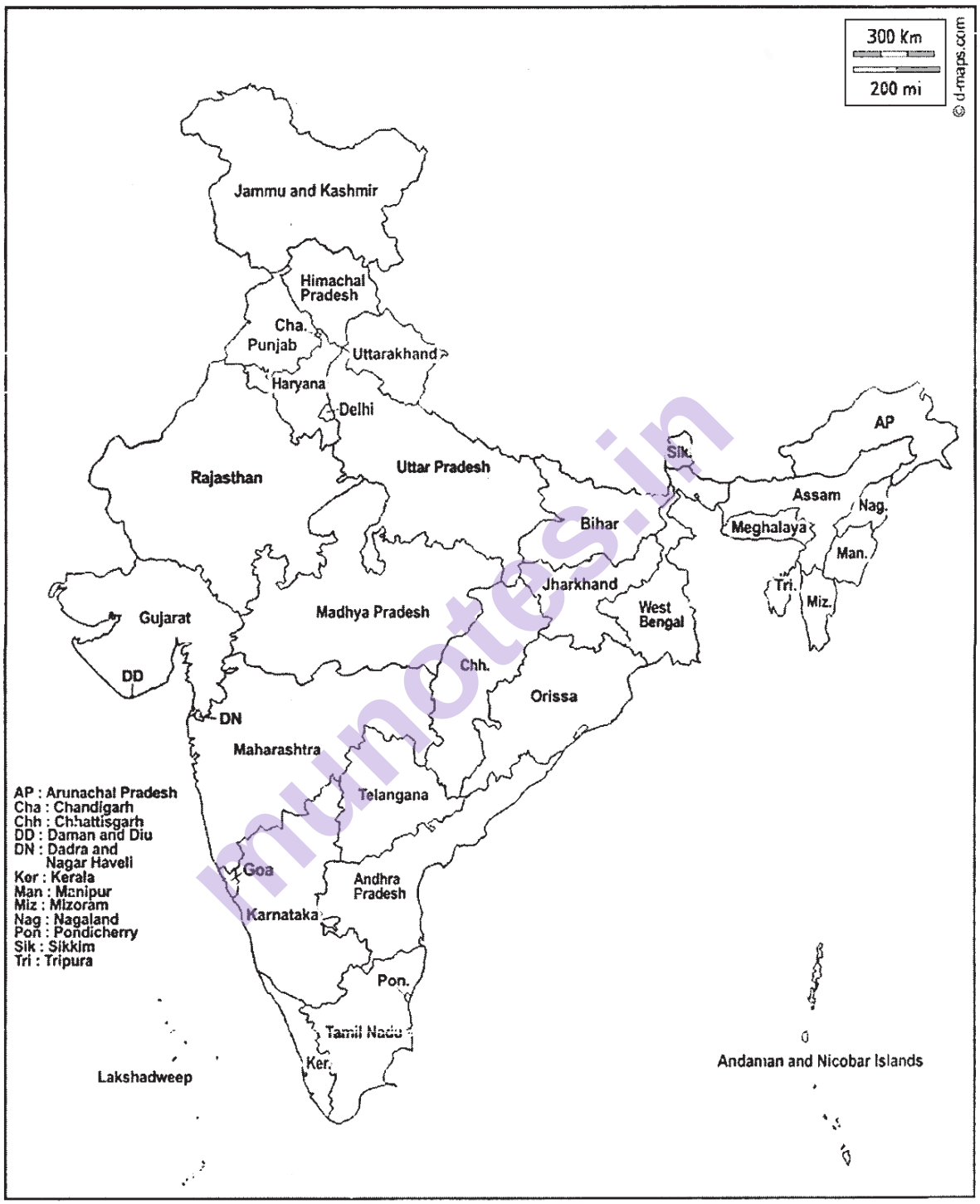
किंवा

ब) गंगा, नर्मदा व कृष्णा नदी दाखवा.

