Total No. of Questions : 4]

SEAT No. :

P417

[Total No. of Pages : 2

[4817]-101
S.Y. B.Sc.
MATHEMATICS
MT - 211 : Calculus of Several Variables
(51111) (2008 Pattern) (Semester-I) (Paper-I) (Old)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Attempt Any Five of the following: **[10]**

a) Find $\lim_{(x, y)\to(0, 0)} \frac{2xy^2}{x^2 y^4}$, if exist.

b) State Schwarz's theorem for mixed partial derivatives of $f(x, y)$ of second order.

c) Show that (0, 0) is critical point of $f(x, y) = xy(1–x–y)$.

d) Test differentiability of $f(x, y)$ at (0, 0), where $f(x, y) = x + |y|$.

e) Find Jacobian $J = \frac{\partial(x, y)}{\partial(u, v)}$, where $x = uv$, $y = u - uv$.

f) Using double integration, find area of the rectangle bounded by co-ordinate axes and the line $x = 2$, $y = 3$.

g) If $u = e^{xyz}$, $x = t$, $y = t^2$, $z = t^3$. Find $\frac{du}{dt}$.

Q2) Attempt Any Two of the following: **[10]**

a) State and prove Euler's theorem for homogeneous function of two variables.

b) Using differentials, find approximate value of $\sqrt[5]{(3.8)^2 + 2(2.1)^3}$.

c) Expand $f(x, y) = x^3 + y^3 + xy^2$ in powers of $(x - 1)$ and $(y - 2)$ by using Taylor's theorem.

P.T.O.

Q3) Attempt Any Two of the following: **[10]**

a) Explain Lagrange's method of undetermined multipliers.

b) Show that $f(x, y) = \frac{xy}{x^2 + y^2}$, $x^2 + y^2 \neq 0$

$= 0$, $x^2 + y^2 = 0$.

Possesses first order partial derivatives at (0, 0) but not differentiable at the origin.

c) If $f(x, y) = x^2 \tan^{-1}\left(\frac{y}{x}\right) - y^2 \tan^{-1}\left(\frac{x}{y}\right), xy \neq 0$

$= 0$, otherwise.

Then show that $\frac{\partial^2 f}{\partial x \partial y} \neq \frac{\partial^2 f}{\partial y \partial x}$ at (0, 0).

Q4) Attempt Any One of the following: **[10]**

a) i) Evaluate by changing the order of integration in $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y}\, dy\, dx$.

ii) Evaluate $\iint_R \sqrt{1 - x^2 - y^2}\, dxdy$, where R is region bounded by $x = 0$, $y = 0$ and $x^2 + y^2 = 1$ in the first quadrant.

b) i) Using triple integration, find volume of a sphere of radius 'α'.

ii) Evaluate $\iint_R \sin\left(\frac{x - y}{x + y}\right) dxdy$, where R is the region bounded by the co-ordinate axes and the line $x + y = 1$ in the first quadrant.

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Total No. of Questions : 4]

SEAT No. :

P418

[Total No. of Pages : 4

[4817]-102
S.Y. B.Sc.
MATHEMATICS
MT - 212(A) : Differential Equations
(2008 Pattern) (Semester-I) (Paper-II (A))

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***D stands for the differential operator.***

Q1) Attempt Any Five of the following: **[10]**

a) Find order and degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^{1/5} = \frac{d^2y}{dx^2}$.

b) Solve $\frac{dy}{dx} = x^2 y + y$.

c) Find the orthogonal trajectories of the family of curves $x + y = c$.

d) Using Wronskian check the functions 1, x, $2x^2$ are linearly independent or not.

e) Find the complementary function for the differential equation $(D^2 - 4)(D^2 + 9)\, y = 0$.

f) Find the particular integral of, $(D^3 + 4D)\, y = \cos 2x$.

g) Define the homogeneous differential equation.

Q2) Attempt Any Two of the following: **[10]**

a) Explain the method of solving linear differential equation

$$\frac{dy}{dx} + P(x)\, y = Q(x).$$

b) Solve $(x^2 + y^2 + x)dx + xy\, dy = 0$.

c) Solve $(xy - x^2)dy - y^2\, dx = 0$.

P.T.O.

Q3) Attempt Any Two of the following: **[10]**

a) Solve $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=2e^{2x}$.

b) Solve $(D^2 + 3D + 2)y = 1+ 3x + x^2$.

c) Let $f(D)=(D-a)^r\,\phi(D)$ be polynomial in D with constant coefficients.

Prove that $\frac{1}{(D-a)^r\phi(D)}e^{ax}=\frac{x^r\,e^{ax}}{r!\phi(a)}$, if $\phi(a)\neq 0$.

Q4) Attempt Any One of the following: **[10]**

a) i) Explain the method of solving general second order linear differential equation by the method of reduction of order.

ii) Solve $(D^3 + D^2 + D + 1)\,y = \sin 2x$.

b) i) Obtain the particular integral of the differential equation

$$\frac{d^2y}{dx^2}-2\frac{dy}{dx}+y=\frac{e^x}{x}$$

by using the method of variation of parameters.

ii) Verify that $y=c_1\sin 2x+c_2\sin 2x$ is the solution of the differential equation $\frac{d^2y}{dx^2}+4y=0$.

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Total No. of Questions : 4]

P418

[4817]-102
S.Y. B.Sc.
MATHEMATICS
MT - 212(B) : Numerical Analysis
(2008 Pattern) (Semester-I) (Paper-II (B))

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Use of non-progrmmable calculator is allowed.***

Q1) Attempt Any Five of the following: **[10]**

a) If the number $\frac{1}{3}$ be represented approximately as 0.3333, find the absolute and relative errors.

b) Round-off the following numbers to four significant digits: 0.70039, 0.0022217, 4.23567, 12.0056.

c) State Sturm's theorem.

d) Is it possible to solve the system of equations:

$5x + 3y = 6$

$7x - 5y = 8$

by Gauss - Seidel iterative method? Justify.

e) State the normal equations for fitting a second degree polynomial.

f) Prove that $E \equiv 1 + \Delta$, where E is the shift operator and Δ is a forward difference operator.

g) State Simpson's $\frac{1}{3}^{rd}$ rule for numerical integration.

Q2) Attempt Any Two of the following: **[10]**

a) Find the number and position of the real roots of the polynomial equation $f(x) = 8x^3 - 12x^2 - 2x + 3 = 0$.

b) Compute the root of the equation $x^5 + 5x + 1 = 0$ by using Newton - Raphson method.

c) Use the method of least squares to fit the equation $y = a + bx$ to the following data:

x	0	1	2	3
y	2	5	8	11

Q3) Attempt Any Two of the following: **[10]**

a) Solve the system using Gauss - Seidel method

$27x + 6y - z = 85$

$6x + 15y + 2z = 72$

$x + y + 54z = 110$

b) Prove that $\Delta^n x^{(n)} = n!h^n$ and $\Delta^{n+1} x^{(n)} = 0$.

c) From the following data, find the number of students who obtained less than 45 marks.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

Q4) Attempt Any One of the following: **[10]**

a) i) Explain the Lagrange's interpolation formula for unequal intervals.

ii) Evaluate $\int_0^3 \frac{dx}{1+x}$ using Simpson's $\frac{3}{8}^{th}$ rule (Take $h = 0.5$).

b) i) Explain Euler's method of successive approximation to solve first order first degree differential equation.

ii) Estimate $\int_0^{\pi} \sin x \, dx$, dividing the interval into six equal parts using Trapezoidal rule and compare with correct value.

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Total No. of Questions : 4]

SEAT No. :

P419

[Total No. of Pages : 2

[4817]-103
S. Y. B. Sc.
PHYSICS
PH-211: Mathematical Methods in Physics
(Paper-I) (2008 Pattern)(Old) (Semester-I)(51211)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Use of log table and calculator is allowed.***

Q1) Attempt ALL the following

a) Find the modulus of $z = 1 + \sqrt{3}\, i$. . **[1]**

b) Find $\ln z$, where $z = 1 + i$. **[1]**

c) Write $z = 1 - i$ in polar form. **[1]**

d) State statement of De-Moiver's theorem. **[1]**

e) If $F(x,y) = e^{xy}$, find F_x and F_{xx}. **[1]**

f) State the order of the differential equation $\frac{d^2x}{dt^2} + w^2 x = 0$ **[1]**

g) Define scalar triple product. **[1]**

h) $\bar{v} = \bar{w} \times \bar{r}$ is an example of which product. **[1]**

i) Define solenoidal vector field. **[1]**

j) $\bar{v} = x\hat{i} + y\hat{j} + z\hat{k}$, find $\bar{\nabla}.\bar{v}$. **[1]**

P.T.O.

Q2) Attempt any <u>two</u> of the follwing.

a) If $F(x,y)=\frac{xy}{x^2+y^2}$, find F_x. **[5]**

b) Using total differential , find approximate value of $\sqrt{(2.05)^2+(1.98)^2}$. **[5]**

c) Find real and imaginary parts of $\sin z$, where $z=x+iy$. **[5]**

Q3) Attempt any <u>two</u> of the following:

a) Show that $\bar{\nabla}\times\bar{\nabla}\phi=0$. **[5]**

b) If $\bar{v}=\bar{w}\times\bar{r}$ prove that $\bar{w}=\frac{1}{2}\text{curl }\bar{v}$, where $\bar{w}=$ constant. **[5]**

c) Determine the constant 'a', so that the vector **[5]**

$\bar{v}=(x+3y)\hat{i}+(y-2z)\hat{j}+(x+az)\hat{k}$ is solenoidal.

Q4) a) Attempt the following.

i) Find the directional derivative of $\phi=x^2yz+4xz^2$ at $(1,-2,-1)$ in the direction $2\hat{i}-\hat{j}-2\hat{k}$. **[4]**

ii) If $w=e^{-r^2-s^2}$, $r=uv\ \&\ s=u+2v$ find $\frac{dw}{du}$ and $\frac{dw}{dv}$. **[4]**

OR

i) Evaluate $\left(\frac{1+i}{1-i}\right)^4$. **[4]**

ii) Find the constants a,b,c so that the given vector field **[4]**

$\bar{v}=(x+2y+az)\hat{i}+(bx-3y-z)\hat{j}+(4x+cy+2z)\hat{k}$

is irrotational.

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

i) If $\bar{A}=2\hat{i}-3\hat{j}-\hat{k}$ and $\bar{B}=\hat{i}+4\hat{j}-2\hat{k}$, find $\bar{A}\times\bar{B}$. **[2]**

ii) Show that the following differential equation is an exact. **[2]**

$df=(y^2-y+2xy)dx+(x^2-x+2xy)dy$.

