Total No. of Questions : 4]

SEAT No. :

PA-2112

[Total No. of Pages : 3

[5901]-101

S.Y.B.Sc. (Regular)

MATHEMATICS

MT-231 : Calculus of Several Variables

(2019 Pattern) (Semester - III) (Credit System) (Paper-I) (23111)

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. **[5×1=5]**

a) Find the domain and range of $g(x,y)=\sqrt{g-x^2-y^2}$.

b) Where is the function

$$f(x,y)=\frac{x^2-y^2}{x^2+y^2}$$

continuous?

c) Find $\frac{\partial z}{\partial x}$ if $x^3+y^3+z^3+6xyz=1$.

d) Find the critical point of $f(x,y)=x^2+y^2-2x-6y+14$.

e) Write the condition for a critical point (a, b) of a function $f(x, y)$ to be a saddle point.

f) Evaluate

$$\int_0^1\int_0^3 e^{x+3y}\,dx\,dy$$

g) Find the Jacobian of the transformation $x = 5u–v$, $y = u + 3v$.

P.T.O.

Q2) a) Attempt any one of the following. **[5]**

i) If $f(x, y)$ is a function of two variables, write the formulas for $f_x(x,y), f_y(x,y), f_{xx}(x,y), f_{xy}(x,y)$ and $f_{yy}(x,y)$.

ii) State clairaut's theorem. Write laplace's equation in two dimension. Give an example of a function of two variables that satisfies laplace's equation.

b) Attempt any one of the following. **[5]**

i) Evaluate

$$\lim_{(x,y)\to(0,0)} \frac{xy}{\sqrt{x^2+y^2}}$$

ii) Verify that the function $u = \frac{1}{\sqrt{x^2+y^2+z^2}}$ is a solution of the three dimensional Laplace equation.

Q3) a) Attempt any one of the following. **[5]**

i) If $f(x, y)$ is a homogeneous function of degree n that has continuous second order partial derivatives, then show that

$$x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf(x,y).$$

ii) Explain the second derivative test to classify the critical points of a function of two variables into extreme points and saddle point.

b) Attempt any one of the following. **[5]**

i) If $u = x^4y + y^2z^3$, where $x = rse^t$, $y = rs^2e^{-t}$, and $z = r^2s\sin t$, find the value of $\frac{\partial u}{\partial s}$ when $r = 2, s = 1, t = 0$.

ii) A rectangular box without a lid is to be made from $12m^2$ of cardboard. Find the maximum volume of such a box.

Q4) a) Attempt any one of the following. **[5]**

i) State Fubini's theorem. Write the formula for change of cartesian coordinates to polar coordinates in a double integral.

ii) Write the equations of relationship between rectangular coordinates (X, Y, Z) and the spherical coordinates (ρ, θ, ϕ). Hence find the rectangular coordinates of a point $\left(2, \frac{\pi}{2}, \frac{\pi}{2}\right)$ in spherical coordinates.

b) Attempt any one of the following. **[5]**

i) Evaluate

$$\int_1^2 \int_0^{2z} \int_0^{\ln x} xe^{-y}\, dy\, dx\, dz$$

ii) Evaluate

$$\int_0^1 \int_{3y}^3 e^{x^2}\, dx\, dy$$

by reversing the order of integration.

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Total No. of Questions : 4]

SEAT No. :

PA-2113

[Total No. of Pages : 2

[5901]-102
S.Y. B.Sc.
MATHEMATICS (Paper - II)
MT-232 (A) : Numerical Methods and its Applications
(2019 Pattern) (CBCS) (Semester - III) (23112A)

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 is allowed.***

Q1) **Attempt any Five of the following :** **[5 × 1 = 5]**

a) Define absolute error.

b) Write the formula to find first approximation x_1 in Regula-Falsi method with initial approximations a and b.

c) Simplify E^3x^2 take $h = 1$.

d) Prove that $\nabla(k) = 0$ where k is constant.

e) Write the formula for $\frac{dy}{dx}$ at $x = x_n$ in terms of ∇.

f) Write Runge-Kutta second order formulae to solve $\frac{dy}{dx} = f(x, y)$ with initial condition $y(x_0) = y_0$.

g) Write the formula for $y_1^{(n)}$ in modified Euler's method.

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

i) Explain Bisection method to find root of $f(x) = 0$.

ii) Derive Lagrange's interpolation formula.

P.T.O.

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

i) Evaluate $\int_0^6 e^x dx$ by Simpson's $\frac{3}{8}$ rule using the data e = 2.71, e^2 = 7.38, e^3 = 20.08, e^4 = 54.59, e^5 = 148.41, e^6 = 403.42.

ii) Solve $\frac{dy}{dx} = -y$ with $y(0) = 1$ by Euler's method. Take $h = 0.01$ and obtain $y(0.01)$, $y(0.02)$, $y(0.03)$

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

i) Explain Taylor's series method to solve initial value problem.

ii) Explain modified Euler's method to solve $\frac{dy}{dx} = f(x, y)$ with $y(x_0) = y_0$.

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

i) Find the real root of $x^2 - 2x - 1 = 0$ between 1 and 3 by Regula-Falsi method (perform two iterations)

ii) Prove that $\Delta \log f(x) = \log\left\{1 + \frac{\Delta f(x)}{f(x)}\right\}$.

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

i) Write the rules for round-off the number to significant figure.

ii) Derive the formula for $\frac{dy}{dx}$ at $x = x_0$ in terms of Δ.

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

i) Find $\sqrt[4]{74}$ by Newton-Raphson method. Perform two iterations.

ii) Find y when $x = 0.1$ by Runge-Kutta fourth order formula given $\frac{dy}{dx} = x + y$ with $y(0) = 1$.

□□□

Total No. of Questions : 4]

SEAT No. :

PA-2114

[Total No. of Pages : 3

[5901]-103

S.Y. B.Sc.

MATHEMATICS (Paper - II(B))

MT-232(B) : Graph Theory

(2019 Pattern) (Credit System) (Semester - III) (23112B)

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

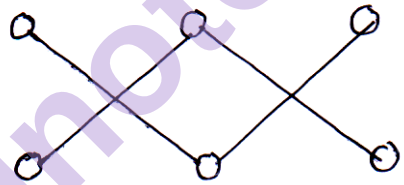
Instructions to the candidates:

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

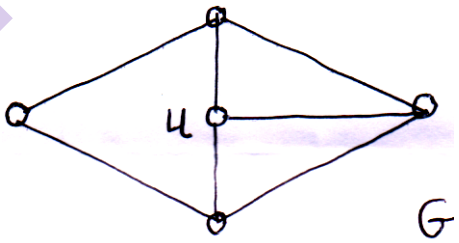
Q1) Attempt any FIVE of the following **[5]**

a) Define : Finite graph.

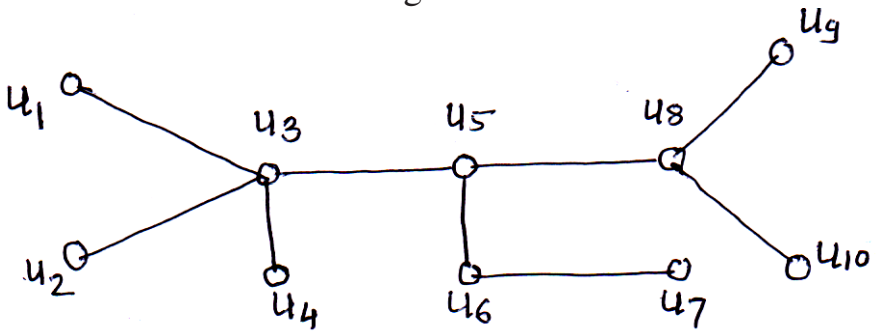
b) Determine the following graph is connected or not.



c) For the following graph G, Draw a graph G-u.



d) Find centre of the Following tree.

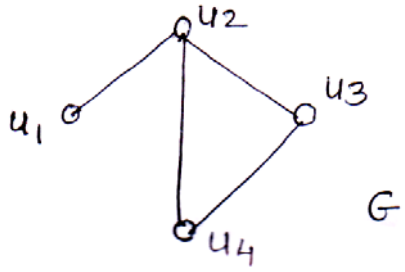


e) What is the value of prefix expression / 6 – 42?

P.T.O.

f) Find the edge connectivity of complete graph with n vertices.

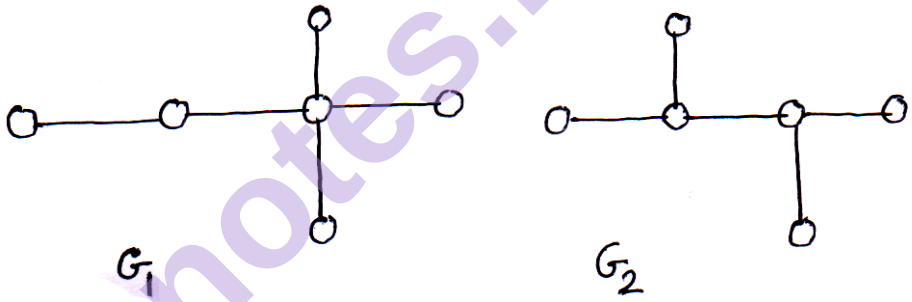
g) Find cut vertex in the following graph G.



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

i) Show that the maximum number of edges in a simple graph with n vertices is $\frac{n(n-1)}{2}$.

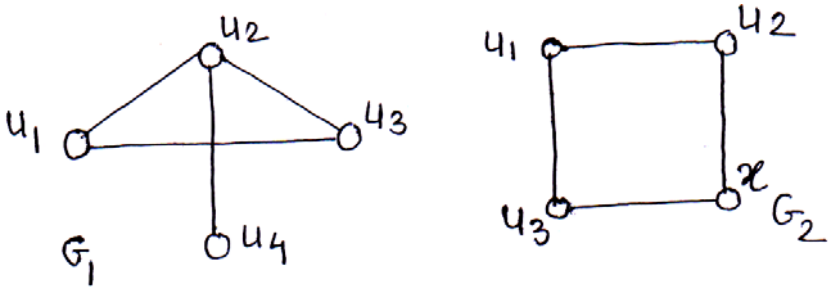
ii) Show that the following graphs are not isomorphic.



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

i) How many edges are there in a graph with 5 vertices with each of degree 8?

ii) Find $G_1 \cup G_2$ and $G_1 \cap G_2$ for the following graphs.



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

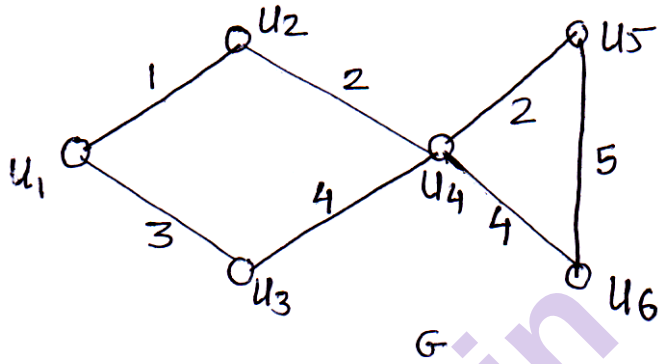
i) If G is a simple graph with n vertices and k components then prove that G can have at most $\frac{(n-k)(n-k+1)}{2}$ edges.

ii) In a tree T, prove that there is one and only one path between any two vertices.