(Supplement - I)



(Supplement - II)



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Total No. of Questions : 5]

SEAT No. :

P4744

[Total No. of Pages : 2

[5822]-231

F.Y. B.Sc. (Vocational)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

(CHNA - 121) : Essentials of Computer - II

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

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.***
3) ***Questions 2 to 5 carry euqal marks.***

Q1) Solve any five of the following : **[5 × 1 = 5]**

a) What is RAM.

b) Define control unit of computer.

c) What is MAR.

d) Define access time.

e) Write the full form of EDORAM.

f) Write typical uses of magnetic disks.

Q2) a) i) What is SDRAM. **[3]**

ii) With the help of block diagram. Explain the register based CPU organization. **[3]**

b) Write short notes on HDD. **[4]**

Q3) a) i) What is memory hierarchy? **[3]**

ii) What is memory card? Write its features and typical uses. **[3]**

b) Write short notes on tablet PC. **[4]**

P.T.O.

Q4) a) i) Explain the primary memory. **[3]**

ii) What is a super computer? What are its main uses. **[3]**

b) Explain the working of compact disk. **[4]**

Q5) Attempt any four of the following : **[10]**

a) Write short notes on notebook computer.

b) What is SIMM? Explain their need.

c) Explain MBR in brief.

d) Define flash memory.

e) Write short notes on memory mapping.

f) Write short notes on DVD.

Total No. of Questions : 5]

SEAT No. :

P4745

[Total No. of Pages : 2

[5822]-232

F.Y. B.Sc. (Vocational)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

CHNA - 122 : Computer Organisation - II

(2019 Pattern) (Paper - II) (Semester - II) (12872)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) What in micro and mini USB?

b) What is PPI?

c) Define NOS.

d) What is HDMI?

e) Define Timer circuit in computer system.

f) Define Latches.

Q2) a) i) Explan Rs- 232 in details. **[3]**

ii) What is co-processor? Explain math co-processor. **[3]**

b) List different Internet connection types explain any one Internet connection type in details. **[4]**

Q3) a) i) Explain working of USB in details. **[3]**

ii) Compare client to server Network and peer to peer Network. **[3]**

b) What is networking? Explain advantages of networking. **[4]**

P.T.O.

Q4) a) i) Explain working of keyboard controller. **[3]**

ii) What is tri-state buffer? Explain applications of tri-state buffer. **[3]**

b) What is Interrupt? Explain Hardware and software Interrupt. **[4]**

Q5) Attempt any four of the following : **[10]**

a) What is NIC? Explain it's function in details.

b) Write a short note on CRT controller.

c) What is multimedia? Explain multimedia computer system.

d) List advantages and disadvantages of serial communication over parallel communication.

e) What is HDC? Explain its function.

Total No. of Questions : 5]

SEAT No. :

P4746

[Total No. of Pages : 2

[5822]-233

F.Y. B.Sc. (Biotechnology)

VBt - 121 : BIOINSTRUMENTATION (Vocational Paper - I)

(CBCS) (2019 Pattern) (Semester - II) (12571)

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.***
3) ***Q.2 to Q.5 carry euqal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) Solve any 5 of the following : **[5]**

a) Name any 2 types of plane chromatography.

b) Define wavenumber.

c) Name any 2 types of rotars used in centrifuge.

d) Define total magnification of microscope.

e) What is electrophoresis?

f) What are radioisotopes?

Q2) a) Answer any two of the following : **[6]**

i) Give the principle of gel filtration technique.

ii) Give the applications of pH-meter.

iii) Distinguish between α & β particles.

b) Answer any one of the following : **[4]**

i) Describe the principle and working of phase contrast microscope.

ii) Give the applications of spectroscopy to biomolecules.

P.T.O.

