Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2013
MATHEMATICS – I
Linear Algebra
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

1. Attempt **any five** of the following :   **10**

   1) Is the set $\{(1, 0), (2, 3), (1, 2)\}$ linearly dependent ? Justify.

   2) Show that the system $x + 2y = 1$, $3x + 6y = 7$ has no solution.

   3) Find the co-ordinate vector of $\bar{v} = (1, 2)$ relative to the basis $S = \{(0, 1), (2, 1)\}$
      of $\mathbb{R}^2$.

   4) Let $W = \{(x, y, z) : x^2 = y\}$. Is W a subspace of $\mathbb{R}^3$?

   5) Compute the angle between the vectors $(2, 2)$ and $(0, 1)$.

   6) Find eigenvalues of the matrix $\begin{pmatrix} 2 & 1 \\ 1 & 0 \end{pmatrix}$.

   7) If $\bar{u} = (3, 0, 4)$ and $\bar{a} = (2, 3, 3)$, find $\text{Proj}_{\bar{a}}\bar{u}$.

2. Attempt **any two** of the following :   **10**

   1) Prove that a square matrix A is invertible if and only if det $A \neq 0$.

   2) Find a basis of $\mathbb{R}^3$ which contains the vector $(1, 1, 1)$.

   3) Let $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be defined by $T(x, y, z) = (4x + 3y + 2z, 2x + y - z, -x + y)$.

      Find a basis and the dimension of Kernel of T.

                                                                                                    P.T.O.

3. Attempt **any two** of the following :　　　　　　　　　　　　　　　**10**

　　1) Apply Gram-Schmidt process to the set {(1, 1, 1), (1,1, 0), (1, 2, 1)} to obtain an orthogonal basis of $\mathbb{R}^3$.

　　2) State and prove Cauchy-Schwarz inequality for real inner product space.

　　3) Given that the set {(1, 0, 0), (0, 2, 1), (2, 0, 1)} is a basis of $\mathbb{R}^3$. If $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is a linear transformation such that $T(1, 0, 0) = (0, 0, 1)$, $T (0, 2, 1) = (1, 2, 0)$ and $T (2, 0, 1) = (1, 1, 1)$. Find $T(2, -3, 4)$.

4. Attempt **any one** of the following :　　　　　　　　　　　　　　　**10**

　　1) Let $A = \begin{pmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{pmatrix}$. Find eigenvalues of A. Also find basis and dimension of the eigenspace corresponding to each eigenvalue.

　　2) If V and W are finite dimensional vector spaces and $T : V \rightarrow W$ is a linear transformation, then prove that dim V = dim ker (T) + dim Im(T).

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Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2013
MATHEMATICS – I
Linear Algebra
(2008 Pattern)

Time : 2 Hours   Max. Marks : 40

1. Attempt **any five** of the following :   **10**

   1) Is the set {(1, 0), (2, 3), (1, 2)} linearly dependent ? Justify.

   2) Show that the system $x + 2y = 1$, $3x + 6y = 7$ has no solution.

   3) Find the co-ordinate vector of $\bar{v} = (1, 2)$ relative to the basis $S = \{(0, 1), (2, 1)\}$

      of $\mathbb{R}^2$.

   4) Let $W = \{(x, y, z) : x^2 = y\}$. Is W a subspace of $\mathbb{R}^3$?

   5) Compute the angle between the vectors (2, 2) and (0, 1).

   6) Find eigenvalues of the matrix $\begin{pmatrix} 2 & 1 \\ 1 & 0 \end{pmatrix}$.

   7) If $\bar{u} = (3, 0, 4)$ and $\bar{a} = (2, 3, 3)$, find $\text{Proj}_{\bar{a}}\bar{u}$.

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   1) Prove that a square matrix A is invertible if and only if det $A \neq 0$.

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   3) Let $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be defined by $T(x, y, z) = (4x + 3y + 2z, 2x + y - z, -x + y)$.

   Find a basis and the dimension of Kernel of T.

3. Attempt **any two** of the following : **10**

   1) Apply Gram-Schmidt process to the set $\{(1, 1, 1), (1, 1, 0), (1, 2, 1)\}$ to obtain an orthogonal basis of $\mathbb{R}^3$.

   2) State and prove Cauchy-Schwarz inequality for real inner product space.

   3) Given that the set $\{(1, 0, 0), (0, 2, 1), (2, 0, 1)\}$ is a basis of $\mathbb{R}^3$. If $T : \mathbb{R}^3 \to \mathbb{R}^3$ is a linear transformation such that $T(1, 0, 0) = (0, 0, 1)$, $T(0, 2, 1) = (1, 2, 0)$ and $T(2, 0, 1) = (1, 1, 1)$. Find $T(2, -3, 4)$.

4. Attempt **any one** of the following : **10**

   1) Let $A = \begin{pmatrix} 2 & 1 & 1 \\ 2 & 3 & 4 \\ -1 & -1 & -2 \end{pmatrix}$. Find eigenvalues of A. Also find basis and dimension of the eigenspace corresponding to each eigenvalue.

   2) If V and W are finite dimensional vector spaces and $T : V \to W$ is a linear transformation, then prove that dim V = dim ker (T) + dim Im(T).