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Total No. of Questions : 4]

SEAT No. :

P420

[Total No. of Pages : 4

[4817] - 104
S.Y.B.Sc.
PHYSICS
PH-212(A): Electronics
(Old) (2008 Pattern) (Semester - I) (Paper - II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculators are allowed.***
4) ***Neat circuit diagrams must be drawn wherever necessary.***
5) ***Symbols have their usual meanings.***

Q1) Attempt all of the following:

a) Define reactance and impedance. **[1]**

b) State maximum power transfer theorem. **[1]**

c) For transistor having α=0.98, find value of β. **[1]**

d) Convert $(19)_{10}$ into its binary equivalent. **[1]**

e) Draw symbol of OR gate and give its truth table. **[1]**

f) If load voltage changes from 5V to 4.8V, when the line voltage changes from 127V to 103V. What is line regulation? **[1]**

g) A transistor has current gain 200. If base current is 0.1mA what is collector current? **[1]**

h) What is regulated power supply? **[1]**

i) Draw pin diagram of I_C-741. **[1]**

j) What is tolerance of a resistor? **[1]**

Q2) Attempt <u>any two</u> of the following:

a) Explain input and output characteristics of CE configuration of a transistor. **[5]**

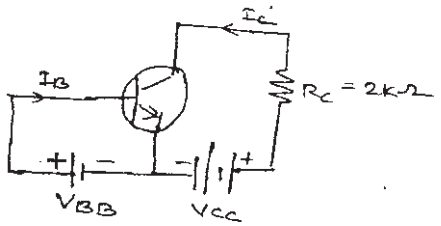
b) State Thevenin's theorem. How to thevenize a circuit? **[5]**

c) What is oscillator? Explain barkhausen criterion for oscillation. **[5]**

P.T.O.

Q3) Attempt <u>any two</u> of the following:

a) For transistor shown in figure, the voltage drop across 2kΩ collector resistance is 1V. If β=50 find the base current. **[5]**



b) Calculate the gain of non inverting amplifier, when input resistance at inverting terminal is 10kΩ and feedback resistance is 200kΩ. If the feedback resistance is doubled, what is the change in the voltage gain? **[5]**

c) Reduce the following Boolean expression and draw the logic diagram as well. **[5]**

$\bar{A}BC\bar{D}+BC\bar{D}+B\bar{C}\bar{D}+B\bar{C}D$.

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

i) 1) Draw the equivalent circuit of UJT. Explain the characteristics of UJT. **[4]**

2) State and verify De Morgan's first theorem. Draw the necessary logic diagram. **[4]**

ii) 1) Explain NOT and NAND gate with symbol and truth table. **[4]**

2) Explain positive and negative feedback in amplifier. **[4]**

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

i) What is transformer? State various types of transformer. **[2]**

ii) What do you understand by class A amplifier? **[2]**

Total No. of Questions : 4]

P420

[4817] - 104
S.Y.B.Sc.
PHYSICS
PH-212 (B): Instrumentation
(Old) (2008 Pattern) (Semester - I) (Paper - II)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Use of log tables and calculators are allowed.***

Q1) Attempt all of the following: (One mark each) **[10]**

a) What is the difference between precision and sensitivity?

b) Write any one instrument of second order system.

c) State any two characteristics of transducer.

d) What is principle of resistive transducer.

e) What do you mean by cantilever beam.

f) State Bernoulli's theorem.

g) What is Reynold's number.

h) Name any two paramagnetic substances.

i) What are the different types of flow.

j) State uses of pyranometer.

Q2) Attempt any two of the following:

a) Describe how cantilever beam used for the measurement of force. **[5]**

b) Explain principle, construction and working of variable capacitance transducer. **[5]**

c) What is pyranometer? How it is used for measurement of solar flux. **[5]**

Q3) Attempt <u>any two</u> of the following:

a) When input voltage of an instrument changes from 10V to 12V, the corresponding output voltage changes from 50V to 60V. What will be the sensitivity of the instrument. **[5]**

b) Water flowing in a horizontal pipe has a speed of 25 cm/s at one end point and 20 cm/s at another point. Determine the pressure drop between two points. **[5]**

c) The magnetic induction and magnetising field in a sample of magnetic material are 1 Wb/m^2 and 2 x 10^3 A/m respectively. **[5]**

Find i) Magnetic permeability
ii) Relative permeability of the material.

Q4) a) Attempt the following:

i) Write a note on first order thermal element system. **[4]**

ii) What is the aim of measurement? Discuss different standards of measurement? **[4]**

OR

i) Draw a block diagram of ECG machine and explain each block. **[4]**

ii) Write a note on column type device. **[4]**

b) Attempt any one of the following:

i) State any two characteristics of sound. **[2]**

ii) What is passive transducer. **[2]**

Total No. of Questions : 4]

SEAT No. :

P421

[Total No. of Pages : 2

[4817]-105
S.Y. B.Sc.
CHEMISTRY
CH-211:Physical Chemistry
(2008 Pattern) (Paper-I) (Semester-I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) Answer the following: **[10]**

a) Give the principle of steam distillation.

b) Write different forms of Clapeyron's equation.

c) Define the entropy.

d) What are azotropes?

e) Define freezing point of liquid.

f) What do you mean by abnormal molecular weight?

g) State Le-Chatlier Braun principle.

h) Give the limitations of Nernst distribution law.

i) Define the term molarity.

j) Give any two physical significance of free energy change.

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

i) What is van't Hoff factor? Derive the relation between van't Hoff factor and degree of dissociation.

ii) What are K_p and K_c? Derive the relation between K_p and K_c.

iii) State and explain third law of thermodynamics and give its limitations.

P.T.O.

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

i) Find the free energy change when 84gm of nitrogen gas is compressed reversibly and isothermally from 3 x 10^4 N/m^2 to 6 x 10^4 N/m^2 at 40ºC. (Given: R=8.314 J/mole/K., At. Wt. of nitrogen =14)

ii) Three moles of oxygen, three moles of hydrogen and two moles of nitrogen are mixed at constant temperature. Assuming these gases do not react chemically. (R=8.314 J/mole/K)

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

i) Explain positive and negative deviations for non ideal binary solutions.

ii) The extraction is more economical and efficient if the given volume of solvent is not used in single lot. Explain.

iii) Give the assumptions of arrhenius theory of electrolytic dissociation.

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

i) The boiling point of the solution containing 25.6 gm of substance 'X' per thousand grams of water is higher by 0.0514ºC than boiling point of pure water. Calculate the molecular weight of substance 'X' if Kb water is 0.514.

ii) One liter of water under nitrogen pressure of one atm. Dissolves 0.02 gm of nitrogen at 20ºC. Calculate Henry's law constant.

Q4) a) Define Helmholtz's free energy and Gibb's free energy. Derive the Gibb's Helmholtz's equation. **[6]**

OR

Define Osmosis and Osmotic pressure. How osmotic pressure of solution is determined Hartley-Berkeley's method?

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

i) Explain construction and working of fractionating column with the help of neat diagram.

ii) Write note on criteria of chemical equilibrium in terms of ΔS, ΔA and ΔF.

Total No. of Questions : 4]

SEAT No. :

P422

[Total No. of Pages : 2

[4817]-106
S.Y. B.Sc.
CHEMISTRY
CH - 212 : Organic Chemistry
(2008 Pattern) (Semester-I) (Paper-II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt the following: **[10]**

a) Define the term 'enantiomer'.

b) How will you prepare acetone from 2-propanol?

c) Give the classification of carboxylic acid.

d) Give the preparation of aniline from nitrobenzene.

e) What is the action of cold conc. H_2SO_4 on thiophene?

f) Define biochemistry.

g) Draw the structure of sucrose.

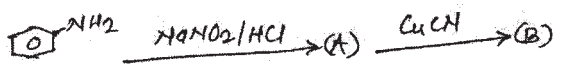
h) Define peptide linkage.

i) What are nucleosides?

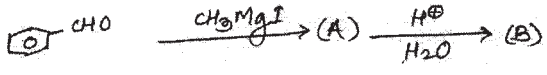
j) Explain the term 'Zwitter ion'.

Q2) a) Assign (A) and (B) of the following reactions (Any Three): **[6]**

i) $CH_3-\overset{O}{\overset{\|}{C}}-H \xrightarrow[H_2SO_4]{K_2Cr_2O_7} (A) \xrightarrow{NH_3} (B)$

ii) 

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

iv) 

P.T.O.

b) How will you bring about the following conversions (Any Two): **[4]**

i) Benzene to acetanilide.

ii) Methyl bromide to acetic acid.

iii) Acetaldehyde to crotonaldehyde.

iv) Acetylene to 1-pentyne.

Q3) Attempt Any Two of the following: **[10]**

a) Why Baeyer's strain theory fails to explain the stability of higher cycloalkane?

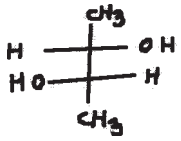
b) What are monosaccharide's? Explain the reaction of following with D-glucose.

i) dil. HNO_3 ii) H_2/Pt

c) What are proteins? Give the classification of protein with one example.

Q4) a) Attempt Any Two of the following: **[6]**

i) Define the term chiral centre. Assign 'R' & 'S' configuration of the following.



ii) Explain Perkin reaction with suitable example.

iii) Explain functions of RNA.

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

i) Give synthesis of furan? What is the action of following on furan

1) $CHCl_3/KOH$

2) SO_3/pyridine

ii) Discuss the effect of temperature on the enzyme catalyzed reactions.

OR

i) Explain cannizzaro reaction with suitable example.

ii) What are fatty acids? Discuss the properties of fatty acids.

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Total No. of Questions :4]

SEAT No. :

P423

[Total No. of Pages :2

[4817]-107
S.Y.B.Sc.
BOTANY
BO-211: Fundamentals of Plant Systematics and Plant Ecology
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Answer the following: **[10]**

a) What is taxonomy?

b) Enlist phases of taxonomy.

c) Give any two micromorphological characters used as data source in taxonomy.

d) What is ICBN?

e) Mention the type of fruit in Annonaceae.

f) Define Autecology.

g) What is Biosphere?

h) What is nudation?

i) Define food web.

j) Give any two examples of free floating hydrophytes.

P.T.O.

Q2) Answer any TWO of the following: **[10]**

a) Give the merits of Bentham and Hooker's system of classification of seed plants.

b) Give an account of principles of ICBN.

c) What are ecological pyramids? Explain pyramid of numbers.

Q3) Write notes on any two of the following: **[10]**

a) Morphological features in systematics.

b) Succession on land.

c) External adaptive features of xerophytes.

Q4) Give distinguishing characters, floral formula and floral diagram of family Meliaceae and Rubiaceae. **[10]**

OR

Give an account of abiotic and biotic components of ecosystem.