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

i) Draw all simple non isomorphic graphs on 3 vertices.

ii) Using Krushkal's algorithm, obtain the shortest spanning tree in the graph G.



G

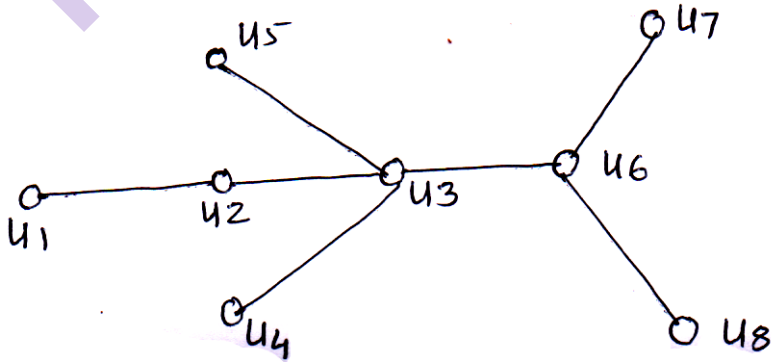
Q4) a) Attempt any ONE of the following : **[5]**

i) If T is a binary tree with n vertices then prove that number of pendant vertices in it is $\frac{n+1}{2}$.

ii) Prove that the edge connectivity of a connected graph G can not exceed the smallest degree of G i.e. $\lambda(G) \leq \delta(G)$, where $\delta(G)$ denotes the smallest degree in a graph G.

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

i) Find eccentricity of each vertex in the following tree. Also find centre, radius of tree.



ii) Is it possible to construct a graph on 11 vertices and 21 edges with edge connectivity 4? Justify.

Total No. of Questions : 5]

SEAT No. :

PA-2115

[Total No. of Pages : 2

[5901]-104

S.Y.B.Sc. (Regular)

PHYSICS

PHY- 231 : Mathematical Methods in Physics - I

(CBCS 2019 Pattern) (Semester - III) (Paper - I) (23121)

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 number 2 to question number 5 carry equal marks.***
4) ***Use of logtable and calculator is allowed.***

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

a) If z = 4+9i, then write Im(z) and Re(z) and also define a complex number.

b) Write an equation for modulus and complex conjugate of a complex number z = x+iy.

c) If F = F (X, Y), write an equation for exact differential.

d) Find the total differential of the function F = F (x, y) = $2x^3 + y^3x$.

e) What are the concurrent and coplaner vectors?

f) Define vector triple product.

Q2) A) Solve any two of the following.

a) Find the general value of log (1 + i) + log (1 – i). **[3]**

b) Verify two theorems of differentiation in the case of ideal gas_____. **[3]**

c) Obtain exponential form of a complex number. **[3]**

B) Find $\nabla\phi$ and $|\nabla\phi|$ for the function $\phi = 2xz^4 - x^2y$ at (1, 2, –2). **[4]**

Q3) A) Solve any two of the following.

a) Define and explain scalar and vector field with suitable examples. **[3]**

b) Find the work done in moving an object along a vector $\vec{r} = 3\hat{i} + 2\hat{j} + 5\hat{k}$ if applied force is $\vec{F} = 4\hat{i} + 6\hat{j} - 3\hat{k}$. **[3]**

c) Define and explain law of triangle and polygon. **[3]**

P.T.O.

B) Using a complex number, determine velocity and acceleration in curved motion. **[4]**

Q4) A) Solve any two of the following.

a) State the order and degree of following differential equation. **[3]**

$$\frac{d^4y}{dx^4} - \sqrt{y^2 - 5} = 0.$$

b) Find area of a triangle having vertices at P(1, 3, 2), Q(2, –1, 1), R(–1, 2, 3). **[3]**

c) Define and explain gradient of a scalar field an a divergence of avector field. **[3]**

B) Find approximate value of $[(3.82)^2+(2.1)^3]^{1/3}$ using differential. **[4]**

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

a) Find the percentage error in the area of ellipse when an error of 1% is made in measuring its major and minor axes.

b) State and prove De-Moivre's theorem.

c) State whether following differential equation is linear or non-linear, homogeneous or non-homogeneous and order of given equation $x^2y'' + e^xy' + (x^2–1)\,y = 0$.

d) Show that $\vec{F} = \cos y\,\hat{i} - x\sin y\,\hat{j} - \cos z\,\hat{k}$ is a conservative field.

e) Find the position and nature of the stationary points of the function $f(x) = x^3 – 3x + 3$.

f) Show that $\cos\ 2\theta = \cos^2\theta - \sin^2\theta$
using

$$\cos\theta = \frac{e^{i\theta} - e^{-i\theta}}{2} \text{ and } \sin\theta = \frac{e^{i\theta} + e^{-i\theta}}{2i}.$$

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Total No. of Questions : 5]

SEAT No. :

PA-2116

[Total No. of Pages : 5

[5901]-105

S.Y. B.Sc.

PHYSICS

PHY - 232(A) : Electronics

(2019 Pattern) (Semester - III) (23122A) (Paper - IIA) (CBCS)

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

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Use of calculator and log table is allowed.***
5) ***Figures to the right indicate full marks.***

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

a) State Norton's theorem.

b) Draw symbols of BJT.

c) Define Q-point (operating point) of transistor.

d) Calculate the gain of an inverting amplifier. The value of input resistance is 10 kΩ and that of feedback resistance is 100 kΩ.

e) Define CMRR.

f) Find the two's complement of number $(1001001)_2$.

P.T.O.

Q2) Answer the following :

a) Draw input & output characteristics curves of CE configuration of transistor. Hence define the terms : **[6]**

i) Cut-off region.

ii) Active region

iii) Saturation region

OR

With circuit diagram explain collector to base bias method of transistor biasing. Give its advantages.

b) Draw the circuit diagram of OP-AMP as non-inverting amplifier and derive equation for its gain. **[4]**

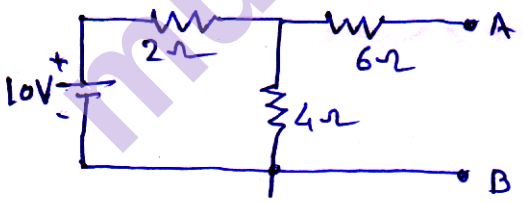
Q3) Answer the following :

a) Draw and explain the circuit diagram for OP-AMP an Adder. Derive the necessary formula. **[6]**

OR

Define AND, OR and NOT gates. Draw their symbols and write the truth tables.

b) Nortonize the following circuit : **[4]**



Q4) Answer the following :

a) Explain the construction and working of UJT **[6]**

OR

Explain with circuit diagram the use of transistor as a switch. Write its advantages.

b) Reduce the following Boolean expression and draw the logic diagram as well - **[4]**

AB + A (B + C) + B (B + C).

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

a) Current Divider Circuit.

b) Obtain the relation between α and β for transistor.

c) Characteristics of UJT.

d) Ideal characteristics of OP-AMP.

e) De Morgan's theorem (any one)

f) Concept of virtual ground.

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Total No. of Questions : 5]

PA-2116

[5901]-105
S.Y. B.Sc.
PHYSICS
PHY-232(B) : Instrumentation
(2019 Pattern) (Semester - III) (23122B) (Paper - II(B)) (CBCS)

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

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Question 2 to 5 carry equal marks.***
4) ***Use of calculator and log table is allowed.***
5) ***Figures to the right indicate full marks.***

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

a) What is the difference between precision and accuracy?

b) State principle of working of a RTD.

c) What is the sensitivity of the LVDT if an output voltage of 2mV is produced when core of LVDT moves through a distance of 0.5mm.

d) One Pascal is how many bar pressure?

e) What is a diaphragm?

f) Write equation for gain of a non-inverting amplifier.

Q2) Answer the following questions :

a) Explain V-tube manometer in detail. Derive the second order relation between input and output parameters. **[6]**

OR

What are primary, secondary and working standards of measurement? Explain why primary standards are not available to an ordinary user. Where are the international standards maintained?

b) The diameter of wire measured with a vernier callipers with least count of 0.1 mm is 3.15 cm. Find the percentage error in measurement. **[4]**

Q3) Answer the following questions :

a) What are displacement transducers? Explain the constructional features of linear and rotary potentiometer. **[6]**

OR

What is piezo electric effect? Explain what is a piezoelectric transducer? State its applications.

b) Explain principle and working of a liquid filled thermometer. **[4]**

Q4) Answer the following questions :

a) What are elastic transducers? Exlain the construction and woking of spiral and helical Bourdon tube. **[6]**

OR

What is sample and hold circuit? With the help of a block diagram explain the working of a sample and hold circuit.

b) Calculate the gain of non-inverting amplifier when input resistance at the inverting terminal is 10 kΩ and feedback resistance is 200 kΩ. If the feedback resistance is doubled, what is the change in the voltage gain.**[4]**

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

a) Current to voltage converter.

b) Concept of vacuum.

c) Types of transducers.

d) Cantilever Beam.

e) Linearity.

f) Hysteresis.

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Total No. of Questions : 5]

SEAT No. :

PA-2117

[Total No. of Pages : 2

[5901]-106

S.Y.B.Sc. (Regular)

CHEMISTRY

CH-301 : Physical and Analytical Chemistry

(2019 Pattern) (CBCS) (Semester - III)

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

Instructions to the candidates :

1) ***Question 1 is compulsory.***
2) ***Solve any three questions frome Q2 to Q5.***
3) ***Questions Q.2 to Q.5 carry equal marks.***

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

a) Define the term Accuracy.
b) What is mean by Adsorption?
c) Define the term half-life period of a reaction
d) What is a neutralization curve?
e) What is rate law?
f) Define the term equivalence point.

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

i) Explain the methods of expressing Accuracy.
ii) Give the direct and indirect method of preparation of standard solution.
iii) Explain the term molecularity with suitable example.

b) Explain half-life method to determine the order of reaction. **[4]**

Q3) a) Write any two of the following : **[6]**

i) Derive langmuir adsorption isotherm.
ii) Write a note on titration of strong acid and strong base.
iii) Explain the characteristics of first order reaction.

b) 50% of the first order reaction is complete in 28 minutes. Calculate the time required to complete 90% the reaction. **[4]**

P.T.O.

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

i) Explain the term order of reaction with suitable examples.

ii) Write a note on mohr's method for determination of chloride and bromide ions in aqueous solution.

iii) How standard EDTA solutions are prepared? Give the procedure for determination of hardness of water.

b) Calculate the PH of the solution after addition of 12.5 ml of 0.1 N NaoH to 25 ml CH_3COOH during the titration. [Ka of CH_3COOH = 1.75×10^{-5}]. **[4]**

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

a) Define the term adsorption. Explain the important applications of adsorption.

b) Explain the term deviation, average deviation and standard deviation.

c) Explain the classification of reaction in volumetric analysis. Give suitable example of each type of reaction.

d) What is a second order reaction? Obtain the rate equation for a second order reaction when reaction involves only one reactant.

e) Explain neutralization curve for weak acid and strong base filtration.

f) Write a note on "Minimisation of error".