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Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2013
MATHEMATICS – Paper – II (A) (2008 Pattern)
MT – 222 (A) : Vector Calculus

Time : 2 Hours   Max. Marks : 40

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

1. Answer the following questions (**any five**) :   **10**

   a) A point moves along a curve given by r (t) = a cos nti + b sin ntj. Show that
   $$\frac{d^2r}{dt^2} = -n^2r.$$

   b) Find divergence and curl of f = (x^2 + yz) i + (y^2 + zx) j + (z^2 + xy) k.

   c) If r is a twice derivable function on an open interval J such that on J, $r \times \ddot{r} = 0$, show that $r \times \dot{r}$ is constant on J.

   d) Let f (x, y, z) = x^3y + yz + z^2. Find $\nabla f(x, y, z)$ and $\nabla f(1, 1, 0)$.

   e) Evaluate $\int_C \left\{ \left(x^2 + y^2 \right) i + \left(x^2 - y^2 \right) j \right\}. dr$ where C is the line joining (0, 0) to (1, 1).

   f) If $r = e^{-\lambda x} (a \sin \lambda y + b \cos \lambda y)$, where a, b are constant vectors and λ is a constant scalar, show that $\frac{\partial^2 r}{\partial x^2} + \frac{\partial^2 r}{\partial y^2} = 0$.

   g) Let C be the boundary of the square $D = [0, 1] \times [0, 1]$ oriented counter clockwise. Evaluate $I = \int_C \left(y^4 + x^3 \right) dx + 2x^6 dy$, using Green's theorem.

2. Attempt **any two** of the following :   **10**

   a) Let u be a derivable function on $J = (\alpha, \beta)$ such that u(t) $\neq$ 0 for all t$\in$ J. Show that u has constant direction on J if and only if
   $$u \times \frac{du}{dt} = 0 \text{ for all } t \in J.$$

P.T.O.

b) A particle moves along the curve r = $(2t^2)$ i + $(t^2 - 4t)$j + $(3t - 5)$ k. Find its velocity and acceleration at t = 1 in the direction of the vector n = i – 3j + 2k.

c) Find the equations of the tangent plane and normal line to the surface $2xz^2 - 3xy - 4x = 7$ at the point P(1, –1, 2).

3. Attempt **any two** of the following : **10**

a) Suppose f, g are vector functions and ϕ is a scalar function having first order partial derivatives in a region D. Then show that in D,

$\text{div}(f \times g) = g \cdot \text{curl} f - f \cdot \text{curl} g$.

b) Show that $F = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational and find a scalar field ϕ such that $F = \nabla\phi$.

c) i) If $f(r)$ is a derivable function of r, then show that $\text{curl}(f(r)r) = 0$.

ii) If a is a constant vector and $f = (a \times r)r^n$, then show that $\text{div} f = 0$.

4. Attempt **any one** of the following : **10**

a) i) Using Green's theorem, show that the area bounded by a simple closed curve C is given by $\dfrac{1}{2}\int_C (xdy - ydx)$. Hence find the area of the ellipse $x = a\cos\theta, y = b\sin\theta$.

ii) Evaluate $\iint_S f \cdot n dS$ if $f = 8zi - 12j + 3yk$, where S is the part of the plane 2x + 3y + 6z = 12 in the first octant.

b) i) Let ϕ, ψ have continuous second partial derivatives. Then show that

$$\iiint_V \nabla\phi \cdot \nabla\psi dv + \iiint_V \phi\nabla^2\psi dv = \iint_S \phi\frac{\partial\psi}{\partial n} dS,$$

where $\dfrac{\partial\psi}{\partial n} = \text{grad } \psi \cdot n$.

ii) Let $F = (2x - y)i - yz^2j - y^2zk$ and S be the portion of the sphere $x^2 + y^2 + z^2 = 1$ above the plane z = 0. Let C be the curve of intersection of $x^2 + y^2 + z^2 = 1$ and z = 0. Show that $\iint_S \text{curl} F \cdot n dS = \oint_C F \cdot dr$.

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Seat
No.

S.Y. B.Sc. (Semester – II) Examination, 2013
MATHEMATICS (Paper – II (B))
MT – 222 : Discrete Mathematics (2008 Pattern) (511B2)

Time : 2 Hours   Max. Marks : 40

N.B. : 1) **All** questions are **compulsory**.
2) Figures to the **right** indicate **full** marks.
3) **Use** of non-programmable scientific calculator is **allowed**.

1. Answer **any five** of the following :   **10**

   a) Prove that for integer $n \geq 3$, $n^2 \geq 2n + 1$.

   b) Find the number of permutations that can be formed from all the letters of each word : "BENZEME".

   c) List all self-complementary graphs on 4 vertices.

   d) Consider the recurrence relation $a_n = a_{n-1} + 3 a_{n-4}$. Is it a linear recurrence relation ? If yes, then what is its order ?

   e) Give an example of a graph which is Hamiltonian but not Eulerian.

   f) How many different five card hands with 2 red and 3 black cards can be obtained from a deck of 52 cards ?

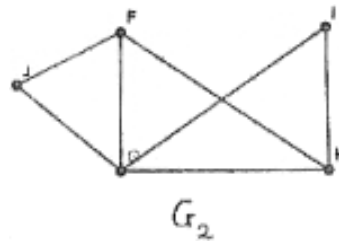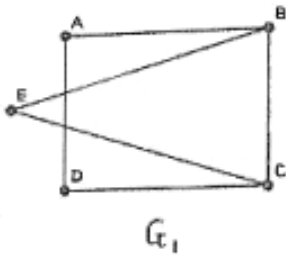   g) Draw the graph after the fusion of u and v given below.
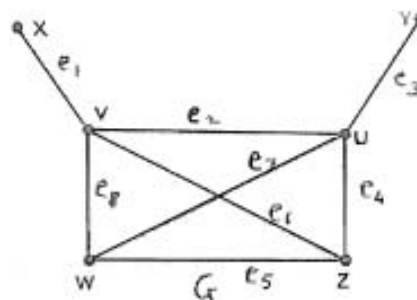
2. Answer **any two** of the following :   **10**

   a) Prove that $n^4 - 4n^2$ is divisible by 3, for all $n \geq 2$.

   b) Prove that the maximum number of edges in a simple graph with n vertices and k components is $\frac{(n-k)(n-k+1)}{2}$.

c) Check whether the following graphs are isomorphic or not.