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Total No. of Questions :4]

SEAT No. :

P424

[Total No. of Pages :2

[4817]-108
S.Y.B.Sc.
BOTANY -II
BO-212: Fundamentals of Plant Physiology
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10]**

a) How plant cell acts as organic laboratory?

b) What are long day plants?

c) Give any two factors affecting absorption of water.

d) Define transpiration.

e) Give any two applications of vernalization.

f) Enlist phases of growth.

g) Give role of phytochrome.

h) What are anti-transpirants?

i) Define acids.

j) What is bioenergetics?

P.T.O.

Q2) Answer Any Two of the following: **[10]**

a) Give significance of transpiration.

b) Explain practical applications of cytokinnins.

c) Describe root pressure theory of ascent of sap.

Q3) Write notes Any Two of the following: **[10]**

a) Physico-chemical properties of water.

b) Factors affecting salt absorption.

c) Pfeffer's Auxanometer.

Q4) What is plasmolysis? Give its mechanism and significance. **[10]**

OR

Give an account of role and deficiency symptoms of Phosphorous.

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Total No. of Questions : 4]

SEAT No. :

P425

[Total No. of Pages : 2

[4817]-109
S.Y. B.Sc.
ZOOLOGY
ZY-211: General Zoology and Biological Techniques-I
(2008 Pattern) (Semester-I) (Paper-I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following: **[10]**

a) What are pedicellariae?

b) Define spermatogenesis.

c) What is stereoblastula?

d) What is thin layer chromatography?

e) What is dewaxing?

f) What is use of sphygmomanometer?

g) Mention any two advantages of IVF?

h) What is bilateral cleavage?

i) What is pseudometamerism?

j) Define haemocoelomata.

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

a) Amoeboid movement in protista.

b) Sterilization by dry heat.

c) Useful protista.

P.T.O.

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

a) Sketch and label piercing and sucking mouth parts in insects.

b) Principle and applications of gel electrophoresis.

c) Describe the principle and use of Camera Lucida.

Q4) Describe the water vascular system of starfish. **[10]**

OR

Describe the process of oogenesis and add a note on structure of ovum.

Total No. of Questions : 4]

SEAT No. :

P426

[Total No. of Pages : 2

[4817]-110
S.Y. B.Sc.
ZOOLOGY
ZY - 212 : Applied Zoology-I
(Fisheries and Agricultural Pests and their Control)
(2008 Pattern) (Semester-I) (Paper-II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat labelled diagrams must be drawn wherever necessary.***

Q1) Attempt the following: **[10]**

a) Mention any two structural pests.

b) Give name of gears used for Bombay duck fishery.

c) Write the biological name of Pearl oyster.

d) Write any two damages caused by Aphids.

e) Enlist any two fishing crafts.

f) Define pesticide.

g) What is freshwater fishery?

h) Mention any two methods of pest control.

i) Mention any two uses of fish liver oil.

j) Write the biological name of Red cotton bug.

P.T.O.

Q2) Write short notes on (Any Two): **[10]**

a) Squirrel and Rat as non-insect pests.

b) Rampani net.

c) Freezing and drying techniques in fish preservation.

Q3) Attempt the following (Any Two): **[10]**

a) Describe harvesting methods of Mackerel.

b) Describe in brief Rotary duster as a plant protection appliance.

c) Mention the concept of IPM.

Q4) Describe marks of identification, nature of damage and control measures of Brinjal fruit borer and Red cotton bug. **[10]**

OR

Describe the habit, habitat and culture methods of Macrobrachium rosenbergii and Cirrhinus mrigala.

●●●●●

Total No. of Questions :4]

SEAT No. :

P427

[Total No. of Pages :2

[4817]-111
S.Y.B.Sc.
GEOLOGY
GL-211: Mineralogy
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Answer the following questions in 2/3 lines: **[10]**

a) Define hemihedral form.

b) Give the gem variety of coruadum.

c) What is oblique extinction?

d) What is the alteration product of olivire?

e) What are solid inclusions?

f) Define nesosilicate structure.

g) State two minerals belonging to feldspathoid group.

h) Define twinning in crystals.

i) Define isotropism.

j) Mention any two external imperfections in crystals.

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

a) Growth of crystals in cavities.

b) Phenomenon of anisotropism.

c) Silicate structure and physical property of silica minerals.

P.T.O.

Q3) Explain the following (any 2): **[10]**

a) Silicate structure, chemical composition and physical property of pyroxene mineral.

b) Classification of twins.

c) Attributes of gemstones.

Q4) Describe the structure, mineral composition, physical and optical properties and paragenesis of amphibole group of minerals. **[10]**

OR

Give the crystallographic axes, elements of summetry and forms present with indices of cubic system, Type Pyrite and Type Tetrahedrite.

EEE

Total No. of Questions :4]

SEAT No. :

P428

[Total No. of Pages :2

[4817]-112
S.Y.B.Sc.
GEOLOGY
GL-212: Structural Geology
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following questions: **[10]**

a) Thrust fault.

b) Isoclinal fold.

c) Non - conformity.

d) Dome.

e) Plunging fold.

f) What is true dip?

g) What is diapir?

h) Define strike.

i) What is true thickness?

j) Tension Joints.

Q2) Write a note on (Any two): **[10]**

a) Recumbent and suprataneous fold.

b) Movements along fault.

c) Disconformity and angular Unconformity.

P.T.O.

Q3) Explain the following (Any two): **[10]**

a) Criteria for recognise faults in the field.

b) Geometric classification of joints.

c) Anticlinorium and synclinorium.

Q4) What are primary structures? Describe how ripple marks and cross bedding help in determing the top of bed. **[10]**

OR

What are joints? Write genetic classification of joints.

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Total No. of Questions : 4]

SEAT No. :

P429

[Total No. of Pages : 3

[4817]-113
S.Y.B.Sc.
STATISTICS
ST-211: Discrete Probability Distributions and Time Series
(Paper-I) (2008 Pattern) (Semester-I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is 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]**

i) Which of the following is a discrete random variable?

A) Size of a family B) Height of a person

C) Temperature at a place D) Life of an electric bulb

ii) In a time series, effect of earthquake gives rise to

A) Seasonal variations B) Cyclical variations

C) Secular Trend D) Irregular variations

iii) If X ~ Poisson (m=3), then mode of X is

A) 2 and 3 B) 3 and 4

C) 3 D) 2

b) State whether each of the following statements is True or False.**[1 each]**

i) If X and Y are independent random variables, then the conditional probability distribution of X given Y=y is the same as the probability distribution of X.

ii) For negative binomial distribution, mean is greater than variance.

iii) The long term regular movement in a time series is called as secular trend.

P.T.O.

c) Give one real life situation where geometric distribution can be applied. **[1]**

d) State the uniqueness property of moment generating function. **[1]**

e) Suppose X is a Poisson random variable such that

$P(X=2)=\frac{3}{4}\cdot P(X=1)$. Find $P(X=0)$. **[1]**

f) Write the normal equations for fitting the trend $Y=a+bt$ in time series analysis. **[1]**

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

a) Define negative binomial distribution. Obtain its expected value.

b) Define time series. Name its components. Write a note on cyclical variation.

c) The joint probability distribution of a random variable(X,Y) is given as follows:

$$P(x,y)=\begin{cases} e^{-1}p^{y}q^{x-y} & , \quad x=0,1,2..... \\ & \quad y=0,1,2.....x \\ & \quad 0<p<1,\ q=1-p \\ 0 & , \quad otherwise \end{cases}$$

Find (i) marginal probalility distribution of X.

(ii) marginal probability distribution of Y.

Check whether X and Y are independent.

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

a) Let X and Y be independent Poisson random variables with parameters m_1 and m_2 respectively. Find the conditional probability distribution of X given X+Y=n where n is a positive integer.

b) State and prove the lack of memory property of geometric distribution.

c) Customers arrive at a coffee-shop according to Poisson distribution with an average time of 6 minutes between two successive arrivals. The service time for each customer is exponentially distributed with mean 4 minutes. Find

i) probability that the server is idle,

ii) average waiting time of a customer in queue,

iii) average queue length.

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

a) i) Show that all cumulants except the first are invariant to chage of origin but not to chage of scale. **[5]**

ii) A marker is to continue shooting at the target until he hits it 6 times. Probability that he hits the target at any shoot is 0.4. Calculate the probability that the marker will have to shoot nine times. **[5]**

b) i) A bivariate r.v.(X,Y) has p.m.f

$$P(x,y)=\begin{cases}\dfrac{5!}{x!\,y!(5-x-y)!}\left(\dfrac{1}{3}\right)^5, & x=0,1,2.....5 \\ & y=0,1,2.....5-x \\ 0, & \text{otherwise}\end{cases}$$

Find moment generating function of (X,Y). Hence find E(x) and E(y) **[7]**

ii) State the additive and multiplicate models used in time series analysis. In which situations are these models used? **[3]**

Total No. of Questions : 4]

SEAT No. :

P430

[Total No. of Pages : 3

[4817]-114
S.Y. B.Sc.
STATISTICS
ST-212: Continuous Probability Distributions-I
(2008 Pattern) (Semester-I) (Paper-II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator and statistical tables is 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]**

i) If X and Y are two independent random variables (r.v.) then

1) $M_{XY}(t) = M_X(t) + M_Y(t)$ 2) $M_{X+Y}(t) = M_X(t) + M_Y(t)$

3) $M_{XY}(t) = M_X(t) \cdot M_Y(t)$ 4) $M_{X+Y}(t) = M_X(t) \cdot M_Y(t)$

ii) Coefficient of quartile deviation for $N(\mu, \sigma^2)$ where $\mu \neq 0$ is,

1) 0.67σ 2) $0.67\sigma / |\mu|$

3) $|\mu| / 0.67\sigma$ 4) $|\mu|$

iii) If a r.v. X follows $G(\alpha, \lambda)$ distribution with $\alpha = 2\lambda$, then its mean is equal to

1) 2 2) α

3) $1/2$ 4) λ

b) State whether each of the following statements is True or False. **[1 each]**

i) If (X, Y) is bivariate continuous r.v. then E(XY)=E(X).E(Y) always.

ii) Exponential distribution possesses additive property.

iii) The points of inflexion of $N(\mu, \sigma^2)$ probability curve are $\mu - \sigma$ and $\mu + \sigma$.

P.T.O.

c) Find $P(1\times1<\frac{1}{2})$ if probability distribution of a continuous r.v. X is **[1]**

$$f(x)=\frac{3}{2}x^2,\ -1\le x\le 1$$
$$=0\quad,\ \text{otherwise.}$$

d) State moment generating function (m.g.f.) of exponential distribution with mean θ. **[1]**

e) State the fourth order central moment of normal distribution with parameters μ and σ^2. **[1]**

f) Define gamma distribution. **[1]**

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

a) Find distribution function of $G(\alpha=2,\lambda=1)$ distribution. Also find $P(0.5<X<1.5)$

b) For two dimensional r.v (X,Y) show that $E(E(X|Y))=E(X)$

c) A fair coin is tossed 900 times. Using normal approximation find probability of getting

i) Number of tails between 430 and 460.

ii) Number of tails less than or equal to 462.