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PA-2118

[Total No. of Pages : 2

[5901]-107

S.Y. B.Sc.

CHEMISTRY

CH-302 : Inorganic and Organic Chemistry (Paper - II)

(2019 Pattern) (CBCS) (Semester - III) (23132)

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 No.2 to 5 carry equal marks.***
4) ***Figures to the right indicate full marks.***
5) ***Atomic no. of CO = 27.***

Q1) **Solve any <u>five</u> of the following :** **[5]**

a) What is molecular orbital?

b) What is the bond order in Li_2 molecule?

c) Define Chelate.

d) Define Aromaticity.

e) Draw the structure of 3-bromo 4-methyl-Pentan-2-ol.

f) State Saytzeffs rule.

Q2) a) **Attempt any <u>two</u> of the following :** **[6]**

i) Draw MO diagram of O_2 molecule and calculate the bond order and explain magnetic behaviour.

ii) What do you mean by effective atomic number? Calculate EAN in $[CO(NH_3)_6]^{3+}$.

iii) What is electrophilic substitution reaction? Explain halogenation of benzene.

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

i) What are arylhalides? How will you prepare chlorobenzene from aniline.

ii) Give assumptions of Werner's theory.

P.T.O.

Q3) a) **Attempt any <u>two</u> of the following :** **[6]**

i) Draw MO diagram of N_2 molecule and calculate the bond order and explain magnetic behaviour.

ii) Distinguish between σMO and πMO.

iii) How ethyl alcohol prepared from I) acetic acid and II) Ethyl chloride.

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

i) Give the molecular orbital configuration of CO molecule and calculate bond order.

ii) Identify product 'A' and 'B' and rewrite reaction.

$$CH_3-CH=CH_2 \xrightarrow{HBr} A \xrightarrow{aq.KOH} B$$

Q4) a) **Attempt any <u>two</u> of the following :** **[6]**

i) Give the assumptions of MOT.

ii) Discuss the mechanism of SN^1 reaction with energy profile diagram.

iii) How will you convert phenol to Salicylaldehyde.

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

i) Calculate Stabilisation energy and bond Order of C_2 molecule.

ii) Identify the reaction products 'A' and 'B'

$$\xrightarrow[HCl]{NaNO_2} A \xrightarrow[HCl]{H_2O} B$$

Q5) **Attempt any <u>four</u> of the following :** **[10]**

a) Write note on L.C.A.O. principle.

b) What is mean by ligand? How they are classified? Give examples.

c) Identify product 'A' and 'B' and rewrite the reaction.

$$\begin{matrix} CH_3 & & CH_3 \\ \diagdown & & \diagup \\ C = C & \xrightarrow[Hg(O-\overset{\overset{O}{\|}}{C}-CF_3)_2]{CH_3OH} & A \xrightarrow[NaBH_4]{\text{Demercuration}} B \\ \diagup & & \diagdown \\ CH_3 & & CH_3 \end{matrix}$$

d) What are phenols? Explain hydrogen bonding in phenols.

e) Write note on Benzyne mechanism.

f) Write note on Friedel craft alkylation.

Total No. of Questions : 5]

SEAT No. :

PA-2119

[Total No. of Pages : 2

[5901]-108

S.Y.B.Sc.

BOTANY

BO-231 : Taxonomy of Angiosperms and Plant Ecology

(2019 CBCS Pattern) (Theory) (Paper - I) (Sem. - III) (23141) (Regular)

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 2 to 5 carry equal marks.***
4) ***Draw neat labeled diagrams wherever essential.***

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

a) Define plant taxonomy.

b) Write floral formula of family solanaceae.

c) What is natural system of classification?

d) Define autoecology.

e) What are hydrophytes?

f) Define genetic diversity.

Q2) a) Write distinguishing characters, floral formula and economic importance of family amaryllidaceae. **[6]**

b) Write adaptive internal features of xerophytes. **[4]**

Q3) a) What is ICN? Enlist the principles of ICN. **[6]**

b) Write merits and limitations of phylogenetic system of classification. **[4]**

P.T.O.

Q4) a) What is species diversity? Add a note on types of species diversity indices. **[6]**

b) Explain economic importance of family myrtaceae. **[4]**

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

a) Objectives of taxonomy.

b) Flower of family rubiaceae.

c) Citation of author.

d) Halophytes.

e) Grassland ecosystem.

f) Mesophytes.

Total No. of Questions : 5]

SEAT No. : ____

PA-2120

[Total No. of Pages : 2

[5901]-109

S.Y.B.Sc.

BOTANY

BO - 232 : Plant Physiology

(CBCS 2019 Pattern) (Paper - II) (Semester - III) (23142) (Regular)

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

Instructions to the candidates:

1) ***Question No.1 is Compulsory.***
2) ***Attempt any three questions from Q.2 to Q.5.***
3) ***Question 2 to 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 rate of water absorption.

c) Enlist types of transpiration.

d) What is devernalization?

e) What is stratification?

f) What is non-symbiotic nitrogen fixation?

Q2) a) What is transpiration? Describe internal factors affecting rate of transpiration. **[6]**

b) Explain methods of breaking seed dormancy. **[4]**

Q3) a) What is nitrogen fixation? Explain role of nitrogen in plants. **[6]**

b) Describe factors affecting ascent of sap. **[4]**

P.T.O.

Q4) a) What is photoperiodism? Describe classification of plants on the basis of photoperiod. **[6]**

b) Explain mechanism of active osmotic absorption of water. **[4]**

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

a) Antitranspirant's

b) Applications of plant physiology.

c) Cuticular transpiration.

d) Denitrification

e) Transpiration pull theory.

f) Physical seed dormancy.

Total No. of Questions : 5]

SEAT No. :

PA-2121

[Total No. of Pages : 2

[5901]-110
S.Y. B.Sc. (Semester - III)
ZOOLOGY
ZO - 231 : Animal Diversity - III
(2019 Pattern) (CBCS) (Paper - I) (23151)

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]**

a) Write any one character of Pisces.

b) Write one example of Agnatha.

c) What is clasper in Scoliodon?

d) Give one example of Cephalochordata.

e) Give the function of Scroll valve.

f) Give any one function of medulla oblongata.

Q2) a) Describe the structure and working of heart of Scoliodon. **[6]**

OR

Write the general characters of sub-phylum Vertebrata.

b) Give the salient features of class Amphibia. **[4]**

Q3) a) Describe any two types of scales in fishes. **[6]**

OR

Sketch and label dorsal view of brain of Scoliodon.

b) Describe structure of holobranch in Scoliodon. **[4]**

P.T.O.

Q4) a) Describe the female reproductive system of Scoliodon. **[6]**

OR

Give the salient features of Urochordata.

b) Describe external characters of Scoliodon. **[4]**

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

a) Heterocercal fin.

b) Economic importance of Scoliodon.

c) Liver of Scoliodon.

d) Origin of Chordates.

e) Parental care in Amphibia.

f) Food and feeding mechanism of Scoliodon.

▽▽▽▽

Total No. Of Questions : 5]

SEAT No. :

PA-2122

[Total No. Of Pages : 2

[5901]-111
S.Y.B.Sc. (Semester-III)
ZOOLOGY
ZO - 232: Applied Zoology - I
(CBCS) (2019 Pattern) (Paper - II) (23152)

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]**

a) What is Sericulture?

b) Write biological name of Jowar stem borer.

c) What is biological name of Muga silkworm.

d) What is fullform of IPM

e) Define mounting

f) Define fumigants

Q2) a) Describe external morphology of Bombyx mori. **[6]**

OR

Explain life cycle of mango stem borer.

b) Explain rearing house of Silkworm. **[4]**

P.T.O.

Q3) a) Describe marks of identification, nature of damage and control measures of pulse beetle. **[6]**

OR

Describe nature of damage and control measures of Uzi fly and dermestid beetle.

b) Explain cyanogas pump. **[4]**

Q4) a) Describe post harvest processing of cocoons. **[6]**

OR

Explain mechanical and cultural control measures of pests.

b) Describe fertilizer schedule of irrigated mulberry cultivation. **[4]**

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

a) Tassar silkworm

b) Damage caused by crab

c) Veterinary pests

d) Cocoon

e) Leaf plucking

f) Pheromonal control

Total No. of Questions : 5]

SEAT No. :

PA-2123

[Total No. of Pages :2

[5901]-112
S.Y. B.Sc. (Geology)
GL - 211 : STRUCTURAL GEOLOGY
(2019 Pattern) (Semester - III) (23161)

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

a) Define strike.

b) Define strain.

c) Draw diagram of normal fault.

d) Define Boudinage.

e) Strike and dip symbol for horizontal and vertical strata.

f) Define joints.

Q2) Answer the following:

a) What is plastic deformation? Explain Reckie's principle. **[6]**

b) Explain component of rock deformation. **[4]**

Q3) Answer the following:

a) What is fold? Explain types of folds. **[6]**

b) Define compass. Explain fore and back bearing. **[4]**

P.T.O.

Q4) Answer the following:

a) Define fault. Explain geometric classification of faults. **[6]**

b) Explain Brittle and Ductile deformation. **[4]**

Q5) Write short note: (Any four) **[10]**

a) Clinometer.

b) Types of joints.

c) Rotational movement along fault.

d) Genetic types of fractures.

e) Explain parts of folds.

◆◆◆

Total No. of Questions : 5]

SEAT No. :

PA-2124

[Total No. of Pages : 2

[5901]-113

S.Y.B.Sc (Regular)

GEOLOGY

GL 212 : Palaeontology

(2021 Credit Pattern) (Semester - III) (Paper - II) (23162B)

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

Instructions to the candidates:

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

Q1) Answer any five of the following question in 2-3 lines. **[5]**

a) Define Era.

b) Enlist any 4 instruments needed for the fossil collection.

c) Give the classification of Glossopteris.

d) Enlist any 4 types of microfossils.

e) Give systematic classification of phylum Arthropoda.

f) Draw a neat labeled diagram of imperforate and perforate gastropod shells.

Q2) Answer the following.

a) Describe the morphology of hard parts of Belemnites with neat labeled diagram. **[6]**

b) Explain the uses of fossils in Geology. **[4]**

Q3) Answer the following.

a) Explain the major mass extinctions of geological time. **[6]**

b) Explain any four altered remains of modes of preservation of fossils. **[4]**

P.T.O.

Q4) Answer the following.

a) Explain septas in corals and give geographical & geological distribution of corals. **[6]**

b) Describe with the help of neat diagrams, different types of coiling and sprial angle in the gastropods. **[4]**

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

a) Types of hinge in Ostracods.

b) Types of suture lines in ammonoids.

c) Geological time scale.

d) Mechanical method for seperation of mega fossils.

e) Branches of palaeontology.

f) Arrangement of chambers in foraminifera.