G_1 G_2

3. Answer **any two** of the following :   **10**

a) Solve the recurrence relation
 $a_n = 2a_{n-1} + 3a_{n-2}$ given $a_0 = 1$, $a_1 = 11$.

b) Prove that in a set of any seven distinct integers there must exist two integers whose sum or difference is a multiple of 10.

c) Prove that the number of vertices in self-complementary graph is of the type $4k$ or $4k + 1$, where k is an integer.

4. Answer **any one** of the following :   **10**

a) i) Find the chromatic polynomial P_G for the following graph and use P_G to find $\chi(G)$, where $\chi(G)$ denotes the chromatic number of graph G.
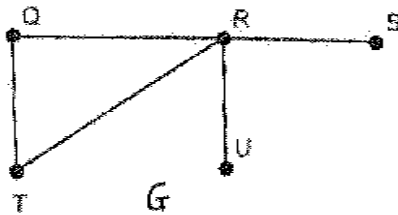
ii) Given eight different English books, seven different French books and five different German books :
   A) How many ways are there to select one book ?
   B) How many ways are there to select three books one of each language ?
   C) How many ways are there to make a row of three books in which exactly one language is missing (the order of the three books makes difference) ?

b) i) In a graph G, show that there exists a path from the vertex u to the vertex v if and only if there exists a walk from u to v.

ii) Using Kruskal's algorithm, find a minimal spanning tree of the given graph. Also state the weight of the minimal spanning tree.
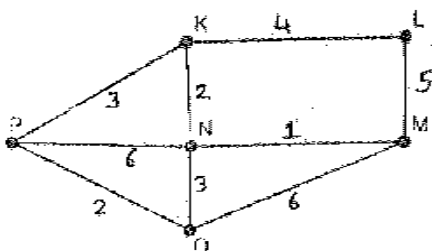
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(S.Y. B.Sc.) (Semester - II) (2008 Course)

हिंदी (HINDI)

नया पाठयक्रम

समय : 2 घण्टे]   [पूर्णांक : 40

पाठ्यपुस्तकें :   1)   प्रतिनिधि कहानियाँ

2)   संपादक – हिंदी विभाग, एस. एन. डी. टी. विश्वविद्यालय, मुंबई

3)   छायावाद : प्रतिनिधि रचनाएँ

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 संक्षिप्तियों के हिंदी पूर्ण पर्याय लिखिए।   [10]

i)   A.F.C.

ii)   C.T.B.T.

iii) C-DAC

iv)   D.Litt

v)   I.F.C.

vi)   I.M.F.

vii) M.P.S.C.

viii) N.A.S.A.

ix)   N.I.B.M.

x)   S.E.B.I.

xi)   U.K.

xii) U.P.S.C.

आ) निम्नलिखित अनुच्छेद का एक-तिहाई सारांश लिखते हुए उसे उचित शीर्षक दीजिए। [4]

किसान अब कृषि कार्यों के लिए छोटे कंप्यूटरों का इस्तेमाल कर रहे हैं। इन कंप्यूटरों की कीमत ट्रैक्टर से भी कम होती है। किसान इन कंप्यूटरों का इस्तेमाल फसल सूचना, प्रति एकड़ लागत तथा खाद-बीज की लागत आदि जानने के काम में कर रहे हैं। उदाहरण के तौर पर महाराष्ट्र के एक कपास उत्पादक, ने खेतों में खाद डालने के सही समय का पता लगाने में कंप्यूटर का इस्तेमाल करके अपनी वार्षिक आय में तकरीबन दस फीसदी की बढ़ोत्तरी की। इसके अलावा कंप्यूटर लोगों को शहरी दफ्तरों में बैठकर काम करने की बजाए घर पर काम करने का विकल्प प्रदान करता है। परिणामस्वरूप गांवों में जीवन का सूनापन कम हो सकता है और यहाँ तक की इससे संभवत: गाँवों से शहरों की ओर युवाओं का पलायन रूक सकता है।

*प्रश्न 2)*अ) निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर लिखिए। [8]

i)   शादी में जाने के लिए सोमा बुआ किस प्रकार तैयारी करती है ?

ii) 'जिंदगी और गुलाब' कहानी की समस्या पर प्रकाश डालिए।

iii) 'चीफ की दावत' कहानी का कथानक संक्षेप में लिखिए।

vi) रेहान का चरित्र - चित्रण कीजिए।

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

i)   बेचारे इतने हंगामे में बुलाना भूल गये तो मैं भी मान करके बैठ जाती? फिर घरवालों का कैसा बुलावा ? मैं तो अपनेपन की बात जानती हूँ।

अथवा

ii) तुम कभी ठीक वक्त से आते भी हो। रात को दस ग्यारह बजे आये। ठण्डा-सूखा खा लिया। सुबह देर से उठे, दोपहर को फिर गायब। कब बनाऊँ, कब दूँ ?

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

i)   'जागो फिर एक बार' कविता द्वारा कवि कौन-सा संदेश देना चाहता है और क्यों ?

ii) 'वनबेला' कविता में कवि ने साम्यवाद का समर्थन किस प्रकार किया है ?

iii) 'द्रुत झरो' कविता द्वारा कवि कौनसा संदेश देना चाहता है ?

iv) 'भारत माता'कविता का भावार्थ अपने शब्दों में लिखिए।

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

    i)   फिर पिता-संग

          जनता की सेवा का व्रत मैं लेता अभंग करता प्रचार

          मंच पर खड़ा हो साम्यवाद इतना उदार !