Q3) Attempt <u>any two</u> of the following: **[5 each]**

a) Find the cumulant generating function (c.g.f.) of $N(\mu,\sigma^2)$ distribution. Hence find its variance.

b) If X is a p.v. with probability distribution

$$f(x)=kx^2(1-x),0<x<1,k>0$$
$$=0\quad,\ \text{otherwise}$$

then find: i) k,

ii) mode of the distribution

c) The joint probability distribution of r.v. (X,Y) is

$$f(x,y)=6\,e^{-(2x+3y)},\ x>0,y>0$$
$$=0\quad,\ \text{otherwise}$$

Find: i) Marginal probability distribution of r.v.X.

ii) Conditional mean of Y given X=*x*.

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

a) i) For a normal distribution with mean 48.5, 64% of the observations are less than 60. Find standard deviation of the distribution. **[3]**

ii) If joint probability distribution of r.v.(X,Y) is **[5]**

$f(x, y) = kxy,\ 0 \le x \le y \le 2, k > 0$

$= 0$, otherwise.

Find: A) Value of k,

B) E(X).

iii) State the relation between first four cumulants and moments. **[2]**

b) i) For U(-a, a), find a if $p(X \ge 2) = 0.25$. Also find its variance. **[3]**

ii) Find m.g.f. of exponential distribution with variance equal to 9. **[4]**

iii) A r.v. X has p.d.f. **[3]**

$f(x) = kx^3, 0 \le x \le 1, k > 0$

$= 0$, otherwise.

Find: A) value of k.

B) the third order raw moment of X.

Total No. of Questions :4]

SEAT No. :

P431

[Total No. of Pages :2

[4817]-115
S.Y.B.Sc.
GEOGRAPHY
Gg-211: Fundamentals of Geography of Resources
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagram wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following questions in two of three sentences each: **[10]**

a) Define the term Resource.

b) Write any two uses of forest resources.

c) Give any two examples of biotic non-renewable resources.

d) Write any two industrial uses of water.

e) Give any two examples of land degradation due to agriculture.

f) What is renewable resource.

g) Give any two examples of human resource.

h) State two effects of deforestation.

i) Define irrigation.

j) What is land degradation.

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

a) Give the various methods of land conservation.

b) Importance of renewable biotic resources.

c) Degradation of land due to deforestation.

P.T.O.

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

a) Describe the various methods of water conservation.

b) Uses of water for agriculture.

c) Importance of abiotic non-renewable resources.

Q4) Explain the environmental significance of forests. **[10]**

OR

Describe the components of natural and human resources.

EEE

Total No. of Questions :4]

SEAT No. :

P432

[Total No. of Pages :2

[4817]-116
S.Y.B.Sc.
GEOGRAPHY
Gg-212: Introduction to Hydrology
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams and sketches wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following in two or three sentences each: **[10]**

a) Define hydrology.

b) What is saturation?

c) What is surface runoff?

d) What is stream flow?

e) What is evaporation?

f) Write any two sources of hydrological data.

g) What is humidity?

h) Write the types of precipitation.

i) What do you mean by probable maximum precipitation?

j) What do you mean by depression storage?

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

a) Sources of hydrologic data.

b) Areal precipitation.

c) Interception.

P.T.O.

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

a) Explain the hydrologic budget.

b) Explain the precipitation frequency analysis.

c) Explain the throughfall.

Q4) What is hydrology? Explan in detail the hydrologic cycle. **[10]**

OR

Explain in detail the measurements of hydrologic variables.

EEE

Total No. of Questions : 4]

SEAT No. :

P433

[Total No. of Pages : 2

[4817]-117
S.Y.B.Sc.
MICROBIOLOGY
MB-211: Microbial Physiology
(Paper-I) (2008 Pattern) (Semester-I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt the following. **[10]**

a) Define 'Metalloenzymes'.

b) Give example of multienzyme complex.

c) State relationship between RP M v/s g.

d) Define fermentation.

e) Write the biochemical reaction of conversion of pyruvate to Lactate.

f) Amylase belongs to _____ class of enzyme.

i) Transferase ii) Lyases

iii) Hydrolase iv) Isomerases

g) In aerobic respiration CO_2 is the final electron acceptor. State true or false.

h) Write the structure of ethanol.

i) Define angular velocity.

j) Write any two applications of 'Manometric technique'.

P.T.O.

Q2) Attempt any two of the following: **[10]**

a) Explain the effect of Temperature on enzyme activity.

b) Write the significance of HMP pathway.

c) Describe pulse chase experiment.

Q3) Answer any two of the follwoing: **[10]**

a) Describe principles and applications of spectrophotometer.

b) Schematically represent phosphoketolase pathway.

c) Describe principles of applications of partition chromatography.

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

a) Describe with structures TCA cycle. Comment on energetics of TCA cycle.

b) Describe lock and key and Induced fit model for enzyme catalysis.

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Total No. of Questions : 4]

SEAT No. :

P434

[Total No. of Pages : 2

[4817]-118
S.Y. B.Sc.
MICROBIOLOGY
MB-212:Microbial Genetics
(2008 Pattern) (Semester-I) (Paper-II)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat, labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10]**

a) Z DNA is a _____

i) Left handed double helix ii) Right handed double helix

iii) Left handed single helix iv) Right handed single helix

b) Define: 'Transcription'

c) The first visualization of replicating bacterial DNA was made by _____

i) F. Griffith ii) J. Cairn

ii) Hershey iv) Chase

d) The two steps is gene expression are _____ & _____.

e) Name the mechanism by which the plasmid DNA replicates.

f) State true or false-During DNA replication, the leading strand is synthesized as Okazaki fragments.

g) Name any two stop/termination codons.

h) Define-Linking number of DNA.

i) Give the structure of deoxy ribose.

j) Define- Reversion.

P.T.O.

Q2) Diagrammatically represent the following (any two). **[10]**

a) D-loop mechanism of DNA replication.

b) Semidiscontinuous replication of DNA.

c) Replica plate technique.

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

a) Enlist any five properties of genetic code.

b) Describe important features of B form of DNA.

c) Explain F.Griffith's experiment.

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

a) Explain the mode of action of the following mutagenic agents on DNA.

i) HNO_2 ii) U.V. rays

ii) Acridine orange iv) Alkylating agenti (any 1)

b) With suitable diagram, explain the messelson & Stahl's experiment.

Total No. of Questions :4]

SEAT No. :

P435

[Total No. of Pages :2

[4817]-119
S.Y.B.Sc.
PSYCHOLOGY
Psychology of Adjustment
(2008 Pattern) (New Course) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***Attempt all questions.***
2) ***Draw the figures and diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in two or four sentences: **[16]**

a) Define divorce.

b) What is personality?

c) Define abnormal behaviour.

d) Write the full form of ICD.

e) State the characteristic of paranoid personality.

f) State job characteristics.

g) Who proposed trait measurement and matching model.

h) List the essential information about occupations.

Q2) Attempt any two of the following in eight to ten sentences: **[8]**

a) Explain Freud's psychoanalytic theory.

b) Explain how to cope with occupational hazards.

c) Discuss the anxiety disorder.

P.T.O.

Q3) Write short notes on any two of the following: **[8]**

a) Explain obsessive - compulsive disorder (OCD).

b) Describe personal and family influences on job choice.

c) Describe stereotypes of single life and summerize evidence on the adjustment of single people.

Q4) What is happiness? Explain the roots of happiness. **[8]**

OR

Discuss several factors influencing the selection of a mate.

EEE

Total No. of Questions :4]

SEAT No. :

P436

[Total No. of Pages :2

[4817]-120
S.Y.B.Sc.
PSYCHOLOGY
EP-212: Experimental Psychology
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw figures and diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer in <u>two or four</u> sentences: **[16]**

a) Define dark adaptation.

b) What is stereoscopic vision?

c) What is insight in problem solving?

d) Define reinforcement.

e) What is spontaneous recovery?

f) What is the concept of abstraction in thinking?

g) Name the types of conditioning.

h) What is trial and error learning?

Q2) Attempt <u>any two</u> of the following in eight or ten sentences: **[8]**

a) Explain the phenomenon of classical conditioning.

b) Describe the process of perception of spatial world.

c) Explain the role of wavelength and intensity in relation to visual stimulus.

P.T.O.

Q3) Write short notes on <u>any two</u> of the following: **[8]**

a) Colour blindness.

b) Determinants of thinking.

c) Instrumental conditioning.

Q4) Describe in detail light and dark adaptation. **[8]**

OR

Explain the monocular cues of perception.

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Total No. of Questions : 4]

SEAT No. :

P437

[Total No. of Pages : 2

[4817]-123
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL-211:Analog Circuits and Systems
(2008 Pattern) (Semester-I) (Paper-I) (52211) (Old & New)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable calculator is allowed.***

Q1) Answer all of the following:

a) Why coupling is necessary in amplifiers? **[1]**

b) Define common mode rejection ratio. **[1]**

c) What are the characteristics of an ideal op-amp. **[1]**

d) Draw the single ended balanced output differential amplifier configuration. **[1]**

e) "In class C amplifier transistor cools faster than class A and class B amplifiers". Comment. **[2]**

f) "The power amplifier stage is the final stage in cascade amplifier". Comment. **[2]**

g) Calculate the gain of an amplifier with positive feedback. Given β=0.005 and gain without feed back is 50. **[2]**

h) Calculate the frequency of Weinbridge oscillator if R=5.1kΩ and C=0.001 μF. **[2]**

Q2) Answer any two of the following:

a) Draw circuit diagram of transformer coupled class-A amplifier. Show that its efficiency is 50%. **[4]**

b) Compare small signal and large signal amplifiers with respect to gain, efficiency and distortion. **[4]**

c) Write short note on " Thermal runaway". **[4]**

P.T.O.