Total No. of Questions : 4]

SEAT No. :

PA-2125

[Total No. of Pages : 2

[5901]-114
S.Y. B.Sc. (Regular)
STATISTICS
ST - 231 : Discrete Probability Distributions and Time Series
(2019 Pattern) (Credit System) (Semester - III) (23171)

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.***
4) ***Symbols and abbreviations have their usual meanings.***

Q1) Attempt each of the following :

a) Choose the correct alternative in each of the following : **[1 each]**

i) Let $x \rightarrow$ NB (3, p) then the distribution is :

a) Letptokurtic b) Mesokurtic

c) Platykurtic d) Positively skewed

ii) If $\underline{x} = (x_1, x_2, \ldots x_k)$ follows multinomial distribution then the number of parameters in the real sense are

a) K – 1 b) K

c) K + 1 d) K + 2

iii) Moving averages remove the cyclical variations if

a) the period is even

b) the period is odd

c) the average is weighted

d) the period is same as that of cycle

b) State whether each of the following statement is true or false : **[1 each]**

i) If $(x_1, x_2, \ldots x_k) \rightarrow$ MD$(n, p_1, p_2 \ldots . p_k)$ then $E(x_i\, x_j) = n(n-1)\, p_i\, p_j$.

ii) If $x \rightarrow P(\lambda)$, $X_T \rightarrow P(\lambda)$ truncated below at $X = 0$ then $E(X) = E(X_T)$.

P.T.O.

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

a) State and prove Poisson approximation to negative binomial distribution.

b) Define binomial distribution truncated below at $x = 0$ and find its mean.

c) Define time series. Explain different utility of time series.

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

a) State and prove relation between geometric distribution and negative binomial distribution.

b) If $(x_1, x_2, \ldots . x_k) \rightarrow MD(n, p_1, p_2, \ldots . p_k)$ then find the conditional distribution of x_i given $x_j = r$.

c) Write a note on AR(1) model.

Q4) Attempt any one of the following :

a) i) Estimate trend by using exponential smoothing with $\alpha = 0.10$ for the following time series. **[7]**

Year Profit	2010	2011	2012	2013	2014	2015	2016	2017
(in' 000 Rs.)	90	100	102	93	104	109	102	114

ii) Suppose $X_T \rightarrow P(3)$ truncated below at $x = 0$. Find **[3]**

I) $p(x_T = 2.5)$

II) $p(x_T \geq 2)$.

b) i) If $(x_1, x_2, x_3) \rightarrow MD(6, ½, ⅖, ⅒)$ find **[7]**

I) $P(x_1 = 2, x_2 = 3, x_3 = 1)$

II) $E(x_1 \mid x_2 = 4)$

III) $E(x_2 \mid x_2 + x_3 = 4)$

IV) $V(x_1 \mid x_2 = 4)$

ii) Discuss any one component of time series. **[3]**

▽▽▽▽

Total No. of Questions : 4]

SEAT No. :

PA-2126

[Total No. of Pages : 3

[5901]-115

S.Y.B.Sc. (Regular)

STATISTICS

ST-232 : Continuous Probability Distributions

(2019 Pattern) (Semester - III) (23172) (Credit System)

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 in allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following:

A) Choose the correct alternative in each of the following. **[1 each]**

a) Joint probability density function (p.d.f.) of random variable (r.v.) (x, y) is F (x,y) Marginal p.d.f. of r.v. x is.

i) $\int_y f(x,y)dy$ ii) $\int_x f(x,y)dy$

iii) $\int_x f(x,y)dx$ iv) $\int_y f(x,y)dx$

b) Cumulative distribution function (c.d.f.) of U(0, 1) distribution is

i) 1 ii) x

iii) ½ iv) $x/2$

c) Mean of exponential distribution with parameter α is

i) 1 ii) 0

iii) $1/\alpha$ iv) α

B) State whether each of the following statements is true or false.

a) For the joint random variable (X, Y) E(Y|X) is the function of X.

b) The graph of cumulative distribution function (c.d.f.) is the line parallel to X axis.

P.T.O.

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

a) Find the moment generating function (m.g.f.) of $N(\mu, \sigma^2)$ distribution. Hence find its second order raw moment.

b) State and prove lack of memory property of exponential distribution.

c) If X is a r.v. with p.d.f.

$f(x) = 3x^2 \; ; \; 0 < x < 1$

$= 0 \; ;$ otherwise

Find E(X) and Var(X).

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

a) Joint p.d.f. of bivariate r.v. (X,Y) is

$$f(x, y) = \frac{1}{8}(4 - x - y); \; 0 \le x \le 2, \; 0 \le y \le 2$$

$= 0$; otherwise

find E(XY).

b) A random variable X has p.d.f.

$f(x) = 3(1-x)^2 \; ; \; 0 \le x \le 1$

$= 0$; otherwise

Find $E(-ln\,(1-X))$

c) A fair coin is tossed 225 times independently. Using normal approximation find probability of getting.

i) atleast 115 heads

ii) number of heads between 110 and 115

Q4) Attempt any one of the following:

a) i) The joint p.d.f. of bivariate r.v. (X, Y) is **[7]**

$f(x, y) = K(3x^2 + xy)$; $0 \le x \le 1$, $0 \le y \le 2$

$= 0$; otherwise

Find k, E(Y|X=x).

ii) If $X \to U(a, b)$, find the distribution of $Y = \dfrac{x-a}{b-a}$. **[3]**

b) i) Find mean deviation about mean of normal distribution with mean μ and variance σ^2. Hence obtain the proportion between mean deviation about mean and standard deviation. **[7]**

ii) For certain bivariate r.v. (X, Y) E(Y|X) = 3+4X. Find E(Y) if E(X) = 8. **[3]**

Total No. of Questions : 5]

SEAT No. :

PA-2127

[Total No. of Pages : 2

[5901]-116
S.Y. B.Sc.
GEOGRAPHY
GG - 231 : Environmental Geography - I
(2019 Pattern) (CBCS) (Semester - III) (23181) (Paper - I)

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) ***Use of map stencil is allowed.***

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

a) Define Environmental Geography.

b) Write any two abiotic components of River Ecosystem.

c) What is Neo-determinism?

d) Give any two causes of climate change.

e) Who was the main leader of 'Chipko Movement'.

f) What was the famous slogan used in 'Narmada Bachao Andolan'.

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

i) Describe the structure of an ecosystem.

ii) Explain impacts of energy crisis in India.

iii) Explain different effects of Air Pollution.

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

i) Explain the causes and effects of Noise Pollution.

ii) Explain the concept of Food-Chain and Food-Web.

P.T.O.

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

i) Explain 'Save Silent Valley Movement'.

ii) Explain different effects of Nuclear Pollution.

iii) Explain Tropic Level in brief.

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

i) Explain stratospheric ozone Depletion in detail.

ii) Give an account of Human activities in 'Desert Region'.

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

i) Describe nature of Environmental Geography.

ii) Explain possibilism.

iii) Explain the role of World Bank in Narmada Bachao Andolan.

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

i) Explain the Chipko Movement in detail.

ii) Give an account of Human activities in Coastal Region.

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

a) Scope of Environmental Geography.

b) Energy Flow.

c) Causes of Air Pollution.

d) Environmental Determinism.

e) Loss of Biodiversity.

f) Energy crisis in India.

□□□

Total No. of Questions : 5]

SEAT No. :

PA-2128

[Total No. of Pages : 2

[5901]-117

S.Y.B.Sc. (Regular)

GEOGRAPHY

Gg-232 : Geography of Maharashtra (Physical - I)

(2019 CBCS Pattern) (Semester - III) (23182) (Paper - II)

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) Name the capital of yadav empire.

b) What is the length of coast of Maharashtra?

c) What is mean by a monsoon?

d) Define soil.

e) What is the average range of temperature in Maharashtra?

f) What is the average attitude of Sahyadri?

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

i) Explain the geological structure of Maharashtra.

ii) Describe the unique features of Sahyadri.

iii) Explain the characteristics of Monsoon in Maharashtra.

b) Answer the following question in 150 words (any one). **[4]**

i) Describe the relative location of Maharashtra.

ii) Explain the causes of soil erosion.

P.T.O.

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

i) What are the characteristics of west flowing rivers in Maharashtra.

ii) Explain the rainfall distribution in Maharashtra.

iii) Describe different effects of soil erosion.

b) Answer the following question in 150 words (any one). **[4]**

i) Discuss the historical background of Maharashtra.

ii) Explain the physiography of the konkan coast.

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

i) Describe the location and extent of the state of Maharashtra.

ii) Explain the effect of Monsoon on agriculture of Maharashtra.

iii) Explain the soil Management methods soil conservation.

b) Answer the following question in 150 words (any one). **[4]**

i) Explain the physiography of Sahyadri.

ii) Give an account of Drought - prone region of Maharashtra.

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

a) The Maratha Empire.

b) Administrative division of Maharashtra.

c) Maharashtra Plateau.

d) Temperature distribution in Maharashtra.

e) Deforestation.

f) Tropical evergreen forest.

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Total No. Of Questions : 5]

SEAT No. : ____

PA-2129

[Total No. Of Pages : 2

[5901]-118
S.Y.B.Sc
MICROBIOLOGY
MB 231: Medical Microbiology And Immunology
(CBCS) (2019 Pattern) (Semester - III) (23191)

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 Q2 to Q5 carry equal marks.***

Q1) **Answer the following (any Five)** **[5]**

a) Define pathogenecity

b) State whether true or false

'A disease spreading in a community at normal or expected level is a pandemic disease'

c) State whether true or false.

'Immunological memory is a characteristic feature of adoptive immunity'

d) Define acquired immunity.

e) A person of blood group'o'will not have

a) Anti A in his serum
b) Anti B in his serum
c) Anti A and anti B in his serum
d) Antigen A and antigen B

f) The lowest concentration of an antimicrobial agent that will prevent growth of an organism is known as

a) MIC
b) MBC
c) LD_{50}
d) Selective toxicity

P.T.O.

Q2) **Describe any Two of the following.** **[6]**

a) i) Classification of dermatophytes.
ii) Formation of myeloid linage cells.
iii) Laboratory diagnosis of candidiasis.

b) Describe 'Rh' blood group system. **[4]**

Q3) **Explain any Two of the following.** **[6]**

a) i) Medicolegal applications of blood groups.
ii) Infections caused by E. coli
iii) Biochemical nature of blood group substances.

b) Describe morphological and cultural charateristics of Staphylococcus aureus **[4]**

Q4) **Discuss any Two of the following.** **[6]**

a) i) Passive Immunization.
ii) Synergism in drug administration.
iii) Toxins produced by S aureus

b) Describe in detail pathogenesis of E. coli **[4]**

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

a) Epidemiology of Dermatophycosis
b) Staphylococcal enterotoxin
c) Selective toxicity.
d) Bombay blood group.
e) Attenuated vaccines
f) Types of lymphocytes.

Total No. of Questions : 5]

SEAT No. :

PA-2130

[Total No. of Pages : 2

[5901]-119

S.Y.B.Sc. (Regular)

MICROBIOLOGY

MB 232 : Bacterial Physiology and Fermentation Technology

(2019 Pattern) (CBCS) (Semester - III) (23192)

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

Instructions to the candidates:

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

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

a) State the function of sparger in fermenter.

b) NADH oxidation in ETC yields _____ ATP.

c) Define 'Batch fermentation'.

d) Amylase belongs to ____ class of enzymes.

e) Name any two antifoam agents.

f) State whether true or false. 'Vinegar production is an example of duel fermentation'.