                   अथवा

   ii)   कंकाल जाल जग में फैले

          फिर नवल रूधिर, – पल्लव लाली !

          प्राणों की मर्मर से मुखरित

          जीव की मांसल हरियाली !

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

संस्कृत SANSKRIT (2008 Pattern)

गीर्वाणभारती

Time : **2** Hours]

[Max.Marks : **40**

Q1) Write short answers in <u>any 2-4 lines</u> of the following questions   **[16]**

  i)   Who has edited the book '**सद्धर्मपुण्डरीकसूत्र**' and when ?

  '**सद्धर्मपुण्डरीकसूत्र**' हा ग्रंथ कोणी व कधी संपादित केला ?

  ii)   What is the meaning of **शास्त्र** ?

  '**शास्त्र**' म्हणजे काय ?

  iii)   Which Sanskrit Famous book is related to mathematics and who is the
         author of that book ?

  संस्कृत मधील गणित शास्त्रविषयी प्रसिद्ध ग्रंथ कोणता व त्याचा कर्ता कोण ?

  iv)   Which are the **अष्टाङ्ग**'s of **आयुर्वेद** ?

  आयुर्वेदाची अष्टांगे कोणती ?

  v)   Name an epic which describes savarkar's life and who is the author of
        that epic ?

  सावरकरांच्या जीवनावर आधारित महाकाव्याचे नाव लिहा. त्यामहाकाव्याचे लेखक कोण ?

  vi)   How did Poet describe **सावरकर**'s message to his wife ?

  सावरकरांनी आपल्या पत्नीला दिलेल्या संदेशाचे कवीने कसे वर्णन केले आहे ?

  vii)   How did Poet describe **विवेकभ्रष्ट** ?

  विवेकभ्रष्टाचे वर्णन कवीने कसे केले आहे ?

  viii)   How did Poet describe the stick ?

  कवीने काठीचे वर्णन कसे केले आहे ?

P.T.O.

Q2) Write short notes on <u>any two</u> of the following <u>8 - 10 lines</u> each   **[8]**

पुढीलपैकी कोणत्याही दोहोंवर ८ ते १० ओळीत टीपा लिहा

i) वास्तुशास्त्रम्

ii) वनस्पति शास्त्रम्

iii) Purpose of सद्धर्मपुण्डरीक कथा , सद्धर्मपुण्डरीक कथेचे प्रयोजन

Q3) Write Short notes on <u>any two</u> of the following in <u>8-10 lines</u> each   **[8]**

पुढीलपैकी कोणत्याही दोहोंवर ८ ते १० ओळीमध्ये संक्षिप्त टीपा लिहा

i) लीलावती

ii) Charcter Sketch of सावरकर

सावरकरांचे व्यक्तिचित्रण

iii) शीलं परं भूषणम् ।

Q4) Answer <u>any one</u> of the following questions in <u>16-20 lines</u>   **[8]**

पुढीलपैकी कोणत्याही एका प्रश्नांचे उत्तर १६ ते २० ओळीत लिहा.

i) Explain in detail गणितशास्त्र and पदार्थविज्ञान.

गणितशास्त्र व पदार्थविज्ञानाचे सविस्तर स्पष्टीकरण करा.

ii) How did भवभूती describe the life of Ideal couple and Company of Good people ?

भवभूतीने आदर्श दांपत्य जीवन व सज्जन सहवास यांचे वर्णन कसे केले आहे.

■■■

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S.Y. B.Sc. (Semester - II)
CHEMISTRY - I
CH - 221 : Inorganic Chemistry
(2008 Pattern) (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 diagrams must be drawn wherever necessary.*

Q1) Answer the following :   **[10]**
  a) Define smelting.
  b) Write the name of method of purification of Bauxite.
  c) What are different forms of Iron?
  d) Mention the type of hybridisation and geometry in PCl_5.
  e) What is 'Itai-Itai' or 'Ouch-Ouch' disease?
  f) Define inert pair effect.
  g) Define chemical Toxicology.
  h) Write the two examples of protic solvents.
  i) Give the composition of stainless steel.
  j) Give the names of different methods for preventing corrosion.

Q2) Attempt <u>any two</u> of the following :   **[10]**
  a) Write the names, symbols and electronic configurations of halogen family elements. Explain the trends in the following properties.
     i) Atomic and ionic sizes
     ii) Electronegativity
  b) Give the comparision between Arrhenius theory and Lowry-Bronsted theory of acids and bases.
  c) Answer the following :
     i) Describe the concentration or dressing of ore.
     ii) Explain with examples, the impact of toxic chemicals on enzymes.

P.T.O.

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

a) Write names and outer electronic configuration of first transition series of d-block elements and comment on complex formations ability.

b) Explain electrolysis of Al_2O_3 with neat diagram and reactions.

c) Define the term 'passivity'. Explain oxide film theory of passivity. Give the evidences in favour of oxide film theory.

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

i) How cast iron is manufactured? Give a neat diagram of blast furnace and chemical reactions in various zones.

ii) What is steel? Explain L.D. process of manufacturing of steel. What are its advantages?

b) Attempt <u>any one</u> of the following : **[4]**

i) Distinguish between diamond and graphite.

ii) Explain with suitable example concept of hard and soft acids-bases.