Q3) Answer any two of the following:

a) Discuss DC load line analysis for common emitter amplifier. **[4]**

b) Draw the circuit diagram of voltage to current converter using op-amp. Derive expression for the output of it. **[4]**

c) Explain in detail the designing steps involved in single stage class A amplifier. **[4]**

Q4) Answer all of the following:

a) Draw a circuit diagram of transistorized Colpitt's oscillator circuit. Explain its operation. What are the limitations of RC and LC oscillator? **[6]**

b) Explain the need of constant current source. Discuss the effect of it on CMRR. **[6]**

OR

Answer all of the following:

a) Design phase shift oscillator circuit for frequency 1kHz. Given $C=0.01\ \mu F$. **[4]**

b) A power transistor dissipate 5 W energy. If the maximum junction temperature is 75°C. Calculate the maximum ambient temperature at which it can be operated with thermal resistance of 10°C/W **[4]**

c) Draw the circuit diagram of op-amp in inverting mode. Find the output voltage if $R_i=2k\Omega$, $R_F=30k\Omega$, $V_{in}=20mV$ and $V_{cc}=\pm 15V$. **[4]**

Total No. of Questions : 4]

SEAT No. :

P438

[Total No. of Pages : 4

[4817]-124
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 2A1 : Digital System Design
(52221) (2008 Pattern) (Semester-I) (Paper-II) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer All of the following

a) What is half adder? **[1]**

b) State applications of tristate buffer. **[1]**

c) Define accuracy of digital to Analog converter. **[1]**

d) What do you mean by synchronous counter? **[1]**

e) "High fan-out is desirable". Comment. **[2]**

f) "Non-multiplexed display draws large current from power supply than multiplexed display system". Comment. **[2]**

g) Convert following binary numbers into gray code. **[2]**

i) 10110 ii) 11011

h) A certain gate draws I_{cc} = 2.5 mA. What is its average power dissipation if V_{cc} = 5 Volts and it is operated at a 50% duty cycle? **[2]**

P.T.O.

Q2) Answer Any Two of the following:

a) Design 4-bit comparator using IC 7485. **[4]**

b) Explain the concept of state table and state diagram with suitable example. **[4]**

c) State the applications of shift register and explain any one in detail. **[4]**

Q3) Attempt Any Two:

a) Draw block diagram of single slope ADC and explain it in brief. **[4]**

b) Define following parameters of a digital IC family. **[4]**

i) Figure of merit ii) Noise Margin

iii) Fan out iv) Fan-IN

c) Draw a single 7-segment LED display using IC 7447 (BCD to 7-segment decoder / driver) and design 4 digit 7-segment LED display system. **[4]**

Q4) Attempt All of the following:

a) Design 4:2 priority encoder using K-map and implement it using logic gates. **[6]**

b) What is up/down counter? Draw logic diagram of 3 bit asynchronous up/down counter and explain it with waveforms. **[6]**

OR

a) Four bit DAC using R-2R ladder is designed. Obtain the output voltage for the following cases if V_{ref} = 10 Volts. **[4]**

i) 1001 ii) 0010

iii) 0011 iv) 1011

b) Design 1-bit comparator using K-Map. **[4]**

c) For a 10 bit counter type A/D converter with 1 MHz clock. Calculate maximum conversion time and average conversion time. **[4]**

●●●●●

Total No. of Questions : 4]

P438

[4817]-124
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 212 : Electronic Instrumentation-II
(52221) (2008 Pattern) (Semester-I) (Paper-II) (Old Course)

Time : 2 Hours] ***[Max. Marks : 40***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw the neat diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of Non programmable calculator is allowed.***

Q1) Answer All of the following:

a) List measurement characteristics, which determine quality of measurement system. **[1]**

b) What is sweep generator? **[1]**

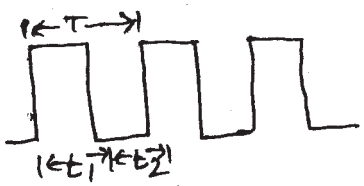
c) Enlist front panel control on CRO. **[1]**

d) Write steps to adjust CVCC power supply for 9V, 750 mA. **[1]**

e) "Digital thermometer is precise than glass mercury thermometer" comment. **[2]**

f) "The oscilloscope is basically an electronic beam voltmeter" comment. **[2]**

g) Calculate duty cycle for the following waveform. **[2]**



$t_1 = t_2 = 7$ ms.

h) A 33 ohm resistor is to be measured using digital multimeter. What will be read out at 100Ω and 1 KΩ. **[2]**

Q2) Attempt Any Two of the following:

a) Draw the block diagram of measurement system. Explain each block in brief. **[4]**

b) With neat block diagram, explain working of function generator. **[4]**

c) Explain the working of DFM with neat block diagram. **[4]**

Q3) Attempt Any Two of the following:

a) What is DMM? State the advantages of DMM over an analog multimeter. **[4]**

b) Explain with block diagram, working principle of SMPS. **[4]**

c) State important specifications of signal generator. **[4]**

Q4) Attempt All of the following:

a) Draw the block diagram of LUX meter. List the sensors used in LUX meter. State application areas of LUX meter. **[6]**

b) Write a short note on storage type CRO. Draw the block diagram of Digital Storage Oscilloscope. **[6]**

OR

Attempt All of the following:

a) Draw the circuit diagram of DC voltmeter by using PMMC and calculate the value of R_s for the measurement of 0 to 10 V with internal resistance of 100Ω and full scale deflection current is 10 mA. **[4]**

b) Calculate the percent load regulation for power supply if V_{NL} = 10 V and V_{FL} = 9.95 V. State ideal values for load regulation. **[4]**

c) Consider voltage divider circuit in which a fixed resistor of 100 KΩ is connected in series of LDR. If change in LDR resistance is 100Ω when light is incident on it. Calculate output voltage across LDR.

(Given V_{in} = 100 V) **[4]**

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Total No. of Questions :4]

SEAT No. :

P439

[Total No. of Pages :2

[4817]-125
S.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS-101: International Relations and Foreign Policy
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

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

Q1) Answer in 2 to 4 sentences each: **[16]**

a) Define "International Relations".

b) When and how India became a "Sovereign State"?

c) Define "National Interest".

d) Name the natural elements which contribute to national power.

e) What do you mean by 'Ideology'?

f) What is "National Values"?

g) Who was Marganthu?

h) Why preservation of cultural identity of nation is essential?

Q2) Answer in 8 to 10 sentences each (any two): **[8]**

a) Write the basic nature and scope of International Relations.

b) Write the role of national power in International Relations.

c) Write the nature and purpose of national interest.

P.T.O.

Q3) Write short notes on (any two): **[8]**

a) Realist Theory.

b) India's Foreign Policy.

c) Role of Internal Determinants of Foreign Policy.

Q4) Answer in 16 to 20 sentences (any one): **[8]**

a) Discuss in brief about the type of National Interest.

b) Explain about the important Elements of National Power.

EEE

Total No. of Questions : 4]

SEAT No. :

P440

[Total No. of Pages : 2

[4817]-126
S.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS-102: Elements of National Security
(Paper-II) (2013 Pattern) (Semester-I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Answer in 2 or 4 sentences each : **[16]**

a) What do you mean by national defence.

b) Write any two characteristics of State.

c) Define Energy security.

d) Define strategic security.

e) Define war potential.

f) Write any two objectives of India's security policy.

g) Define diplomacy.

h) Write meaning of Cross Border Terrorism.

Q2) Answer in 8 to 10 sentences each (Any Two): **[8]**

a) Write a note on India's freedom struggle.

b) Explain problems of India's land border.

c) Discuss about the present status of human security in India.

P.T.O.

Q3) Write short notes on (Any Two): **[8]**

a) India's economic sustainability.

b) Cross border terrorism.

c) Insurgency in North-East India.

Q4) Answer in 18 to 20 sentences (Any One): **[8]**

a) Describe India's military capability.

b) Write a note on India's security planning.

Total No. of Questions :4]

SEAT No. :

P441

[Total No. of Pages :2

[4817]-127
S.Y.B.Sc.
DEFENCE AND STRATEGIC STUDIES
DS-103: Geopolitics
(2008 Pattern) (Paper - III) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

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

Q1) Answer in 2 or 4 sentences each: **[16]**

a) What do you mean by Strategic Minerals.

b) Define "Boundary".

c) What do you mean by Demarcation?

d) Define "Bufferstate"

e) State the limits of a state for Territorial sea.

f) Write any two problems of Bufferstate.

g) State the meaning of frontiers.

h) What do you mean by geopolitics?

Q2) Answer in 8 or 10 sentences each (Any two): **[8]**

a) Explain the concept of Delimitation.

b) Write in short the nature of geopolitics.

c) Write a few lines on "Exclusive Economic Zone".

P.T.O.

Q3) Write short notes on (any two): **[8]**

a) Concept of maritime Boundaries.

b) Geostrategic importance of Kuwait.

c) Various uses of strategic Minerals.

Q4) Answer in 16 to 20 sentences (any one): **[8]**

a) Explain the geostrategic position & importance of Indias Andaman-Nicobar & Lakshadweep Islands.

b) Highlight on basic elements for "creations of state".

ℰℰℰ

Total No. of Questions : 4]

SEAT No. :

P442

[Total No. of Pages : 2

[4817]-128
S.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 201 : Ecology & Ecosystem
(2008 Pattern) (Semester-I) (Paper-I) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat and labelled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in 1-2 lines each: **[10]**

a) Define Landscape.

b) What is Population Ecology?

c) Who coined the term Ecosystem?

d) Name any 2 energy flow models.

e) What is meant by productivity of an ecosystem?

f) What are Biogeochemical Cycles?

g) What are the basic ecological age groups in which a population is divided?

h) Define Carrying Capacity.

i) What is meant by Absolute Maximum Carrying Capacity?

j) Define Community.

P.T.O.

Q2) Write a short note on (Any Two): **[10]**

a) Human impact on nutrient cycles.

b) Any 5 Intra-specific relationship.

c) Ecological Classification System.

Q3) Answer Any Two from the following: **[10]**

a) What are 'Limiting Factors'? Describe any 5 biotic & abiotic limiting factors each.

b) Explain Nitrogen Cycle with suitable diagram.

c) Discuss Ecotone, Ecological niche & Edge effect with suitable examples.

Q4) Attempt Any One of the following: **[10]**

a) Describe in detail the various stages in the evolution of atmosphere. How did the atmosphere change from a reducing to an oxidising one?

b) Explain the structural & functional attributes of ecosystem in detail.

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Total No. of Questions : 4]

SEAT No. :

P443

[Total No. of Pages : 2

[4817]-129
S.Y. B.Sc.
ENVIRONMENTAL SCIENCE
ENV - 202 : Hydrology
(2008 Pattern) (Semester-I) (Paper-II) (New Course)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat and labelled diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt the following in 1-2 lines each: **[10]**

a) Differentiate between point source and non-point source of pollution.

b) What is meant by 'Watershed'?

c) What are the secondary aquifers?

d) Mention any two regions of India affected with Arsenic.

e) Define the term 'Unconfined Aquifer'.

f) Which disease is caused due to excess of fluoride in drinking water?

g) What is meant by 'Subsidence'?

h) Write any two sources of nitrate contamination in groundwater.

i) Mention any two problems of groundwater exploitation.

j) Define the term 'Water Mining'.

P.T.O.

Q2) Write a short note on (Any Two): **[10]**

a) Scope of hydrology.

b) Saline water intrusion in aquifer.

c) Chemical composition of sea water.