Q3) a) Answer any one of the following : **[6]**

i) Describe the components and working of colorimeter in detail.

ii) Explain liquid scintillation technique in detail.

iii) Describe ion-exchange chromatography in detail.

b) Answer any one of the following : **[4]**

i) Describe the principle and procedure of agarose gel electrophoresis.

ii) Describe density gradient centrifugation in detail.

Q4) a) Answer any two of the following : **[6]**

i) Give any three applications of x-ray region.

ii) Explain desktop centrifuge in detail.

iii) Give any 3 applications of TLC.

b) What are the applications of radioisotopes in biology? **[4]**

Q5) Write short note on any four of the following : **[10]**

a) γ particles (Gamma particles).

b) Types of chromatography.

c) Principle of inverted microscope.

d) Electromagnetic spectrum and its regions.

e) Any three factors affecting electrophoretic mobility.

f) RCF and RPM.

Total No. of Questions : 5]

SEAT No. :

P4747

[Total No. of Pages : 2

[5822]-234

F.Y. B.Sc. (Vocational)

Biotechnology

VBT - 122 : Biostatistics and Computers for Biologists

(CBCS) (2019 Pattern) (Paper - II) (Semseter - II) (12572)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Solve any five of the following : **[5]**

a) Define primary data.

b) Find the mode of the following data 2, 6, 3, 9, 5, 6, 2, 6

c) What are micro computers?

d) Give full form of NCBI

e) Enlist the Boolean operates?

f) Define coefficient of variation.

Q2) a) Attempt any two from the following : **[6]**

i) What is Kurtosis of distribution? Explain its type.

ii) Describe the use of the following with an example of each : (1) Bar diagram (2) Pie diagram.

iii) What is a computer? Give a well labeled block diagram of a computer system.

b) Compute the mean, standard deviation and coefficient of variation for the following weights in (g) of 4 frogs: 30, 90, 20, 10, 80, 70. **[4]**

P.T.O.

Q3) a) Attempt any two from the following : **[6]**

i) Define poison distribution and give its applications.

ii) What is chi-square test? Explain its application in biology.

iii) Enlist the characteristics of first generation computers.

b) What are literature database. Explain any one. **[4]**

Q4) a) Attempt any two from the following : **[6]**

i) The following table gives the litter size of each of the 36 sows. Calculate the cumulative frequency and determine the median of litter size

No of piglets	5	6	7	8	9	10	11	12	13	14
Frequency	1	0	2	3	3	9	8	5	3	2

ii) Write in brief the applications of biostatistics.

iii) Define correlation. What do you understand by negative correlation?

b) What are search engines? Explain any one in detail. **[4]**

Q5) Attempt any four from the following : **[10]**

a) Distinguish between population and sample of biological investigation.

b) Enlist the relative advantages of arithmetic mean.

c) Give the general precautions of viruses of the computer.

d) Write a short note on Microsoft Excel.

e) Give negative skewed of a distribution with the help of a diagram.

f) Define probability. Give one example.

Total No. of Questions : 5]

SEAT No. :

P4748

[Total No. of Pages : 2

[5822]-235

F.Y. B.Sc. (Vocational)

12891 : SEED TECHNOLOGY

ST1.4 : Seed Physiology

(2019 Pattern) (CBCS) (Semester - II) (2 Credits)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Solve any five of the following : **[5 × 1 = 5]**

a) Define Endosperm.

b) What is viviparous germination?

c) Define synthetic seed.

d) What is seed dormancy?

e) What is fumigation?

f) Define Seed Viability.

Q2) a) Describe the physiology of seed development. **[6]**

b) Explain epigeal type of germination with suitable diagram. **[4]**

Q3) a) Explain any two methods of breaking seed dormancy. **[6]**

b) Describe the process of production of artificial seed. **[4]**

P.T.O.