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[4317] - 207

S.Y. B.Sc. (Semester - II)
CHEMISTRY
CH - 222 : Analytical Chemistry
(Paper - II) (2008 Pattern)

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 logarithmic tables and calculator is allowed.*
4) *Neat diagrams must be drawn wherever necessary.*

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

a) How are samples of gases obtained?

b) Which is a group reagent for V group?

c) Define empirical formula.

d) For which ions, EDTA canbe used as a titrant.

e) What is displacement titration?

f) What are causes of randomness?

g) How will you detect carboxylic group?

h) Define solubility product.

i) What is counter current extraction?

j) Define equivalence point in volumetric analysis.

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

i) Derive the relation between the distribution coefficient and distribution ratio.

ii) Explain the Borate removal scheme in inorganic qualitative analysis.

iii) How 0.1 N iodine solution is prepared? Explain method for standardisation of iodine solution.

b) Using kjeldahl method, the ammonia obtained from 0.5 gm of the sample was distilled into 50 ml of N/10 acid. The excess of the acid required 20 ml of N/10 base. Calculate the percentage of nitrogen. **[4]**

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

    i) Define standard solution. What are the characteristics of the standard solutions?

    ii) What do you mean by significant figure? Give various rules for computations.

    iii) How is aldehyde detected? Give two characteristic tests for aldehyde.

  b) Solve <u>any one</u> of the following : **[4]**

    i) Following weights were obtained by a person on repeating the same experiment four times i.e. 32.6 mg, 28.3 mg, 31.4 mg and 30.9 mg. Calculate the mean deviation, standard deviation and Relative mean deviation.

    ii) Three grams of solute are dissolved in 50 ml aqueous solution. Calculate the amount of solute extracted after a single extraction with 50 ml of benzene. Distribution ratio for the extraction is 10.

Q4) a) What is a titration curve? Discuss the titration curve between Fe^{2+} and ce^{4+} ions. **[6]**

<div align="center">OR</div>

Explain sodium fusion test for detection of nitrogen, sulphur and halogens.

  b) Answer <u>any one</u> of the following : **[4]**

    i) Describe the Mohr's method for estimation of chloride in a given sample.

    ii) Explain the theory of sulphide and hydroxide precipitation in inorganic qualitative analysis.

<div align="center">✪✫✪✫</div>

[4317] - 210
S.Y. B.Sc. (Semester - II)
ZOOLOGY
ZY - 221 : General Zoology and Biological Techniques (Part - II)
(Paper - I) (2008 Pattern)

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) Write the function of scroll valve.

  b) Write any two examples of fish catching beak.

  c) Enlist any two desert adaptations in vertebrates.

  d) What is the function of membranous labyrinth of <u>Scoliodon</u>?

  e) Enlist any two methods of dating of fossils.

  f) Name any two cranial nerves of <u>Scoliodon</u>.

  g) Write any two uses of fins in fishes.

  h) Write the names of paired fins in fishes.

  i) Enlist any two aquatic mammals.

  j) What is haemocytometry.

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

  a) Preparation of eosin and acetocarmine.

  b) Cursorial and raptorial feet.

  c) Placoid scales.

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

   a)   What is molar solution? Describe the method of preparation of molar
        solution.

   b)   Sketch and label - Dorsal view of brain of Scoliodon.

   c)   Primary aquatic adaptations in vertebrates.

Q4) Describe in details the structure and working of heart of Scoliodon.   **[10]**

OR

Describe migration of birds in details.

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[4317] - 211

S.Y. B.Sc. (Semester - II)
ZOOLOGY
ZY - 222 : Applied Zoology - II
(Apiculture and Sericulture)
(Paper - II) (2008 Pattern)

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 biological names of any two honey bee species.

　　b)　Give uses of bee brush.

　　c)　Uses of chopping board.

　　d)　Economic importance of bee venom.

　　e)　What are hibernating eggs?

　　f)　Define multivoltine.

　　g)　Define super sedure.

　　h)　Enlist any two fungal diseases of silkworm.

　　i)　What is biological name of Wox beetle.

　　j)　Define stifling.

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

　　a)　Economic importance and composition of Royal jelly.

　　b)　Dermestid bectles.

　　c)　Standard Langstroth frame.

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

   a) American foal brood disease.

   b) Explain cocoon deflossing.

   c) Describe wag-tail dance.

Q4) Describe life cycle of honey bee. [10]

<div align="center">OR</div>

What is harvesting? Describe the various methods of mulberry harvesting.

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P403

[4317] - 224
S.Y. B.Sc. (Semester - II)
ELECTRONIC SCIENCE
EL - 222 - Electronic Instrumentation - I
(Paper - I) (New)

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

Instructions to candidates:-

1)   All questions are compulsory.

2)   Draw the neat diagrams, whenever necessary.

3)   Figures to the right indicate full marks.

4)   Use of non-programmable calculator is allowed.

Q1) Attempt all of the following :

a)   Define resolution interms of the measurement system.   **[1]**

b)   'Input resistance of voltmeter should be very low'. Comment.   **[1]**

c)   What is static error?   **[1]**

d)   What is the use of attenuator in signal generator?   **[1]**

e)   What is a function generator?   **[2]**

f)   Explain how two single power supplies can be converted into one dual power supply.   **[2]**

g)   Sine wave observed on CRO is having peak to peak voltage of 40 volts. Calculate V_P and V_{RMS}.   **[2]**

h)   "Initial zero setting for pH measurement is at pH = 7". Comment.   **[2]**

Q2) Attempt any two of the following :

a)   Draw the basic circuit diagram of DC-Votmeter by using PMMC and hence derive the formula for series resistance.   **[4]**

b)   State atleast four differences between dual trace and daul beam CRO.**[4]**

c)   Explain with block diagram, working of sweep generator.   **[4]**

P.T.O.