Q3) Answer Any Two from the following: **[10]**

a) What is rainwater harvesting? What are the purposes served by it?

b) What are the various theories related with origin of water?

c) Write an account on groundwater quality in different provinces of India.

Q4) Attempt Any One of the following: **[10]**

a) What is meant by watershed? Explain in detail objectives and various aspects involved in watershed management.

b) What are the various sources of groundwater contamination? Also add a note on sustainable groundwater management.

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Total No. of Questions :4]

SEAT No. :

P444

[Total No. of Pages :3

[4817]-130
S.Y.B.Sc.
ENGLISH
Optional English
Enriching Oral and Written Communication in English
(2008 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

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

Q1) Attempt any two of the following : **[10]**

a) What is downward communication? Explain its advantages.

b) What is effective communication? What are the features of effective communication?

c) What do each of the following nonverbal signals convey?

i) Crossed legs

ii) Hand covering mouth

iii) Open hands

iv) Restless hands

v) Hands on hips

Q2) Attempt any five of the following: **[10]**

a) Choose correct collocations from the following:

i) a large mistake / a big mistake

ii) nice intention / good intention

b) Write two words each using the prefixes given below:

i) dis-_____

ii) multi- _____

P.T.O.

c) Match 'A with 'B'

A		B	
i)	fulfill	1)	Permission
ii)	Grant	2)	traffic
iii)	basic	3)	a dream
iv)	prevent	4)	needs

d) Choose the appropriate words from the alternatives given and fill in the blanks:

i) Did you _____ (remember / remind) to bring your hall ticket?

ii) Can you _____ (remember / remind) me to ring her up tomorrow?

e) Write down one literal and figurative meaning each for the words given below:

i) boil

ii) star

f) Write down two words each, closely related in meaning to the following words:

i) Clever

ii) remember.

Q3) Attempt any five of the following: **[10]**

a) Write four words / phrases belonging to following lexical webs:

i) Hotel

ii) Office

b) Rearrange the jumbled letters to form meaningful words:

i) omtcpreu

ii) roespfsor

c) Choose the correct spellings

i) thyroid, thairoid, trighroid

ii) squirel, squirrel, squiral

d) Give the meanings of the following phrases and use them in sentences:

i) give up

ii) give away

e) Give adjective forms of the following words.

i) courage

ii) act

f) Write four words using the letters in the following words:

i) respectable

ii) fabrication

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

a) Write one sentence each for the following situations:

i) joining conversation

ii) giving permission

iii) asking information

iv) greetings

v) making request

b) Place the accent infront of the right syllable in the following words:

i) expand

ii) fifteen

iii) labour

iv) relax

v) harvest

c) Write the phonetic transcription for the following words:

i) college

ii) table

iii) game

iv) come

v) teacher

EEE

Total No. of Questions : 3]

SEAT No. :

P445

[Total No. of Pages : 1

[4817] - 131
S. Y. B.Sc. (Semester - I)
मराठी (MARATHI)
पाठ्यपुस्तक : विज्ञानवेध
(2010 पॅटर्न)

वेळ : 2 तास] *[एकूण गूण : 40*

सूचना :– 1) सर्व प्रश्न सोडविणे आवश्यक आहेत.

2) उजवीकडील अंक पूर्ण गुण दर्शवितात.

प्रश्न 1) खालील पैकी कोणत्याही एका विषयावर 400 शब्दांत निबंध लिहा. **[10]**

i) वन्यजीवसृष्टी आणि मानवी जीवन

ii) पाणी बचत : काळाची गरज

iii) बदलती फॅशन : एक जीवनशैली (ललित)

प्रश्न 2) 'कालदमन' या कथेचा आशय स्पष्ट करा. **[15]**

किंवा

चरकसंहिता या ग्रंथातून चरकाचार्यांनी सांगितलेले आजार व त्यावरील उपचार याविषयी सविस्तर माहिती लिहा.

प्रश्न 3) टिपा लिहा. (कोणत्याही तीन) **[15]**

i) टॉलेमीची विश्वनिर्मितीची संकल्पना

ii) जनुक बदलाचे तंत्रज्ञान

iii) अल्बर्ट आइन्स्टाईन

iv) गिनिपिग कथेतील डॉ.भार्गव

v) विज्ञान कथेची वैशिष्ट्ये

vi) लीलावतीकार भास्कराचार्य

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Total No. of Questions : 3]

SEAT No. :

P446

[Total No. of Pages : 3

[4817] - 132
S.Y. B.Sc. (Semester - I)
HINDI (हिन्दी)
(2008 Pattern) (General)

समयः 2 घण्टे] *[पूर्णांक : 40*

पाठ्यपुस्तके :– 1) प्रतिनिधि कहानियाँ
हिंदी विभाग. एस. एन. डी. टी. विश्वविद्यालय, मुंबई
2) छायावाद : प्रतिनिधि रचनाँए
संपादक : नीरा परमार

सूचनाएँ :– *1) सभी प्रश्न अनिवार्य हैं।*
2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

प्रश्न 1) अ) निम्नलिखित में से किन्हीं दस वाक्यों को शुद्ध करके फिर से लिखिए। **[10]**

i) चौराहे पर पुलिस खड़ा था।

ii) तुमको पुस्तक चाहिए?

iii) राजा को चार पुत्र थे।

iv) शाम ने ईश्वर का दर्शन किया।

v) यह सुनते ही उसका चेहरा गिर गया।

vi) नदी में बाढ आया।

vii) मेरेकू वो लोग जानते हैं।

viii) मिहीर गोवा को जा रहा है।

ix) अहिल्या ने किताब पढा ।

x) पचास की नोट फटी है।

xi) पेड़ के ऊपर बंदर बैठे है।

xii) रेश्मा का आवाज बड़ा सुंदर है।

P.T.O.

आ) निम्नलिखित अंग्रेजी अनुच्छेद का हिंदी में अनुवाद कीजिए। **[4]**

From the point of view of sustained agricultural production and all round development, water is the most precious resource. Presently about 92 percent of water is used for agriculture, 2 percent for industries and 6 percent for drinking and domestic purposes. For farmers natural rainfall is still the most important source of water for farms. About 75 percent of the total cultivated area in the country depends on rainfall to sustain crop production. Success in dry farming depends on rainfall to sustain crop production success in dry farming depends on moisture conservation practices and judicious use of available water for irrigation.

प्रश्न 2) अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए। **[5]**

i) ''मेरे लिए वहाँ पहुँचकर गाड़ी भेज देना। और जर्मन मुर्दों के लिए भी तो गाड़ियाँ आती होगी।''

अथवा

''दो साल चक्कर लगाता रहा, किसी ने बात नहीं सुनी। खुशामदे कर रहा, किसी ने बात नहीं सुनी।''

आ) निम्नलिखित पद्य अवतरण की ससंदर्भ व्याख्या कीजिए। **[5]**

i) ''अस्ताचल चले रवि
शशि – छवि विभावरी में
चित्रित हुई है देख
यामिनीगन्धा जगी,
एकटक चकोर – कोर दर्शन – प्रिय
आशाओं भरी मौन भाषा बहुभावमयी''

अथवा

''सुन्दर है विहग, सुमन सुन्दर
मानव। तुम सबसे सुन्दरतम
निर्मित सबकी तिल – सुषमा से
तुम निखिल सृष्टि में चिर निरूपम''

प्रश्न 3) अ) निम्नलिखित प्रश्नों में से किन्हीं दो के उत्तर लिखिए। **[8]**

i) 'उसने कहा था' के माध्यम से देशप्रेम और व्यक्तिगत प्रेम का उच्चादर्श प्रस्तुत होता है, स्पष्ट कीजिए।

ii) 'परमात्मा का कुत्ता' कहानी में अंकित भ्रष्टाचार का चित्रण कीजिए।

iii) 'परदा' कहानी की समस्या पर प्रकाश डालिए।

iv) जबरा कुत्ते की ईमानदारी का वर्णन कीजिए।

आ) निम्नलिखित प्रश्नों में से किन्हीं दो के उत्तर लिखिए। **[8]**

i) 'एक बार बस और नाच तू श्यामा।' ऐसा कवि निराला क्यों कहते हैं?

ii) 'सुख-दुख' कविता द्वारा कवि कौन -सा संदेश देना चाहता है?

iii) 'मानव' कविता में कवि का मानवतावादी दृष्टिकोण किस प्रकार दिखाई देता है?

iv) कवि पंत 'ताज' कविता में 'मृतकों के हैं मृतक जीवितों का है ईश्वर' ऐसा क्यों कहते हैं?

Total No. of Questions : 4]

SEAT No. :

P447

[Total No. of Pages : 2

[4817] - 133

S.Y. B.Sc. (Semester - I)

संस्कृत (SANSKRIT)

गीर्वाणभारती (Gīrvāṇabhāratī)

(2013 Pattern)

Time : 2 Hours] [Max. Marks : 40

Instructions :– *1) All questions are compulsory.*

सूचना:– *सर्व प्रश्न अनिवार्य आहेत.*

2) Figures to the right indicate full marks.

उजवीकडील अंक पूर्ण गुण दर्शवितात.

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

पुढील प्रश्नांची **2-4** ओळीत उत्तरे लिहा.

i) What is the moral of Styakāmajābālkāathā?

सत्यकामजाबालकथेचे तात्पर्य काय?

ii) How many kāṇḍas in Rāmāyaṇa and what are they?

रामायणात किती कांडे आहेत आणि ती कोणती?

iii) Write the importance of Śivamānasapūjā?

शिवमानसपूजेचे महत्त्व लिहा.

iv) What is the purpose of Śatopadeśaprabandha?

शतोपदेशप्रबन्धाचे प्रयोजन कोणते?

v) State the names of characters in Chyavanabhārgavakathā.

च्यवनभार्गवकथेतील पात्रांची नावे लिहा.

vi) What is the name of Styakāma's Guru?

सत्यकामाच्या गुरूचे नाव काय?

vii) Who is the adviser of Jyotiṣmānpaād?

ज्योतिष्मान् पादाचा उपदेशकर्ता कोण?

viii) What is Brhmacharya?

ब्रह्मचर्य म्हणजे काय?

P.T.O.

Q2) Write Short notes on any two. of the following in **8-10** lines. **[8]**

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

i) Upaniṣad **उपनिषद्**

ii) Jabālā **जबाला**

iii) Ṡatapathabrāhmaṇa **शतपथब्राह्मण**

Q3) Write Short notes on any two of the following in **8-10** lines. **[8]**

पुढीलपैकी कोणत्याही दोहोंवर 8-10 ओळीत संक्षिप्त टीपा लिहा.

i) Chāyāgrāhisattvam **छायाग्राहिसत्त्वम्**

ii) Explain : - **'श्रयेत सन्मित्रमापत्सु' 'श्रयेत सन्मित्रमापत्सु'। – स्पष्ट करा.**

iii) Explain : - **'धुर्य : कार्ये नियोक्तव्य:'। 'धुर्य: कार्ये नियोक्तव्य:' – स्पष्ट करा.**

Q4) Write any one of the following questions in **16-20** lines. **[8]**

पुढीलपैकी कोणत्याही एका प्रश्नांचे उत्तर 16-20 ओळीत लिहा.

i) Write 'Chyavanabhārgavakathā' in your own words and state the importance of it.