Q2) a) Describe any two of the following. **[6]**

i) Catabolism

ii) Precursors used in fermentation media.

iii) Gluconeogenesis

b) Diagrammatically describe oxidative phase of HMP pathway. **[4]**

P.T.O.

Q3) a) Explain any two of the following. **[6]**

i) Effect of substrate concentration on enzyme activity.

ii) Monitoring to temperature during fermentation process.

iii) Substrate level phosphorylation

b) Write a note on Nomenclature and classification of enzymes as per IUB upto class level. **[4]**

Q4) a) Discuss any two of the following. **[6]**

i) Cofactors and coenzymes.

ii) Inoculum development.

iii) Sources of contaminations and precautions to avoid the contamination.

b) With the help of a neat and labelled diagram, Explain the role or different parts of a fermenter. **[4]**

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

a) Primary screening.

b) Nature and structure of an active site of an enzyme.

c) Fermented food products.

d) Lock and key model of enzyme catalysis.

e) Carbon Sources used in fermentation media.

f) ED pathway.

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Total No. of Questions : 5]

SEAT No. :

PA-2131

[Total No. of Pages :2

[5901]-120
S.Y. B.Sc. (Regular)
NANOSCIENCE AND NANOTECHNOLOGY
NS. - 231 : Physical Techniques for Synthesis of Nanomaterials
(2019 Pattern) (Semester - III) (Paper - I) (23261) (Credit System)

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) Draw the diagram of mettalorganic chemical vapour deposition.

b) Give the name of plants from which silver nanoparticles are synthesized.

c) Give the two mechanical techniques for synthesis of nono materials.

d) Define sputter deposition.

e) What is pulse laser deposition?

f) Give the factors which affect on biological synthesis of metal nanoparticles.

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

i) Give the applications of biologically inspired templates.

ii) Give the plant name from which Indium oxide can synthesized.

b) Give the influence of reaction temperature on biological synthesis of metal nano particles. **[4]**

P.T.O.

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

i) Explain plasma enhanced chemical vapour deposition.

ii) Explain synthesis of titanium dioxide nanoparticles by plant extract.

b) Explain biological synthesis of nano particles via plants. **[4]**

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

i) Explain influence of pH on reaction of biological synthesis of metal nanoparticles.

ii) Describe microbial routes for nanoparticles synthesis by using actinomycetcs.

b) Explain synthesis palladium and platinium nanoparticles by plant extract. **[4]**

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

a) Ball milling.

b) Explain electric arc - deposition.

c) Influence of concentration.

d) Explain 'Ion - beam deposition'.

e) Applications of nano particles.

f) Sputter deposition.

Total No. of Questions : 5]

SEAT No. :

PA-2132

[Total No. of Pages : 2

[5901]-121

S.Y.B.Sc. (Nanoscience and Nanotechnology)
NS - 232 : PROPERTIES OF NANOMATERIALS
(Physical, Chemical, Optical & Magnetic)
(2019 Pattern) (Semester - III) (Paper - II) (23262) (Credit System)

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

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

a) What is mean by surface energy?

b) What is cathodoluminescence?

c) Define neel relaxation temperature.

d) Write down different types of hardness.

e) What is absorption?

f) Define ferrimagnetism.

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

i) Explain superparamagnetism in brief.

ii) Explain scanning electron microscopy with proper diagram.

b) What is exciton? Explain types of excitons. **[4]**

P.T.O.

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

i) Explain giant magneto resistance.

ii) With block diagram explain photoluminescence spectroscopy.

b) Explain the terms histopathology and immunohisto chemistry. **[4]**

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

i) With neat labeled diagram explain x-ray fluorescence spectroscopic method.

ii) Explain diamagnetism in detail.

b) Explain gastro intestinal tract. **[4]**

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

a) Colossal magneto resistance.

b) Effect of magnetic field in superparamagnetism.

c) Strength of nanomaterials.

d) Bohr radius.

e) Antiferromagnetism.

f) Electroluminescence.

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Total No. of Questions : 5]

SEAT No. : ____

PA-2133

[Total No. of Pages : 2

[5901]-122

S.Y.B.Sc. (Regular)
ELECTRONIC SCIENCE
EL-231 : Communication Electronics
(CBCS-2019 Pattern) (Semester-III) (23221) (Paper-I)

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) Attempt any five of the following. **[5]**

a) Define noise figure.

b) What is mean by phase modulation?

c) Give the full form of TDM and FDM.

d) What is modem?

e) List the advantages of PCM.

f) Define sensitivity of radio receiver.

Q2) Answer the following:

a) i) If the total power is 1686 watt and percentage of modulation index 90% calculate carrie power. **[2]**

ii) Draw the block diagram of digital communication system and explain it. **[4]**

b) Draw the block diagram of communication system and explain it. **[4]**

Q3) Answer the following:

a) i) A 50Ω resistor operated at 29°C how much noise voltage is provided to matched over bandwidth 6MHz **[2]**

ii) Define modulation index, Write the equation of modulation index of AM and FM. **[4]**

b) Draw the block diagram of PPM generator and explain it. **[4]**

P.T.O.

Q4) Answer the following:

a) i) Give the advantages of digital communication over analog communication. **[2]**

ii) What is amplitude modulation, Derive the voltage equation of AM. ware. **[4]**

b) Explain the concept of PAM generator with the help of block diagram.**[4]**

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

a) Define following:

i) Centre frequency.

ii) Frequency deviation.

b) Write notes on base band and broad band signals.

c) Compare AM and FM

d) List advantages and disadvantages of PCM.

e) Explain the concept of ASK.

f) Write a short notes on heterodyne principle.

Total No. of Questions : 5]

SEAT No. :

PA-2134

[Total No. of Pages : 2

[5901]-123

S.Y.B.Sc. (Regular)

ELECTRONIC SCIENCE

EL - 232 : Digital System Design

(2019 Pattern) (Semester - III) (Credit System) (Paper-II) (23222)

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

Instructions to the candidates:

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

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

a) Define accuracy in case of DAC.

b) Draw the structure of 3 inputs KMap.

c) What is meant by priority encoder.

d) Write down excitation table of JK flipflop.

e) Which is the fastest ADC in all analog to digital converters?

f) How many flip-flops required to design MOD-5 counter?

Q2) a) Answer the following.

i) Describe performance parameter of logic family such as noise immunity and propagation delay time. **[2]**

ii) Explain 4 bit parallel adder with diagram. **[4]**

b) Draw the circuit diagram of CMOS inverter, Explain its action. **[4]**

P.T.O.

Q3) a) Answer the following.

i) Explain the limitations and advantages with flash ADC. **[2]**

ii) Draw and explain 3 bit down counter. **[4]**

b) Find the output voltages of 4 bit R-2R ladder if digital inputs are **[4]**

i) 0001

ii) 1000 if v_{ref} = 16v

Q4) a) Answer the following.

i) Give two advantages of KMap over boolean algebra. **[2]**

ii) Obtain the logical expression for segment b of BCD to 7 segment decoder to drive common anode. **[4]**

b) Explain with logic diagram MOD-10 counter using J-K flip-flop. **[4]**

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

a) Write a short note on keyboard encoder.

b) Draw and explain block diagram of sequential circuit.

c) Write specifications of ADC.

d) Describe state table and state diagram.

e) Write a short note on frequency measurement system.

f) Determine the conversion time of successive approximation type ADC using 1MHz clock with

i) 10 bits

ii) 12 bits

Total No. of Questions : 5]

SEAT No. :

PA-2135

[Total No. of Pages :2

[5901]-124
S.Y. B.Sc. (Regular)
PSYCHOLOGY
Psychology of Adjustment
(2019 Pattern) (23201) (Semester - III) (Credit System) (Paper - I)

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) What is assertiveness.

b) Define self concept.

c) Define happiness.

d) State the types of adjustment.

e) What are the types of communication?

f) Name the types of occupational hazards.

Q2) a) Elaborate the components of communication process. **[6]**

OR

Examine the various parenting styles. **[6]**

b) Critically evaluate the Holland's career choice model. **[4]**

Q3) a) Justify that case study method is an appropriate approach to study behaviour. **[6]**

OR

Describe the various sound study methods. **[6]**

b) Categorize the types of punishment and its effects. **[4]**

P.T.O.

Q4) a) Explain the self control executing & evaluating program. **[6]**

OR

Describe the areas of marital adjustment. **[6]**

b) Analyze the constructive conflict resolution techniques. **[4]**

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

a) Effective communication.

b) Happiness.

c) Empiricism approach.

d) Nature of assertiveness.

e) Permissive parenting.

f) Effects of unemployment.

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Total No. of Questions : 5]

SEAT No. :

PA-2136

[Total No. of Pages : 2

[5901]-125

S.Y.B.Sc. (Regular)

PSYCHOLOGY

Research Methods in Behavioural Sciences

(2019 Pattern) (Semester - III) (Paper - II) (23202) (Credit System)

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

Instructions to the candidates:

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

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

a) Define scientific research.

b) What is universe.

c) Define sampling.

d) State the types of data collection.

e) Give the meaning of interpretation.

f) Define psychological test.

Q2) a) Explain the types of Probability sampling. **[6]**

OR

Describe the types and advantages of observational method.

b) Differentiate between experimental and non experimental research. **[4]**

Q3) a) Evaluate the stages of research. **[6]**

OR

Examine the structure of research report.

b) Assess the need of interpretation of data in research. **[4]**

P.T.O.

Q4) a) Explain the goals at scientific research. **[6]**

OR

Discuss the types of non-probability sampling.

b) Compare the importance of primarys secondary data. **[4]**

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

a) Case study method.

b) Use of computer in research.

c) Characteristics of scientific research.

d) Disadvanatages of secondary data.

e) Characteristics of psychological tests.

f) Advantages of interpretation in research.

Total No. of Questions : 5]

SEAT No. :

PA-2137

[Total No. of Pages : 2

[5901]-126

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE

EVS-231 : Ecology and Ecosystem

(2019 Pattern) (CBCS) (Semester - III) (Paper - I) (23241)

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

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

a) Which factors effects on species diversity? **[1]**

b) How does NPP depend on temperature? **[1]**

c) What are the types of Synecology? **[1]**

d) What is the proper hierarchical order of ecological organization from most to least inclusive? **[1]**

e) What is mean by population density? **[1]**

f) Define Mortality. **[1]**

Q2) Answer the following :

a) Why is the Y-shaped energy flow model more realistic? **[6]**

b) How does a grazing food chain different from a detritus food chain? **[4]**

Q3) Answer the following :

a) Explain in detail with diagram of Biogeochemical cycles. **[6]**

b) What is the difference between interspecific and Intraspecific Relationship. **[4]**

P.T.O.