Q3) Attempt any two of the following :

a)   Explain how time period can be measured using DFM?   **[4]**

b)   Draw the block diagram of fixed voltage regulated power supply. Explain each block in brief.   **[4]**

c)   Draw the block diagram of LUX meter. Explain its working.   **[4]**

Q4) Attempt all of the following :

a)   Draw the block diagram of DMM and explain working of it with application of autoranging.   **[6]**

b)   State the different types of CRO probes. Explain any two of them in details.   **[6]**

OR

a)   Calculate the percentage of load regulation for power supply, if the output voltage with no load condition is 10 volt and with full load condition is 9 volt. Also calculate the line regulation if the output voltage of the power supply changes by 0.1 volts for change in input voltage by 10 volts. **[4]**

b)   For square wave observed on CRO, the number of divisions for 'ON' period t_1 = 4 divisions and for 'OFF' period t = 2 divisions. Distance between two adjucent positive edges is 6 divisions. If position of time per division knob is on 50 μ sec. Calculate the frequency and duty cycle of square wave.   **[4]**

c)   In case of inductive pick up tachometer, state the formula for calculating the speed in RPS along with details of notations. Calculate the speed in RPM and RPS, if the number of pulses per second is 1000 and number of teeth on rotor is 50.   **[4]**

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P403

[4317] - 224
S.Y. B.Sc. (Semester - II)
ELECTRONIC SCIENCE
EL - 221 - Digital System Design
(Paper - I) (Old)

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) Attempt all of the following :

   a)   Define propagation delay. **[1]**

   b)   What is meant by conversion time? **[1]**

   c)   State the advantages of open collector gate. **[1]**

   d)   Give any two applications of counter. **[1]**

   e)   "IC 74148 is called priority encoder". Comment. **[2]**

   f)   "IC 7495 is a universal shift register". Comment. **[2]**

   g)   For a certain IC Family propagation delay is 1ns with an average power dissipation of 5mW. What is its speed-power product? **[2]**

   h)   If the binary input A = 0110 and B = 0011 are applied to the inputs of a 4-bit logic comparator. Determine the outputs. **[2]**

Q2) Attempt any two of the following :

   a)   With the help of suitable circuit diagram, explain the operation of CMDS NAND gate. **[4]**

   b)   Explain with block diagram counter type ADC. **[4]**

   c)   Design half adder using K-map. **[4]**

P.T.O.

Q3) Attempt any two of the following :

a) With the help of logic diagram, explain the working of 3-bit synchronous counter. Give its state diagram. **[4]**

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

c) Explain the working of single slope ADC with block diagram. **[4]**

Q4) Attempt all of the following :

a) Explain the working of 4-bit binary weighted resistive network of DAC. Derive the formula for analog voltage of it. **[6]**

b) Obtain the logical expression for segments a and c of the BCD to 7 segment decoder to drive common cathode. **[6]**

OR

Attempt all of the following :

a) How many flipflops are required to build a binary counter that counts from 0 to 1023? Determine the frequency at the output of last (MSB) flipflop for an input clock frequency of 2MHz. **[4]**

b) What are the output voltage caused by each bit in a 4-bit ladder? Calculate full swing voltage of it, if $V_{in} = 20V$. **[4]**

c) A clock of 100 kHz is applied to 7491A. How long will it take to produce an input pulse at the output? **[4]**

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[4317] - 225

S.Y. B.Sc. (Semester - II)
ELECTRONIC SCIENCE
EL - 222 : Communication System
(Paper - II) (2008 Pattern)

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 non-programmable calculator is allowed.*

Q1) Attempt all of the following :

   a)   Define signal to noise ratio. **[1]**

   b)   What is e-commerce? **[1]**

   c)   State applications of CCTV. **[1]**

   d)   Give the advantages of DTMF dialing. **[1]**

   e)   "Mobile phone is nothing but cellular phone", comment. **[2]**

   f)   "In pulse dialing to dial digit 1, less time is required than to dial digit 9", comment. **[2]**

   g)   The carrier amplitude after amplitude modulation varies between 4 volts and 1 volt. Calculate depth of modulation. **[2]**

   h)   If vertical retrace time is 1280 μs, how many horizontal lines are scanned using vertical retrace. **[2]**

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

   a)   Define amplitude modulation and derive equation for AM wave. **[4]**

   b)   What is space wave propagation? Give effect of earth curvature on space wave propagation. **[4]**

   c)   With block diagram explain television receiver. **[4]**

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

    a)   Write short note on Set-Top box.   **[4]**

    b)   With neat circuit diagram explain the operation of slope detector circuit.   **[4]**

    c)   Draw block diagram of superheterodyne AM receiver and explain each block in brief.   **[4]**

Q4) Attempt the following :

    a)   Explain cable as a transmission media. Describe Shielded Twisted Pair (STP) cable and Unshielded Twisted Pair (UTP) cable in details.   **[6]**

    b)   State functions of telephone handset. Write a note on Public Switched Telephone Network (PSTN).   **[6]**

OR

Attempt the following :

    a)   A carrier wave of 10kW is amplitude modulated at 80% depth of modulation by sinusoidal modulating signal. Calculate the power in side bands and total power.   **[4]**

    b)   A superheterodyne receiver is tuned to 555kHz, its local oscillator provide the mixer with input at 1010 kHz. What is image frequency.   **[4]**

    c)   A modulating signal $10 \sin (2\pi \times 10^3 t)$ is used to modulate a carrier signal $20 \sin (2\pi \times 10^4 t)$. Find modulation index, frequency of sidebands and their amplitude.   **[4]**

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[4317] - 231

S.Y. B.Sc. (Semester - II)
OPTIONAL ENGLISH
Enriching Oral and Written Communication in English
(2008 Pattern)

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

   a)   Komal, Jasbir, Uday and Asha are participants in a group discussion on the topic 'Youth and Politics'. Write a transcript of the discussion. You can use the following points: voting rights - active participation of youth - their demands - campaigning - corruption - use of money and muscle power -politics without values - responsibility of youth - role in democracy.

   b)   You applied for the post of a Research Associate in the university department and have been asked to appear for an interview. Write down five questions that you could be asked and their possible answers.

   c)   Imagine that you are one of the members attending a meeting organised by the cultural committee of your college. State some of the points that will help you make your participation valuable.