'च्यवनभार्गवकथा' तुमच्या शब्दात लिहून तिचे महत्त्व विशद करा.

ii) Critically appreciate the lesson Ṡivamānasapūjā.

'शिवमानसपूजा' या पाठाचे चिकित्सक रसग्रहण करा.

Total No. of Questions :4]

SEAT No. :

P450

[Total No. of Pages :2

[4817]-136
S.Y.B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY -I
VOC-211: Utilities, Unit Operations and Process Instrumentation
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams should drawn where necessary.***

Q1) Answer the following: **[16]**

a) Convert -140°C into Kelvin.

b) Convert 62 torr into pascals.

c) What is the unit used to measure vacuum pressure?

d) State the principle of the Mcleod gauge.

e) Find the density in SI units of a cubic meter of a liquid weighing 750 kg.

f) Name two salts causing permanent hardness in water.

g) Mention the pressure range of the Pirani gauge.

h) Name two advantages of nucleation.

Q2) Attempt any two of the following: **[8]**

a) Discuss the principle of azeotropic distillation.

b) Explain the different types of liquid filled thermometrs.

c) Describe the working of a typical industrial boiler.

P.T.O.

Q3) Attempt any two of the following: **[8]**

a) Explain the different filtration techniques.

b) Describe the different types of piezoelectric transducers.

c) Write the principle and working of an optical transducer.

Q4) Describe the working of Mcleod gauge and state its applications. **[8]**

OR

Discuss the softening of hard water.

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Total No. of Questions :4]

SEAT No. :

P451

[Total No. of Pages :2

[4817]-137
S.Y.B.Sc. (Vocational)
BIOTECHNOLOGY -II
VOC-Biotech-211: Cell and Molecular Biology
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer each of the following in 1-2 lines: **[10]**

a) Define 'P' site of ribosome.

b) Give the role of RNA polymerase in transcription.

c) What is nucleosome?

d) Give the role of protein disulfide isomerase in post translational modification.

e) What are point mutations?

f) Enlist atleast two secondary messengers.

g) Give the role of collagen in ECM.

h) Which cell organelle sediment last during cell fractionation?

i) What is the role of nucleus in cell?

j) Enlist the molecules present in the Desmosomes.

P.T.O.

Q2) Write short notes on <u>any two</u> of the following: **[10]**

a) Neoplasia and cell death.

b) Nucleotide excision repair.

c) Tight junctions.

Q3) Attempt any two of the following in 8-10 lines: **[10]**

a) Explain in short Na^+ / K^+ pump.

b) Comment on prokaryotic genome structure.

c) Describe eukaryotic gene structure.

Q4) Explain structure and functional organisation of nucleus. **[10]**

OR

What is DNA replication? Explain various steps in E.coli DNA replication.

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Total No. of Questions : 4]

SEAT No. :

P1255

[Total No. of Pages : 2

[4817]-138

S. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Still Photography, Processing & Printing

(2008 Pattern) (Semester - I) (Paper - I)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Answer the following in short: **[16]**

a) What is sky light? How is it important in photography?

b) Mention two important features of a normal lens.

c) Mention two advantages of a zoom lens.

d) Draw a diagram and explain the concept of depth of focus.

e) Discuss the importance of the 'white balance' in digital photography.

f) Discuss the advantages of a spot metering pattern.

g) Define the colour temperature of a light source.

h) State the law of transmission and absorption of light.

Q2) Attempt **ANY TWO** of the following: **[8]**

a) Define the angle of view of a camera lens. Explain how you will classify camera lenses according to their angle of view.

b) Mention at least four studio accessories. How are these useful in photography?

c) Discuss how is a Neutral Density filter useful in photography.

P.T.O.

Q3) Write notes on **ANY TWO** of the following: **[8]**

a) Macro lens.

b) Use of flash light in photography.

c) Optical materials.

Q4) Answer **ANY ONE** of the following: **[8]**

a) Draw a suitable diagram and discuss the how you will arrange the lighting setup for shooting a newly launched beauty soap.

b) Draw a suitable diagram and discuss and standard three point lighting set-up used for studio portrait. Explain the importance of each light used in this set-up.

Total No. of Questions :4]

SEAT No. :

P452

[Total No. of Pages :2

[4817]-139
S.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE -I
VOC-EEM-211: Audio, video and Office Equipment -A
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of calculator / log table is allowed.***

Q1) Answer the following:

a) What type of modulation is used for sound in TV? **[1]**

b) Closed circuit TV can use video base-band signals. Comment. **[1]**

c) Are the horizontal lines scanned left-to-right or right-to left? **[1]**

d) Does hue refer to colour or saturation? **[1]**

e) Give three phosphor colours used for colour TV and colour monitor for computer. **[2]**

f) Which takes more time in trace, or retrace and H-trace or V-retrace? **[2]**

g) What are the frequency ranges for audio and video signals? **[2]**

h) A super hetrodyne receiver with an IF of 450 KHz is tuned a signal at 1200 KHz. calculate the local oscillator frequency. **[2]**

Q2) Answer any Two:

a) With the help of block diagram of a simple AM receiver, explain the basic super hetrodyne principle. **[4]**

b) Briefly explain the features of typical receiver IC. **[4]**

c) Draw a block diagram of magnetic recording and playback system. Describe the function of each block. **[4]**

P.T.O.

Q3) Answer any Two:

a) What is vestigial sideband transmission? Name one advantage and one disadvantage of VSB transmission. **[4]**

b) Draw a neat labelled diagram of a VCR. **[4]**

c) Explain the construction and working of video monitor. **[4]**

Q4) Attempt the following:

a) With the help of a neat block diagram explain the working of public address system. **[6]**

b) Write short note on "MP3 compression & its use". **[6]**

OR

Attempt the following:

a) Draw the block diagram of ACD player. Explain the function of signal processing electronics. **[6]**

b) What is CCTV? State its basic components, features and its use for surveillance. **[6]**

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Total No. of Questions :4]

SEAT No. :

P453

[Total No. of Pages :2

[4817]-140
S.Y.B.Sc. (Vocational)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
Microprocessor & Interfacing Techniques
(2008 Pattern) (New) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

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

Q1) a) Attempt the following : **[4x1=4]**

i) What is full form of PCI?

ii) What is transducer?

iii) How to put 8086 Microprocessor to Maximum mode?

iv) What is DRAM?

b) Attempt the following: **[4x2=8]**

i) Define sensor. List any two sensors you know.

ii) What is size of address bus and data bus of 8086 microprocessor?

iii) What is advantage of USB? List any two devices that support USB.

iv) What is function of DMA?

Q2) Attempt any two of the following: **[2x4=8]**

a) Explain DOS INT 21H with atleast four functions?

b) Explain with a neat diagram 4-bit DAC?

c) List and explain in brief computer based design and development tools.

P.T.O.

Q3) Attempt any two of the following: **[2x4=8]**

a) What is interrupt? Explain software interrupts.

b) Draw schematic diagram to interface matrix keyboard to microprocessor.

c) State advantages and disadvantages of DRAM.

Q4) Attempt any two of the following: **[2x6=12]**

a) List non Intel processors and explain features of any two of them.

b) What is function of ADC? List types of ADC. Explain any one in detail.

c) Explain DMA Controller operation with a neat diagram.

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Total No. of Questions :4]

SEAT No. :

P454

[Total No. of Pages :2

[4817]-141
S.Y.B.Sc. (Vocational)
SEED TECHNOLOGY -I
Hybrid Seed Production
(2008 Pattern) (Paper - I) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labelled diagrams wherever necessary.***

Q1) Attempt the following: **[10 x 1=10]**

a) Define emasculation.

b) What is the isolation distance required for Cotton hybrid seed production.

c) Define self incompatibility.

d) What is isolation?

e) Define Roughing.

f) Define variety.

g) What is stigma receptivity?

h) What is allogamy?

i) Give the types of apomixis.

j) Define genetic male sterility.

P.T.O.

Q2) Attempt any two of the following: **[2 x 5=10]**

a) Comment on pollen storage.

b) Describe in detail genetic male sterility.

c) Explain compact area approaches.

Q3) Write notes on (Any two): **[2 x 5=10]**

a) Hand emasculation.

b) Genetic basis of heterosis.

c) Homomorphic self incompatibility.

Q4) Explain in detail, the procedure for hybrid seed production in *Zea mays*.**[10]**

OR

Describe in detail the procedure for hybrid seed production in Jowar with respect to land requirement, isolation, planting ratio, cultural practices, plant protection, roughing and harvesting. **[10]**

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Total No. of Questions :4]

SEAT No. :

P455

[Total No. of Pages :2

[4817]-142
S.Y.B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY -I
VOC-IND-MIC-211: Bioreactors - Design and Operation
(2008 Pattern) (Paper - I) (Theory) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of scientific calculators is allowed.***

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false: **[10]**

a) State whether the following statement is TRUE or FALSE.
'Fibrous filters are used for sterilizing air used for aeration of a fermentation broth'.

b) State whether the following statement is TRUE or FALSE.
'Hollow Fibre Reactor is a type of immobilized cell reactor'.

c) The pH sensor is a based on _____ (principle of measurement).

d) When the H/D ratio of a fermenter vessel is 2.0 and the fluid is viscous, the number of impeller sets needed ideally is _____.

e) Define 'off-line' monitoring of a process variable.

f) Define 'Del factor'.

g) List 2 factors that affect the design of a fermenter.

h) State the name of one type of ball valve, used in a fermenter assembly.

i) Name any one parameter of fermentation that can be measured 'in-line'.

j) State why foam control is necessary during a fermentaion.

P.T.O.

Q2) Answer any two of the following: **[10]**

a) Draw a CSTR. State the advantages of running a batch process of fermentation over a continuous process.

b) Explain the consequences of contamination of a fermentation broth.

c) Draw and describe the operation of a sensor used for monitoring cell mass during a fermentation process.

Q3) Answer any two of the following: **[10]**

a) With the help of a suitable diagram, explain the working of a chemostat model used in a continuous fermentation process.

b) Explain the working of an adiabatic compressor used for aeration of a fermentation broth. Describe how the microbial load may be reduced during this compression of air.

c) Explain the principle of immobilizing cells using the entrapment method. List names of processes where gel entrapment is used.