Q4) Answer the following :

a) Explain in detail succession with their Mechanism. **[6]**

b) What is mean by population growth curve? **[4]**

Q5) Write a short note on Any Four of the following :

a) Ecological Pyramid **[2½]**

b) Carrying capacity **[2½]**

c) Productivity of an Ecosystem **[2½]**

d) Ecotone & Edge effect **[2½]**

e) Dispersion **[2½]**

f) Survivorship curves **[2½]**

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Total No. of Questions : 5]

SEAT No. :

PA-2138

[Total No. of Pages : 2

[5901]-127

S.Y.B.Sc. (Regular)

ENVIRONMENTAL SCIENCE

EVS - 232 : Natural Resources & Their Management

(2019 Pattern) (Semester - III) (Paper - II) (23242) (Credit System)

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

Instructions to the candidates:

1) ***Question No.1 is Compulsory.***
2) ***Solve any three questions from question No.2 to 5.***
3) ***Question No.2 to 5 carry equal marks.***

Q1) Attempt any FIVE of the following.

a) Define Soil Erosion. **[1]**

b) What are Natural Resources? **[1]**

c) What is deforestation? **[1]**

d) Give examples of any two genetically modified crops. **[1]**

e) Write full form of JFM. **[1]**

f) What is meant by sustainable Agriculture? **[1]**

Q2) Answer the following.

a) Explain the concept of watershed management. **[6]**

b) Write in short about effects of Modern Agriculture technology. **[4]**

Q3) Answer the following.

a) Explain in brief about major causes of soil degradation. **[6]**

b) Explain the reasons of water crisis in short. **[4]**

P.T.O.

Q4) Answer the following.

a) Explain effects of mining with case studies. **[6]**

b) Why is it necessary to conserve mineral resources? **[4]**

Q5) Write a short note on any four of the following.

a) World Food Problem. **[2½]**

b) Green Revolution in India. **[2½]**

c) Protective & Productive functions of forests. **[2½]**

d) Effects of Soil Erosion. **[2½]**

e) Over exploitation of mineral resources. **[2½]**

f) Effects of Dams on Tribal people. **[2½]**

Total No. of Questions : 4]

SEAT No. :

PA-2139

[Total No. of Pages : 1

[5901]-128
S.Y. B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS 201 : Science, Technology & National Security
(2019 Pattern) (Semester - III) (23231)

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: **[5×1=5]**

a) What are the advantages of artificial technology?
b) What is artificial technology used for?
c) Define 'Technology'.
d) What is 'Science'?
e) Define 'Transfer Technology'.

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

a) Armaments Technology.
b) National Security
c) Aircraft Technology

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

a) What is the role of science and technology in national security?
b) State in detail 'Military Technology'.
c) Explain the Submarine Technology.

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

a) How has modernization in science and technology contributed to maintaining peace and security?
b) Explain in detail the Space Vehicles Technology.

Total No. of Questions : 4]

SEAT No. : ____

PA-2140

[Total No. of Pages : 2

[5901]-129

S.Y.B.Sc. (Regular)

DEFENCE AND STRATEGIC STUDIES

DS 202 : Military Geography & Geopolitics

(2019 Pattern) (Credit System) (Semester - III) (23232)

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. **[5×1=5]**

a) What does the term tactics mean?

b) Define Land-Locked States.

c) Who gave the theory of Rimland?

d) Define Military Geography.

e) Define Geopolitics.

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

a) Land Power Theory.

b) Geopolitics.

c) Grand Strategy.

P.T.O.

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

a) State the Problems of Land-Locked and Buffer States.

b) Explain the Meaning & Concepts of Geopolitics.

c) Explain the Tactics - Definition, Meaning & Concepts.

d) What is the difference between heartland and Rimland?

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

a) Why are tactics used?

b) Explain in detail the Rim Land Theory.

Total No. of Questions : 4]

SEAT No. :

PA-2141

[Total No. of Pages : 2

[5901]-130

S.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS-203 : Contemporary Warfare

(2019 Pattern) (CBCS) (Semester - III) (23233)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figure to the right indicates full marks.***

Q1) Define the following questions : **[5 × 1 = 5]**

a) What is National Security?

b) What is Internal Security?

c) What do you mean by security?

d) Define Energy Security.

e) Define Human Rights.

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

a) Indian Ocean

b) Insurgency

c) Terrorism

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

a) Explain the Meaning, Concept, Nature & Scope Of Contemporary Warfare.

b) Explain the relationship between India and the USA.

c) What is the problem between China and India?

P.T.O.

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

a) Discuss in detail the Emerging presence of China in the Indian Ocean.

b) Explain in detail Non - Military Issues of Strategic Concern.

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Total No. of Questions : 3]

SEAT No. :

PA-2142

[Total No. of Pages : 1

[5901]-131

S.Y. B.Sc. Computer Science/Biotechnology/B.C.A.
LANGUAGE ENGLISH
AECC - 11A : Ability Enhancement Compulsory
(2019 Pattern) (Semester - III) (Credit System) (Regular)

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

Instructions to the candidates:

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

Q1) Attempt any One of the following in about 150 to 200 words: **[15]**

a) Explain Sambu's reactions to the end of the story 'A Shadow'.

b) Elaborate the Knight's dream in the poem 'La Belle Dame Sans Merci'.

Q2) Attempt any two of the following in about 50 to 80 words : **[10]**

a) Write a note on your daily routine?

b) Write a dialogue between you and the Principal to get a permission for starting a Reading Club in college.

c) Seema goes to her friend Praveen's house. Her younger sister, Amita, is with her. Seema introduces the two to each other. Write a dialogue for this situation.

Q3) Attempt any Two of the following in about 50 to 80 words: **[10]**

a) Write a note on 'Interview Etiquettes'.

b) Discuss the techniques for effective participation in 'Group Discussion'?

c) Write a Job Application for the post of a 'Computer Lab Assistant'.

Total No. of Questions : 3]

SEAT No. :

PA-2143

[Total No. of Pages : 1

[5901]-132
S.Y. B.Sc. (Regular)
MARATHI (मराठी)
AECC-2B : उपयोजित मराठी
(CBCS 2019 Pattern) (Semester - III) (23331)

वेळ : 2 तास] [एकूण गुण : 35

सूचना : 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.
2) उजवीकडील अंक पूर्ण गुण दर्शावितात.

प्र.1) अ) खालीलपैकी कोणत्याही पाच प्रश्नांची उत्तरे 20 शब्दांत लिहा. **[5]**

i) दृक माध्यमांच्या भाषेची दोन वैशिष्ट्ये लिहा.

ii) दृक श्राव्य माध्यम म्हणजे काय?

iii) दैनंदिन जविन व्यवहारातील भाषेची दोन कार्य लिहा.

iv) व्यवहार भाषेची व्याख्या लिहा.

v) कार्यालयीन भाषा म्हणजे काय?

vi) व्यवहार भाषा व साहित्याची भाषा यातील फरक लिहा.

vii) फेसबुकचा शोध कोणी लावला?

ब) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[10]**

i) आपल्या महाविद्यालयातील प्राचार्यांच्या नावे महाविद्यालयातील वसतिगृहात प्रवेश मिळणेबाबत विनंती अर्ज करा.

ii) आपल्या गावातील वाचनालयातील ग्रंथपालांकडे वाचनालयाचे सभासद होण्यासाठी विनंती अर्ज करा.

iii) संगणकीय अर्ज लेखनात युनिकोड वापराची आवश्यकता थोडक्यात स्पष्ट करा.

प्र.2) खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. **[15]**

अ) 'कृषीप्रदर्शन' या विषयावर वर्तमानपत्रासाठी लेख लिहा.

ब) 'दुग्धजन्य पदार्थांची निर्मिती' या विषयावर आकाशवाणीसाठी भाषण लिहा.

क) 'जनावरांची निगा' या विषयावर दूरदर्शनसाठी माहितीपट तयार करा.

प्र.3) खालीलपैकी कोणत्याही एका प्रश्नांचे उत्तर लिहा. **[5]**

अ) 'निसर्गावर मानवाचे अतिक्रमण' या विषयावर ब्लॉगलेखन करा.

ब) 'व्यसन आणि तरूण' या विषयावर फेसबुकसाठी लेखन करा.

Total No. of Questions : 3]

SEAT No. :

PA-2144

[Total No. of Pages : 1

[5901]-133
S.Y. B.Sc. (Regular)
LANGUAGE HINDI (हिंदी)
AECC-IIC : हिंदी काव्य तथा कहानी साहित्य
(2019 Pattern) (Semester - III) (Credit System) (23341)

समय : 2 घंटे] [पूर्णांक : 35

सूचना : 1) सभी प्रश्न अनिवार्य हैं।

2) दाहिनी ओर लिखे अंक प्रश्नों के पूर्णांक हैं।

प्र.1) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[15]**

अ) 'कई दिनों तक चूल्हा रोया, चक्की रही उदास इस पंक्ति के आशय को स्पष्ट कीजिए।

ब) 'कहाँ तो तय था चिरागाँ हर एक घर के लिए' गजल के माध्यम से कवि ने राजनीतिक और सामाजिक समस्या पर किस प्रकार प्रहार किया है?

क) 'इसको भी अपनाता चल' कविता का भावार्थ स्पष्ट कीजिए।

ड) 'पालतु कुत्ता' कविता के माध्यम से समाज में व्याप्त नारी समस्या पर प्रकाश डालिए।

इ) श्रीप्रकाश शुक्ल ने घर के प्रति लगाव को किस प्रकार व्यक्त किया है?

प्र.2) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। **[15]**

अ) 'उसने कहा था' कहानी के माध्यम से आदर्श प्रेम को स्पष्ट कीजिए।

ब) भिखारिन का चरित्र–चित्रण कीजिए।

क) ककड़ी की कीमत कहानी में चित्रित समस्या को स्पष्ट कीजिए।

ड) 'कप्तान' कहानी का आशय लिखिए।

इ) 'बदबू' कहानी की कथावस्तु लिखिए।

प्र.3) निम्नलिखित में से किसी एक प्रश्न का उत्तर लिखिए। **[5]**

अ) 'लहानासिह' का चरित्र–चित्रण कीजिए।

ब) 'पालतु कुत्ता' कविता का भावार्थ संक्षेप में लिखिए।

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Total No. of Questions : 4]

SEAT No. :

PA-2145

[Total No. of Pages : 2

[5901]-134

S.Y. BSc. (Regular)

AECC-IVE : LANGUAGE SANSKRIT (संस्कृत)

Gīrvānabhārati

गीर्वाणभारती (निवडक संस्कृतवेचे)

(2019 Pattern) (Semester - III) (Credit System) (23351)

वेळ : *2* तास*]* *[* एकूण गुण : *40*

सूचना : 1) All questions are compulsory.
सर्व प्रश्न आवश्यक आहेत.

2) Figures to the right indicate full marks.
उजवीकडील अंक पूर्ण गुण दर्शवितात.

Q1) Write an answer in 2-4 lines on the following questions. **[16]**

पुढील प्रश्नांची दोन ते चार ओळीत उत्तरे लिहा.

a) From which original text च्यवनभार्गवथा has taken?
च्यवनभार्गवथा कोणत्या मूळ ग्रंथातून घेतली आहे?

b) What is the name of the mother of सत्यकाम?
सत्यकामाच्या आईचे नाव काय?

c) What is the name of the Guru of Satyakama?
सत्यकामाच्या गुरूंचे नाव काय?

d) Explain the meaning of the word उपनिषद्
उपनिषद् शब्दाचा अर्थ स्पष्ट करा.

e) Who is the husband of Sakuntala?
शकुंतलेचा पती कोण?

f) State the name of the Kalidasas Drama.
कालिदासाच्या नाटकाचे नाव लिहा.

g) Who is the author of शिवमानसपूजास्तोत्र?
शिवमानसपूजास्तोत्राचे रचयिता कोण?

h) State the name of the काव्य of वाल्मीकी
वाल्मीकीच्या काव्याचे नाव लिहा.