Q4) a) What are the factors affecting seed storage and longevity. **[6]**

b) Comment on quick viability test (Tz). **[4]**

Q5) Write short note on any four of the following : **[10]**

a) Seed embryo

b) Hypogeal germination

c) Seed vigour

d) Physical method of breaking seed dormancy

e) Cold storage

f) Artificial Seed

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Total No. of Questions : 5]

SEAT No. :

P4749

[Total No. of Pages : 2

[5822]-236

F.Y. B.Sc.

SEED TECHNOLOGY (Vocational Paper - II)

ST - 1.5 : Seed Production

(2019 Pattern) (Paper - IV) (Semester - II) (12892)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Define certified seed.

b) What is the long form of NSC in relation to seed.

c) Enlist any two evaluation methods in release of new variety.

d) Weed control

e) Give any one type of nursery bed used in seed production

f) Name any one disease of Tomato crop.

Q2) a) Comment on release of new variety. **[6]**

b) Define seed sowing. Comment on time of sowing with suitable example. **[4]**

Q3) a) What is irrigation? Comment on loss due to excess irrigation and define drainage. **[6]**

b) What is meant by land preparation? Comment on raised type of nursery bed. **[4]**

P.T.O.

Q4) a) What is roughing? What are the steps for maintenance of genetic purity. **[6]**

b) Comment on causal organism, symptoms and control measures of Tikka disease in groundnut. **[4]**

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

a) Threshing

b) Processing

c) Multi location trial

d) Isolation distance

e) Care during harvesting and threshing

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Total No. of Questions : 5]

SEAT No. :

P4750

[Total No. of Pages : 2

[5822]-237

F.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

Quantitative Industrial Microbiology

(2019 Pattern) (Semester - II) (Paper - I) (12821)

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.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any Five of the following : **[5]**

a) Fill in the blank

_____ is the reactant present in an amount in excess of that required to combine with all of the limiting reactant.

b) Convert 1 micrometer = _____ milimeter.

c) Define 'Force'

d) Where is the data related to physical and chemical property of material available?

e) Give two examples of Natural variables.

f) Derived units of force is _____.

Q2) a) Describe :

i) Mathematical models in industrial microbiology. **[6]**

OR

ii) Cyclic Process of model building. **[6]**

b) What is significant figure? Write one, two and three significant figures for observation - 14.7623 **[4]**

P.T.O.

Q3) a) Explain :

i) Log-log plots. **[6]**

OR

ii) Linear models. **[6]**

b) Write the concept of dimensional homogeneity. **[4]**

Q4) a) Discuss :

i) Process flow diagram. **[6]**

OR

ii) Data analysis methods. **[6]**

b) Calculate the mean and variance of the following pH observation pH data : 7.88, 8.11, 7.75, 8.01, 7.93, 7.87, 7.98, 8.07, 7.91, 7.65. **[4]**

Q5) Write short notes on any Four of the following : **[10]**

a) Weight

b) Stoichiometry

c) Goodness of fit

d) Uncertainty in measurement

e) Types of error

f) Specific gravity

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Total No. of Questions : 5]

SEAT No. :

P4751

[Total No. of Pages : 2

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F.Y. B.Sc.

INDUSTRIAL MICROBIOLOGY

IMB - 122 : Industrial Bioprocess and Microbial Products

(CBCS) (2019 Pattern) (Paper - II) (Semester - II) (12822)

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.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Why minerals are added in fermentation media.

b) Give examples of any two organic acids produced by fungi.

c) Enlist two organisms used for production of amino acids.

d) What is CSTR? Write its application.

e) Explain 'GRAS category organisms' with any one example.

f) Define 'Precursors'

Q2) a) Attempt any three of the following : **[6]**

i) Write characteristics of industrially important microorganisms.

ii) Explain in details 'nitrogen sources' in fermentation media.

iii) With help of flow-chart explain the production of antibiotic.

iv) Describe use of Recombinant therapeutic peptides.

b) Explain the microbial fermentation process of Industrial ethanol. **[4]**

P.T.O.