Q2) Attempt <u>any two</u> of the following :   **[10]**

   a)   Write a paragraph of about 15 sentences on 'The Books I Enjoy Reading'.

   b)   Punctuate the following piece of conversation.

        whats the matter john said jane ive got a headache replied john youd better go to bed suggested jane no im all right john said

   c)   Summarize the following paragraph to one third of its length. Suggest a suitable title. Prepare a rough draft also.

Science is the systematic study of the materials and phenomena of the natural world. There are several branches of science. The science of Chemistry deals with the composition of materials and the changes that can take place in them. Chemistry had its beginnings in very ancient times. In studying the Great River (Nile) valley civilisations, scholars have found evidence to show that the processes of Chemistry were known to the people of the ancient times. The ancient Egyptians, the Hindus and the Chinese were interested in the preparation of medicines and perfumes, and in metal-work and pottery. These activities required the application of their knowledge of Chemistry.

Chemistry during the Middle Ages was not a pursuit of knowledge for its own sake. Its aims were more practical. There was a belief among the people that 'base metals' like lead and copper could be converted into the noble metal, gold. The 'philosopher's stone' was supposed to have the power to bring about this change. The people who found this magic substance and conducted experiments with various substances were the Alchemists. Another magic substance that the alchemists sought was 'the elixir of life', which could cure all diseases and make people live long.

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

a)   Write a review of a TV Reality Show that you liked. Take into account the following points: theme, incidents, reaction of the judges, setting, strong and weak points, your opinion, entertainment value.

b)   Choose the more powerful of the two words or phrases given.

  i)   Due to corrosion the windows (creaked/made noise).

  ii)   A child (fell down/rolled down) the steps.

  iii) The patient constantly (gazed/looked) at the clock on the wall.

  iv)   George was a good (disciple/follower) of Pt. Ravi Shankar.

  v)   The Tsunami waves (destroyed/devastated) the town completely.

c)   Write a description of the teacher you liked most taking into consideration his/her personality, subject knowledge, presentation style, command over subject, way of interaction etc.

Q4) Attempt <u>any two</u> of the following : **[10]**

   a) You are ill and unable to go to your work. You want to communicate to your higher authority about your absence. Write a short telephone conversation on this situation.

   b) You are the librarian of your college. Write an e-mail to <u>creativepublisher@yahoo.com</u> for trade catalogue. Mention the books you intend to buy, mode of payment, and ask for a discount on the catalogue price.

   c) Prepare 5 slides of about 20 words each for power point presentation that you would like to make in a function on the topic 'Water Pollution: Causes, Effects and Remedies'.

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[4317] - 235

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

ARABIC (Functional)

(2008 Pattern)

Time :2 Hours]

[Max. Marks :40

Q1) Translate into Eng/Urdu/Marathi any two of the following Passages : **[10]**

(الف) هٰذَا قَمَاشٌ ـ هٰذَا الغَبَارُ صَغِيرٌ ـ ذَالِكَ قِطٌّ ـ
ذَالِكَ القِطُّ كَبِيرٌ وَهُوَ أَبْيَضُ ـ ذَالِكَ طَائِرٌ
ذَالِكَ الطَّائِرُ غُرَابٌ ـ وَهُوَ أَسْوَدُ ـ هٰذَا
دَرْسٌ ـ هٰذَا الدَّرْسُ سَهْلٌ جِدُّ ـ وَهُوَ سَهْلٌ
لَا صَعْبٌ ـ

(ب) اَلوَلَدُ المُجتَهِدُ مَحبُوبٌ لَهُ فَوزٌ كَبِيرٌ ـ
فَهُوَ مَسرُورٌ فِى كُلِّ وَقتٍ ـ اَلوَقتُ عِندَهُ
شَىءٌ ثَمِينٌ ـ ذَالِكَ وَلَدٌ كَسلَانٌ ـ اَلوَلَدُ
الكَسلَانُ مَذمُومٌ هُمُ مَحرُومٌ فِى كُلِّ وَقتٍ
اَلوَقتُ عِندَهُ لَيسَ بِشَىءٍ ـ

(ج) أَنَا وَلَدٌ ـ أَنتَ وَلَدٌ ـ أَنَا قَصِيرٌ ـ أَنتَ طَوِيلٌ ـ
أَنَا سَمِينٌ ـ أَنتَ هَزِيلٌ ـ أَنَا جَالِسٌ عَلَى
الكُرسِىِّ وَهُوَ مَشغُولٌ ـ وَهُوَ وَاقِفٌ
عَلَى الاَرضِ أَنَا مَشغُولٌ بِالقِرَاءَةِ وَهُوَ اَيضًا
مُسلِمٌ ـ أَنَا فِى القِرَاءَةِ ـ