P.T.O.

Q2) Write short notes. (Any two) **[8]**

टीपा लिहा. (कोणत्याही दोन)

i) **शकुन्तला**

ii) **कण्वः**

iii) **च्यवनाः**

Q3) Write short notes. (Any two) **[8]**

टीपा लिहा. (कोणत्याही दोन)

i) **भक्तिः**

ii) **स्तोत्रवाङ्मयम्**

iii) **रामायणम्**

Q4) Write **सत्यकामजाबलकथा** in your own words. **[8]**

सत्यकामजाबालकथा तुमच्या शब्दात लिहा.

OR/**किंवा**

Write the summary of **उपदेशप्रबन्धः**

उपदेशप्रबन्धः पाठाचा सारांश लिहा.

Total No. of Questions : 4]

SEAT No. :

PA-2146

[Total No. of Pages : 2

[5901]-135
S.Y.B.Sc.
ARABIC FUNCTIONAL
CC-1D : Grammar and Translation
(2019 Pattern) (Semester - III)

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

Instructions to the candidates:

1) ***Attempt all questions.***
2) ***Figures to the right side indicate full marks.***

Q1) Define and illustrate any <u>two</u> of the following Grammar. **[10]**

١) اَلمُبتداَء وَالخَبَر___

٢) اَسماءُ اَلا شارَة___

٣) حُرُوفُ الهِجَاء___

Q2) Translate into English Only: **[10]**

١) هٰذهِ المدرسَةُ جَيّدَةٌ__

٢) اَلمُدَرِّسُ مَشغُولٌ__

٣) اَلوَلَدُ ذَكِيٌّ__

٤) تلكَ الّيّارَةُ جَمِيلَةٌ__

٥) اَلكُرسِيُّ مُرِيحٌ__

Q3) Translate into <u>Arabic</u> Only : **[10]**

a) The Student is going to the School.

b) The girl is Sitting on the Chair.

c) This Bus is coming from the College.

d) That Bus is going to the University.

e) Ali is returning with Fatima from the market.

P.T.O.

Q4) Write the term in Arabic: **[5]**

Atom ____ Heat ____ Matter Voltage ____ Computer ____ Soft Orbit

____ Motion ____ Solid ____ Science ____

✣✣✣✣

Total No. of Questions : 5]

SEAT No. :

PA-2147

[Total No. of Pages : 2

[5901] - 136

S.Y.B.Sc. (Vocational Paper - III)

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

CHNA - 231 : Operating System and Diagnostics Tools

(2019 Pattern) (CBCS) (Semester - III) (23871)

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

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

a) What are the different types of operating systems?

b) What is use of Visual Studio?

c) Define Computer Virus.

d) Write the full form of LAN, SCSI.

e) What is flash card?

f) List different programming languages of Computer System.

Q2) a) i) State any two features of MS Excel. **[2]**

ii) Explain the concept of MODEM in brief. **[4]**

b) How to solve the electric power issue in PC? **[4]**

Q3) a) i) What are the advantages of LAN? **[2]**

ii) Explain the instalation process of WLAN card to PC. **[4]**

b) What is External Hard drive? How it works? **[4]**

P.T.O.

Q4) a) i) What are the features of NTFS? **[2]**

ii) Write the steps of installation of new graphics card on PC. **[4]**

b) What is Corel-Draw and write its features? **[4]**

Q5) Attempt **Any Four** of the following : (Short Notes) **[10]**

a) MS Power Point.

b) Effect of Virus on Computer System.

c) Web Camera.

d) Red Hat Linux.

e) Fireware Card.

f) OS troubleshooting issues in Computer System.

Total No. of Questions : 5]

SEAT No. :

PA-2148

[Total No. of Pages : 2

[5901]-137

S.Y.B.Sc. (Vocational) (Regular)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

CHNA - 232 : Microprocessor & Interfacing - I

(CBCS 2019 Pattern) (Semester - III) (Paper - IV) (23872)

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. **[5×1=5]**

a) Write any two conditional flags in flag register of 8086 microprocessor.

b) Define resolution of DAC.

c) What is cache memory?

d) How to put 8086 microprocessor to max. mode.

e) List any two Non - Intel processors.

f) What is fullform of USB?

Q2) Answer the following questions.

a) i) What is interrupt? List anyone software interrupt. **[2]**

ii) What is DAC? Explain working of anyone type of DAC. **[4]**

b) Explain in short DMA controller. **[4]**

P.T.O.

Q3) Answer the following.

a) i) What is sensor? List any two sensors. **[2]**

ii) Explain in short flash ADC. **[4]**

b) What is function of BUS? Explain features of PCI bus. **[4]**

Q4) Answer the following.

a) i) Write two features of 'XEON' processor. **[2]**

ii) Differentiate USB 2.0 and USB 3.0. **[4]**

b) Describe methods of parallel data transfer with timing diagrams. **[4]**

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

a) Dynamic random access memory (DRAM).

b) Bus architecture.

c) LM-35 temperature sensor.

d) DOS and BIOS interrupt.

e) Flag register of 8086 microprocessor.

f) Maximum mode operation of 8086 microprocessor.

Total No. of Questions : 5]

SEAT No. : [ ]

PA-2149

[Total No. of Pages :2

[5901]-138
S.Y. B.Sc.
BIOTECHNOLOGY (Vocational Paper - III)
VBT - 211 : Cell Biology & Microbial Genetics
(2019 Pattern) (CBCS) (Semester - III) (23571)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Q.2 to Q.5 attempt any 3 questions.***
3) ***Q.2 to Q.5 carry equal marks.***

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

a) Define Animal cell.

b) Give one function of mitochondria.

c) Name any one type of cell junction molecule.

d) What are RNA transposons.

e) Mention two types of conjugation.

f) Name organism used for Griffith experiment.

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

i) Draw & label components of Plant cell.

ii) Explain in detail components of cell membrane.

iii) What are mobile elements? Give their significance.

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

i) Distinguish between Generalized and specialized transduction.

ii) Comment of selection and Cadherins as cell junction molecules.

P.T.O.

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

i) Explain mechanism of transformation in Haemophilus influenzae.

ii) Explain in detail different types of cell signalling.

iii) Explain in detail fluid mosaic model of membrane transport.

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

i) Explain in detail concept of Neoplasia and Apoptosis.

ii) Discuss in detail membrane transport.

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

i) What are different types of recombination?

ii) Comment on discovery of conjugation.

iii) Draw and explain structure of chloroplast.

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

i) Draw and explain Holliday model for Homologues recombination.

ii) Comment on extracellular matrix and cellular matrix interaction.

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

a) Tight junctions.

b) G - protein pathway.

c) Mitochondria.

d) Hfr.

e) Lederberg experiment.

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Total No. of Questions : 5]

SEAT No. : ____

PA-2150

[Total No. of Pages : 2

[5901]-139

S.Y.B.Sc. (Vocational)

BIOTECHNOLOGY

VBt-212 : Molecular Biology

(CBCS 2019 Pattern) (Semester - III) (Paper-IV) (23572)

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

Instructions to the candidates:

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

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

a) Define nucleoside.

b) What do you understand by glycosidic bond?

c) What is meant by chromatin?

d) How many pairs of autosomes do human beings have?

e) What do you understand by post translational modifications?

f) State the Chargaff rule.

Q2) a) Answer any one of the following. **[6]**

i) Explain the steps involved in initiation of transcription in prokaryotes.

ii) Describe the nucleosome model of eukaryotic genome organization.

iii) Explain the steps involved in elongation of replication in prokaryotes.

b) Describe the structure of ribosomes in detail. **[4]**

OR

Distinguish between DNA and RNA.

P.T.O.

Q3) a) Answer any two of the following. **[6]**

i) Give any 3 features of genetic code.

ii) Write a short note on alkylating agents.

iii) Explain the inhibitors of translation in prokaryotes and eukaryotes.

b) Write a short note on intron removal process in detail. **[4]**

OR

Distinguish between transcription and replication of DNA.

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

i) Write a short note on any one post translational modification.

ii) Give the functions of DNA gyrase, SSB proteins and DNA primase in replication of DNA in prokaryotes.

iii) Define the terms : Genome and linking number. Give the formula for calculating linking number.

b) Enlist the proteins involved in base excision repair mechanism. Give their role in base excision repair mechanism. **[4]**

OR

Write a short note on nucleotide excision repair mechanism.

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

a) Features of replication of DNA.

b) Central dogma of molecular biology.

c) Features of Watson and Crick model of DNA.

d) Role of pre-RC in eukaryotic initiation of replication.

e) Mutations caused by UV rays.

f) Features of translation.

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Total No. of Questions : 5]

SEAT No. :

PA-2151

[Total No. of Pages : 2

[5901]-140

S.Y.B.Sc. (Vocational)

SEED TECHNOLOGY

ST - 2.1 : Hybrid Seed Production

(2019 CBCS Pattern) (Semester - III) (2 Credits) (Paper - III) (23891)

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 is inbreeding depression?

b) Enlist types of apomixis.

c) What is cytoplasmic male sterility?

d) Define hand pollination.

e) What is roughing?

f) What is a seed rate?

Q2) a) What is hybrid seed production? Comment on its applications. **[6]**

b) Comment on Genetic basis of Heterasis. **[4]**

Q3) a) Define male sterility comment on CGMs. **[6]**

b) Comment on homomorphic self incompatibility. **[4]**

P.T.O.

Q4) a) Describe the process of seed production in cotton w.r.t. source of seed land requirement, isolation distance, cultural practices. Roughing harvesting and threshing. **[6]**

b) Comment on sowing & rowspacing w.r.t. hybrid seed production. **[4]**

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

a) Emasculation.

b) Use of genetic male sterility.

c) Variety and its types.

d) Plant protection in Jowar.

e) Pollen storage.

f) Applications of hybrid seed production.

Total No. of Questions : 5]

SEAT No. :

PA-2152

[Total No. of Pages : 2

[5901]-141
S.Y. B.Sc. (Vocational Paper-IV)
SEED TECHNOLOGY
S.T.-2.2 : Seed Testing
(2019 Pattern) (Semester - III) (2 Credits) (23892) (CBCS)
(Paper-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) Solve any five of the following. **[5]**

a) What is seed testing?

b) What do you mean by service seed sample?

c) Define a normal seedling.

d) What is seed vigour?

e) Enlist any two equipments used for seed testing.

f) What is the use of digital moisture meter?

Q2) a) Comment on the importance and history of seed testing. **[6]**

b) Explain any two equipments used in seed testing. **[4]**

Q3) a) Comment on service and certification seed samples. **[6]**

b) Describe purity components. **[4]**

Q4) a) What are the principles of seed sampling? **[6]**

b) Write the procedure of germination testing w.r.t. paper method. **[4]**

P.T.O.