Q3) a) Attempt any three of the following : **[6]**

i) Write examples of enzymes used in detergent industry.

ii) Give application of Bacteriophages as a therapeutic agents.

iii) Explain the process of fermentation for production of yogurt:

iv) Write application of enzymes in plant juice production.

b) Explain the term 'synbiotics' in details. **[4]**

Q4) a) Attempt any three of the following : **[6]**

i) Explain the use of Hydrogen as biofuel.

ii) Give examples of any two Recombinant therapeutic proteins and their application.

iii) Explain the microbial production of amino acids with respect to substrate used.

iv) Describe with help of flow-chart commercial microbial enzyme production.

b) Explain the microbial biomass production process of manufacture of Mushroom. **[4]**

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

a) Microbial production of cheese

b) Carbon sources used in fermentation media

c) Polysaccharide

d) Bacterial vaccines

e) Starch processing enzymes

f) Butanol

Total No. of Questions : 5]

SEAT No. :

P4752

[Total No. of Pages : 2

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F.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE (EEM)

EEM-121 : Maintenance of Domestic Equipment - B (Cooling Appliances)

(2019 Pattern) (CBCS) (Semester - II) (Paper - I) (12811)

Time : 2 Hours] *[Max. Marks : 35*

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.***

Q1) Attempt any Five of the following : **[5]**

a) What is function of compressor in refrigerator?

b) What is working principle of air conditioner?

c) Which gas is used in AC?

d) What are different types of air conditioners?

e) What is unit of refrigeration?

f) What is coefficient of performance of refrigerator?

Q2) a) Attempt the following : **[6]**

i) What are the electrical components of refrigerator?

ii) What causes a refrigerator compressor to fail?

b) How do you change an AC thermostat? **[4]**

P.T.O.

Q3) a) Attempt the following : **[6]**

i) With a neat block diagram, explain the working of air conditioner.

ii) Why does compressor trip-the circuit breaker?

b) What are four stages of refrigeration? **[4]**

Q4) a) Attempt the following : **[6]**

i) What are main parts of refrigerator?

ii) How does a freezer work?

b) What are different parts of central AC? Explain **[4]**

Q5) Attempt any Four of the following : **[10]**

a) What are different cleaning methods used in air conditioners?

b) Is AC refrigerant leak dangerous?

c) What is best type of refrigerant?

d) What is condenser coil in air conditioner?

e) How to troubleshoot freezer if it is not cold enough?

f) What happens if AC condenser is dirty?

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Total No. of Questions : 5]

SEAT No. :

P4753

[Total No. of Pages : 2

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F.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE

VOC-EEM-122: Elements of Electronic Equipment Design - B (Opem Source Tools)

(CBCS) (2019 Pattern) (Semester - II) (Paper - II) (12812)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Attempt any Five of the following : **[5]**

a) What is development board?

b) What is LCD?

c) Blue tooths have replaced wires. Comment.

d) What is operating system?

e) What is Android studio?

f) What is I2C?

Q2) a) Answer the following : **[6]**

i) What is microcontroller? Write features of it.

ii) Write a program for controlling DC motor connected to Arduino board.

b) Write a note on IDE. **[4]**

P.T.O.

Q3) a) Answer the following : **[6]**

i) What is an app for mobile? Give two examples of popular apps with their applications.

ii) What are the requirements of IDE?

b) Write Arduino interface for Blue tooth control. **[4]**

Q4) a) Answer the following : **[6]**

i) What is function? Explain the functions Digital Read( ) and delay ( ).

ii) Give atleast three features of app.

b) Write Arduino program for Blue tooth control and data transfer. **[4]**

Q5) Attempt any Four of the following : **[10]**

a) Define the term port, Board for Arduino.

b) How to interface keypad to Arduino board.

c) Write Arduino program for ON-OFF of DC motor.

d) Draw the block diagram showing interfacing of I2C with LCD.

e) What are the hidden features of Whats App?

f) How to develop mobile app for controlling electronic appliance?