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

a) Explain any three important aspect of manufacturing fermenter.

b) What is sparger? Describe different types of sparger.

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Total No. of Questions :4]

SEAT No. :

P456

[Total No. of Pages :2

[4817]-143
S.Y.B.Sc. (Vocational)
INDUSTRIAL CHEMISTRY -II
VOC-212: Inorganic Process Industries
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams should drawn wherever necessary.***

Q1) Answer the following: **[16]**

a) Define microbiological corrosion.

b) State two uses of bronze alloys.

c) What is the composition of glass?

d) State the composition of duralumin.

e) Define cullet.

f) Name two uses of ceramics.

g) What are white wares?

h) Define whiskers.

Q2) Attempt any two of the following: **[8]**

a) Discuss the properties of refractory materials.

b) Explain the properties of special cement.

c) Describe the wet method to manufacture cement.

P.T.O.

Q3) Attempt <u>any two</u> of the following: **[8]**

a) Explain the classification of alloys.

b) Discuss the importance of annealing.

c) Write a note on electroplating.

Q4) Describe the dry method to manufacture glass. **[8]**

OR

Discuss the cathodic technique of preventing a metal from corrosion.

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Total No. of Questions :4]

SEAT No. :

P457

[Total No. of Pages :2

[4817]-144
S.Y.B.Sc. (Vocational)
BIOTECHNOLOGY -II
VOC-Biotech.-212: Recombinant DNA Technology and Bioinformatics
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Answer each of the following in 1-2 lines: **[10]**

a) What are cosmids?

b) Name any two restriction endonucleases.

c) What do you mean by southern hybridization?

d) What is Bioinformatics?

e) Give any one application of DNA sequencing.

f) Enlist the components of PCR.

g) Define transfection.

h) What are DNA modifying enzymes?

i) What are palindrome sequences?

j) Define Genomics.

P.T.O.

Q2) Write short notes on <u>any two</u> of the following: **[10]**

a) Type-II restriction endonucleases.

b) YAC.

c) Western Blotting.

Q3) Attempt <u>any two</u> of the following: **[10]**

a) Describe the process of transformation.

b) What are plasmids? Explain how they play a role in rDNA technology.

c) Describe Sanger's method of DNA sequencing.

Q4) Give an account of site-directed mutagenesis. Add a note on its applications. **[10]**

OR

Discuss in detail concept of r-DNA technology. Add a note on its applications.

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Total No. of Questions : 4]

SEAT No. :

P1256

[Total No. of Pages : 2

[4817]-145

S. Y. B. Sc. (Vocational)

PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION

Fundamentals of Acoustics and Sound for Media

(Semester - I) (Paper - II) (2008 Pattern)

Time : 2 Hours] *[Max. Marks : 40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat and labeled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt **ALL** of the following:

a) Define: Reverberation time. **[2]**

b) Draw a neat labeled basic crossover network. **[2]**

c) Mention four basic requirements of an auditorium? **[2]**

d) What is a microphone? Mention any two types of special microphones. **[2]**

e) What is Hi-Fi system? **[2]**

Q2) Attempt **ANY TWO** of the following:

a) Design a crossover network to give 12dB per octave attenuation for tweeter and woofer for critical frequency of 1kHz. Loudspeaker resistance is 16Ω. **[5]**

b) Calculate power gain in dB if input power of 200 mW gives output power of 2W. **[5]**

c) Find the wavelength of sound of 1000Hz presuming its velocity to be 344 m/s. **[5]**

P.T.O.

Q3) Attempt **ANY TWO** of the following:

a) Sound intensity at 1 meter from a loudspeaker is 400 mW/m^2. The audio power fed to the loudspeaker is 10W. Calculate the efficiency of the loudspeaker. **[5]**

b) With the help of a neat sketch, explain the functioning of a crystal microphone. Explain why ceramic crystal is more suitable than Rochelle salt crystal. **[5]**

c) Calculate the reverberation time for an auditorium of 1000 cubic meters having total absorption equal to 230 Sabine. **[5]**

Q4) Attempt **ANY TWO** of the following:

a) Draw a neat labeled block diagram to explain the construction and working of a magnetic sound recording system. **[5]**

b) With the help of a neat sketch, explain the functioning of a moving coil cone type loudspeaker. Explain why it is called direct radiating type loudspeaker. **[5]**

c) State five characteristics of loudspeakers and explain them in brief. **[5]**

Total No. of Questions :4]

SEAT No. :

P458

[Total No. of Pages :2

[4817]-146
S.Y.B.Sc. (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE (EEM) -II
VOC-EEM-212: Maintenance Concepts and Repair - II -A
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams are advised wherever necessary.***
4) ***Use of calculator / log table is allowed.***

Q1) Answer all of the following:

a) Define the term 'Mean time to repair (MTR)'. **[1]**

b) Redundancy is an essential requirement of non-maintainable equipment. Comment. **[2]**

c) Define 'Uptime'. **[1]**

d) What is 'corrective maintenance'? **[1]**

e) Define 'Availability' and state its significance. **[2]**

f) List different types of hazards in an electronics laboratory. **[2]**

g) Define current supplying capacity of a secondary cell. **[1]**

h) Why is water based fire extinguisher not suitable for fighting fires caused due to electric current? **[2]**

Q2) Answer any two of the following:

a) Explain the role of installation manual of the equipment in its installation process. State the significance of various stages involved in the installation process. **[4]**

b) What is the purpose of maintaining a log book and how does it prove to be a good maintenance aid? **[4]**

c) What are the typical actions taken by any maintenance team, for avoiding failure of equipment? What is such maintenance called as? **[4]**

P.T.O.

Q3) Answer any two of the following:

a) What is fail safe design? Explain. **[4]**

b) Write a note on installation process of a computer. **[4]**

c) Write a note on preventive maintenance of a lead acid battery. **[4]**

Q4) a) Define the following terms and explain how these are related with each other. **[6]**

i) Failure

ii) Failure Rate

iii) Mean time to Fail

iv) Mean Time between Failures

v) Mean Time to Repair

vi) Reliability

b) What are fire hazards? How can these be tackled? What safety precautions reduce the risk of fire? **[6]**

OR

a) Compare the MTBF of two systems 'A' and 'B' where 'A' consists of a single linear IC (300 FIT) and 'B' consists of 10 transistors (80 FIT) each and 20 resistors (50 FIT each).

Compare and comment upon the reliability of IC based system with discrete component based system in the light of results obtained in the above example. **[6]**

b) Define reliability with an example. How does reliability differ in series and parallel systems? **[6]**

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Total No. of Questions :4]

SEAT No. :

P459

[Total No. of Pages :2

[4817]-147

S.Y.B.Sc. (Vocational)

COMPUTER HARDWARE & NETWORK ADMINISTRATION

Computer System Management - I

(2008 Pattern) (New Course) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

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

Q1) a) Attempt the following : **[4x1=4]**

i) What is EMI Problem in a PC?

ii) How many USB Ports are there in a PC?

iii) What does CMOS Stand for?

iv) Give one example of Logical Access Control.

b) Attempt the following: **[4x2=8]**

i) What is a Incident?

ii) List any two Environmental Problems.

iii) Give any Two Electrical Contributors to PC Failures.

iv) What is AGP Card?

Q2) Attempt any Two of the following: **[2x4=8]**

a) List Safety Precautions that one Should take during Trouble Shooting a PC?

b) Explain various Access Controls.

c) Discuss Problems related to: i) Serial Port ii) Ethernet Card

P.T.O.

Q3) Attempt any Two of the following: **[2x4=8]**

a) What are the Problems related to Input Devices?

b) Explain the importance of Backup Policies.

c) Which environmental factors affect the performance of a PC?

Q4) Attempt any Two of the following: **[2x6=12]**

a) What are the different steps to detect a Display Problem for a PC?

b) Business continuity and Disaster Recovery. Explain its Importance.

c) How will you do preventive Maintenance of:

i) Computer Hardware

ii) Operating System

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Total No. of Questions :4]

SEAT No. :

P460

[Total No. of Pages :2

[4817]-148
S.Y.B.Sc. (Vocational)
SEED TECHNOLOGY -II
Seed Testing
(2008 Pattern) (Paper - II) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat and labeled diagrams wherever necessary.***

Q1) Attempt the following: **[10 x 1=10]**

a) Write the minimum moisture content required for cereals?

b) Define physical purity.

c) Define heterogeneity test.

d) Define seed vigour.

e) What is seed sampling?

f) Write any two precautions to be taken at the time of seed registration?

g) What are guard samples?

h) What is seed germination?

i) Write an important role of International Seed Testing Association?

j) Define seed testing.

P.T.O.

Q2) Attempt any two of the following: **[10]**

a) Comment on physical purity analysis.

b) Describe air oven method.

c) Give detail account on seed vigour testing.

Q3) Write notes on (Any two): **[10]**

a) Role of International Seed Testing Association.

b) Staffing in relation to Seed Testing Laboratory.

c) Procedure of seed sampling.

Q4) Explain in detail, soil and TZ methods used for testing seed germination. **[10]**

OR

Explain precautions and procedure for registration in detail.

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Total No. of Questions :4]

SEAT No. :

P461

[Total No. of Pages :2

[4817]-149
S.Y.B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY -II
VOC-IND-MIC-212: Screening and Process Optimization
(2008 Pattern) (Paper - II) (Theory) (Semester - I)

Time : 2 Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of scientific calculators is allowed.***

Q1) Answer each sub-question in one or two lines; Fill in the blanks; State whether the statement is true or false: **[10]**

a) Define: Simpson's Index

b) State whether the following statement is true or false:
Precursors from medium end up as a part of the final product molecule.

c) State whether the following statement is true or false:
C. glutamicum is used for the production of gluten.

d) State whether the following statement is true or false:
Antibiotics are generally produced during logarithmic phase of growth.

e) Define: Buffers.

f) Define: Revertant mutants.

g) List any two ingredients used to as Nitrogen source in a fermentation medium.

h) Fill in the blank:
_____ method is widely used for preservation of sporulating fungi.

i) Fill in the blank:
Relationship between Del factor, temperature and time is given by the equation _____.

j) What is the role of dummy variables in Plackett-Burman design?

P.T.O.

Q2) Answer any two of the following: **[10]**

a) Give kinetics of destruction for microorganisms as first order reaction.

b) Explain the concept of culturable and unculturable bacterial diversity giving examples.

c) Explain Lyophilization method for preservation of bacteria.

Q3) Answer any two of the following: **[10]**

a) Define Feedback inhibition and mention its types with examples.

b) Describe the monitoring device of temperature and its controlling process.

c) Describe with a flow chart the process of inoculums build-up for bacterial cultures.

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

a) Give types and importance of Carbon sources in the fermentation growth medium giving examples.

b) What is a scale-up window? Explain giving appropriate examples. Give its application in scaling up.

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