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

a) International seed testing Association.
b) Official seed sample
c) ODV test
d) Moisture testing.
e) Seed evaluation w.r.t. normal and abnormal seedlings.
f) Heterogeneity test.

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Total No. of Questions : 5]

SEAT No. :

PA-2153

[Total No. of Pages : 2

[5901] - 142

S.Y.B.Sc. (Vocational Paper - III)

INDUSTRIAL MICROBIOLOGY

IMB - 211 : Bio-Reactors - Design and Operation

(2019 Pattern) (CBCS) (Semester - III) (23821)

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

Instructions to the candidates :

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

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

a) What is Aspect ratio?

b) What are Online Sensors?

c) What is Continuous mode of fermentation?

d) State importance of flocculation.

e) What are aseptic seals?

f) Enlist types of Spargers.

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

i) Draw a well-labelled diagram of a continuous stirred Tank Reactor.

ii) Enlist objectives of Biological treatment in wastewater management process.

iii) Write a short note on Anaerobic digestion process.

b) Draw a well labelled diagram of Foam Sensor and Control unit. Explain it's working. State examples of anti-foam agents. **[4]**

P.T.O.

Q3) a) Solve **any two** of the following : **[6]**

i) Describe use of air compressor and chilling plants in fermentation facility.

ii) Draw and explain - Air - Lift fermenter.

iii) Write a short note on Trickling filters.

b) Diagramatically explain principle and working of Hollow Fibre Reactor. **[4]**

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

i) What is a Clarifier? State it's applications.

ii) Diagramatically explain principle and working of pH meter.

iii) Write a short note on aeration and agitation.

b) Compare and Contrast Packed - bed reactor and Fluidised Bed-reactor. **[4]**

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

a) Batch mode of fermentation.

b) Bioreactor on Chips.

c) Utilities required for a fermentation process.

d) Screening process and Grit removal in wastewater plant.

e) Disinfection of wastewater.

f) Control and Maintenance of temperature during fermentation process.

Total No. of Questions : 5]

SEAT No. :

PA-2154

[Total No. of Pages : 2

[5901]-143

S.Y.B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY

VOC-IND-IMB - 212 : Screening and Process Optimization

(2019 CBCS Pattern) (Semester - III) (Paper - IV) (23822)

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) Give names of any two control parameters used for monitoring of cell mass.

b) Define 'Unculturable bacteria'.

c) Enlist any two antifoam agents used in fermentation process.

d) What is the role of microbes in biosphere?

e) Write any two biochemical methods used for studying microbial diversity.

f) Define scale - up .

Q2) a) Describe the following any two. **[6]**

i) Describe the process of strain improvement.

ii) Explain the process of inoculum build-up.

iii) Explain shannon's diversity index.

b) Explain in detail the process and importance of primary screening. **[4]**

P.T.O.

Q3) a) Explain the following any two. **[6]**

i) Describe the concerted feedback control with the help of a diagram.

ii) Explain the significance of microbial diversity.

iii) Explain the concept of metagenomics.

b) Describe the importance of 'del factor' in sterilization. **[4]**

Q4) a) Discuss the following any two. **[6]**

i) Describe the objectives of scale-up.

ii) Describe temperature as an important process parameter in fermentation.

iii) Describe the concept of culturable bacteria.

b) Describe sequence based targeted screening in details. **[4]**

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

a) Secondary screening.

b) Lyophilization.

c) Function based targeted screening.

d) Dissolved oxygen as process parameter.

e) Isolation of analogue resistant mutants.

f) Plackett - Burman design.

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Total No. of Questions : 5]

SEAT No. : ____

PA-2155

[Total No. of Pages : 2

[5901]-144

S.Y.B.Sc. (Voc.)

ELECTRONIC EQUIPMENT MAINTENANCE

EEM - 231 : Basic Level Maintenance of Smart Phone

(CBCS 2019 Pattern) (Semester - III) (Paper - III) (23811) (Regular)

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

Instructions to the candidates:

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

Q1) Attempt any five from the following. **[5]**

a) What is NTT & NMT?

b) What are components of small phone?

c) What is CDMA?

d) What is conventional shape of cells in mobile communication system?

e) What is function of MODEM?

f) What is function of BGA Reballing kit?

Q2) a) Answer the following.

i) If "Android phone is running slow" What is its cause? **[3]**

ii) How does PSTN works? **[3]**

b) What are parts of soldering Iron? Explain it with neat lebelled diagram. **[4]**

P.T.O.

Q3) a) Answer the following.

i) Give comparison between resistive & Capacitive touch screen. **[3]**

ii) How to use test jig box? What is its uses? **[3]**

b) What are types of multiplexing techniques? Explain SDMA in brief. **[4]**

Q4) a) Answer the following.

i) What is wireless LAN? What are its components? **[3]**

ii) What are different types of sensors? **[3]**

b) Explain working of FDMA. **[4]**

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

a) Android operating system.

b) Wi fi

c) Modulation techniques

d) TFT LCD display & AMOLED display

e) Working of gyroscope.

f) DC power supply.

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Total No. of Questions : 5]

SEAT No. :

PA-2156

[Total No. of Pages : 2

[5901]-145

S.Y. B.Sc. (Vocational Paper-IV)

ELECTRONIC EQUIPMENT MAINTENANCE

EEM - 232 : Smart Phone Based Electronic Equipment Design

(2019 Pattern) (CBCS) (Semester - III) (23812)

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

Instructions to the candidates :

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

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

a) What is Arduino?

b) What is life cycle activity in Android?

c) What is iteration in data structure?

d) Does android have GUI?

e) What are three types of iterations?

f) List the languages used to build Android.

Q2) a) Answer the following :

i) What is a Service in Android? **[3]**

ii) Write a program to print the “Hellow World” 5 times. **[3]**

b) Differentiate Activities from Services. **[4]**

Q3) a) Answer the following :

i) What is use of Bundle in Android? **[3]**

ii) Explain Sensors in Android. **[3]**

b) Explain dialog boxes supported on Android. **[4]**

P.T.O.

Q4) a) Solve the following :

i) What are disadvantages of Android? **[3]**

ii) What are Features of Android architecture? **[3]**

b) What is home automation using Android? **[4]**

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

a) How to create content provider in Android?

b) What are main building blocks in Android?

c) How to create user Android interface?

d) What is scope of Android?

e) Write short note on “Advantages of Android”.

f) What is the Android architecture?

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

PA-2157

[Total No. of Pages : 2

[5901] - 146

S.Y. B.Sc. (Regular)

GEOLOGY

GL - 212 : Principles of Stratigraphy and Sedimentation

(2019 Pattern) (Credit System) (Semester - III)

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

Instructions to the candidates :

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

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

a) Define lithostratigraphy

b) Sandstone.

c) Enlist chronostratigraphic units.

d) What is roundness?

e) Define porosity.

f) What is Clastic texture?

Q2) a) Define stratigraphy. Explain the principles of Stratigraphy. **[6]**

b) Define Sedimentary Environment. Mention types. **[4]**

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

b) Define Biochemical deposits. Write a note on carbonaceous deposits. **[4]**

P.T.O.

Q4) a) Explain progressive changes in sediments during transport with respect to size and shape. **[6]**

b) Define Residual Sedimentary rock. Write a note on Laterite. **[4]**

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

a) Define cementation and lithification.

b) Load cast and Flute cast.

c) Derivation of sediments referring to source of sediments.

d) Tracks and Trails.

e) Define weathering and its types.

f) Biostratigraphy.

Total No. of Questions : 5]

SEAT No. :

PA-2158

[Total No. of Pages : 4

[5901]-147

SY.B.A./B.Sc./B.Com.

ENVIRONMENTAL SCIENCE

AECC - I : Environmental Awareness/ Environmenal Studies

(2019 Pattern) (Semester-III) (23361)

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

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 Questions No. 5 carry equal marks.***

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

a) What is Renewable energy resources?

b) What is called as soil erosion?

c) Define the term biodiversity.

d) Define the term food chain with example.

e) What is mean by desertification?

f) Define the term ecosystem.

Q2) **Answer the following:**

a) What are the threats to biodiversity? **[6]**

b) What is sustainable development and why it is necessary? **[4]**

Q3) **Answer the following:**

a) What are the causes and impacts of deforestation? **[6]**

b) Explain multidisciplinary nature of Environmental studies. **[4]**

P.T.O.

Q4) **Answer the following:**

a) Describe importance of water resources and its use and over exploitation. **[6]**

b) Explain structure of an ecosystem. **[4]**

Q5) **Write a short note on Any Four of the following:** **[4 × 2½ = 10]**

a) Ex-situ conservation of Biodiversity.

b) Endangered species.

c) Alternative energy resources.

d) Forest ecosystem.

e) Food web

f) Droughts

Total No. of Questions : 5]

PA-2158

[5901]-147

SY.B.A./B.Sc./B.Com.

ENVIRONMENTAL SCIENCE

AECC - I : Environmental Awareness/ Environmenal Studies

(2019 Pattern) (Semester-III) (23361)

(मराठी रूपांतर)

वेळ : 2 तास] *[एकूण गुण : 35*

सूचना :– *1) प्रश्न क्रं. 1 अनिवार्य आहे.*

2) प्रश्न क्रं. 2 ते 5 मध्ये कोणतेही तीन प्रश्न सोडवा.

3) प्रश्न क्रं. 2 ते 5 यांना समान गुण आहेत.

प्रश्न 1) खालीलपैकी कोणतेही पाच लिहा : **[5]**

अ) अक्षय उर्जा संसाधने म्हणजे काय?

ब) मातीची धूप कशाला म्हणतात?

क) व्याख्या लिहा – जैवविविधता

ड) अन्नसाखळी या शब्दाची व्याख्या उदाहरणासहित लिहा.

इ) वाळवंटीकरण म्हणजे काय?

फ) व्याख्या लिहा – परिसंस्था

प्रश्न 2) खालील प्रश्नांची उत्तरे लिहा.

अ) जैवविविधतेला असणारे धोके लिहा. **[6]**

ब) शाश्वत विकास म्हणजे काय आणि त्याची गरज स्पष्ट करा? **[4]**

प्रश्न 3) खालील प्रश्नांची उत्तरे लिहा :

अ) जंगलतोडीची कारणे आणि परिणाम काय आहेत? **[6]**

ब) पर्यावरणीय अभ्यासाचे बहुविद्याशाखीय स्वरूप स्पष्ट करा. **[4]**

प्रश्न 4) खालील प्रश्नांची उत्तरे लिहा :

अ) जलस्त्रोतांचे महत्त्व आणि त्याचा वापर व अतीशोषणाचे वर्णन करा? **[6]**

ब) परिसंस्थेची रचना स्पष्ट करा? **[4]**

प्रश्न 5) खालीलपैकी कोणत्याही चारवर टिपा लिहा. **[4×2½=10]**

अ) जैवविविधतेचे एक्स–सीटू संवर्धन

ब) लुप्तप्राय जाती

क) वैकल्पिक उर्जा संसाधने

ड) वन परिसंस्था

इ) अन्नजाळे

फ) दुष्काळ