P.T.O

Q2) Translate and explain any Five couplets of the following : **[10]**

١) أَيُّهَا النَّحْلَةُ مَاذَا
لِيَشْغُلُ النَّاسُ بِحُبِّكَ

٢) بَيْنَنِي فِي حُسْنِ شَكْلِي
لَسْتُ مَحْجُوبًا الْحَيَاءُ

٣) شَمْسِ السَّمَاءِ السَّاطِعَةُ
فِي كُلِّ يَوْمٍ طَالِعَةُ

٤) نَبْدُ وَالنَّائِفُ الْمُشْرِقُ
لَبَعْدَ الْهِنِّيَاءُ الْمُشْرِقُ

٥) فَكُلُّ حَيٍّ يَنْتَهِي
وَالْحَيَاتُ سَيَرِكُنِي

٦) حَيَاتُنَاهُ الْعَمَلُ
وَسَقَيْنَاهُ الْأَمَلُ

Q3) Answer in Arabic any Five of the following : **[10]**

١) مَنْ رَبُّكَ ؟

٢) هَلْ أَنْتَ كَبِيرٌ ؟

٣) مَتَى امْتِحَانُكَ ؟

٤) مَاذَا الـ...ـكَ ؟

٥) مَا لَوْنُ الغُرَابِ ؟

٦) مَنْ هُنَا ؟

٧) كَيْفَ الحَالُكَ ؟

Q4) Write the letter in Arabic to the College Principal. **[10]**

اكْتُبِ الرِّسَالَةَ فِي العَرَبِيَّةِ إِلَى رَئِيسِ الكُلِّيَّةِ.

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[4317] - 204

S.Y. B.Sc. (Semester - II)
PHYSICS
PH : 221 - Oscillations, Waves & Sound
(2008 Pattern) (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) *Use of calculator & log table is allowed.*
4) *Neat diagram must be drawn wherever necessary.*

Q1) Attempt all of the following: **[10]**
   a) What do you mean be stable equilibrium?
   b) The differential equation of undamped SHM is

$$4\frac{d^2x}{dt^2}+100\,x=0$$ Find period of oscillations.

   c) What is damping force?
   d) Define quality factor of damped oscillatory motion.
   e) What are coupled oscillations?
   f) What is the condition for amplitude resonance in case of forced oscillation?
   g) What is red shift?
   h) The velocity of sound in water of density 1000 kg/m^3 is 1500 m/s. Determine bulk modulus of water ?
   i) Define quality of sound
   j) What is seismology?

Q2) Attempt any two of the following:
   a) Derive an expression for average energy of a damped harmonic oscillator.
                                                    [5]
   b) Describe stroboscope method to determine frequency of A.C.   **[5]**

c) What is velocity resonance? Derive the condition for velocity resonance in case of forced oscillations? **[5]**

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

a) The equation of forced oscillations is given as

$$4\left(\frac{d^2x}{dt^2}\right)+2\left(\frac{dx}{dt}\right)+144x=25\sin 9t$$

Determine the resonant angular frequency at which velocity resonance takes place. Also determine quality factor & half width. **[5]**

b) A particle is subjected to two rectangular S.H.M's. such that displacements at any instant is given by $x=2\sin(wt+\pi/4)$ and $y = 2\sin(wt)$. Find nature & equation of path. **[5]**

c) The equation of wave motion is $y=7\sin 2\pi(20t-0.05x)$.

Find wave velocity and maximum particle velocity in CGS system. **[5]**

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

a) i) Show that the Doppler effect in light is symmetric. **[4]**

ii) Derive an expression of resultant path followed by a particle subjected to two mutually perpendicular SHM's having frequencies in the ratio 1:2. **[4]**

OR

b) i) Obtain an expression for velocity of longitudinal waves propagating through a medium of density ρ and bulk modulus of elasticity k. **[4]**

ii) Describe electrical damped oscillations in LCR series circuits. **[4]**

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

a) A stroboscope disc has 18dots in the ring when seen through strips window, the dots appeared stationary for 324 revolutions in 18 seconds. Determine the frequency of tuning fork. **[2]**

b) A spectral line of wavelength 6600 Å in the spectrum of a star is found to be displaced by 0.22 Å from its normal position towards red end of spectrum. Determine the velocity of star. **[2]**

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[4317] - 205

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

PHYSICS - II

PH-222 : Optics

(2008 Pattern) (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 diagrams must be drawn wherever necessary.

   4)   Use of calculator and log table is allowed.

Q1) Attempt all of the following:

   a)   What is optical aberration?   **[1]**

   b)   Calculate the focal length of a double convex lens for which the radius
        of curvature of each surface is 25cm and refractive index of the material
        of the lens is 2.00.   **[1]**

   c)   Define magnifying power of a simple microscope.   **[1]**

   d)   Define grating element.   **[1]**

   e)   What is diffraction of light?   **[1]**

   f)   Define resolving power of an instrument.   **[1]**

   g)   Calculate the magnifying power of a magnifying glass of 5cm focal length.
        Distance of distinct vision is 25 cm.   **[1]**

   h)   The polarizing angle for air and transparent material is 60°. Calculate
        refractive index of material.   **[1]**

   i)   What are the uses of polaroid?   **[1]**

   j)   What is polarization of light?   **[1]**

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

    a)   Describe and explain with the help of suitable ray diagrams   **[5]**

        i)   Longitudinal chromatic aberration, and

        ii)   Lateral chromatic aberration

    b)   Explain Brewster's law and its applications.   **[5]**

    c)   Describe the construction and use of Ramsden's eye-piece. Why it is termed as a positive eye-piece.   **[5]**

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

    a)   A thin converging lens of focal length 20cm is kept co-axially at a distance of 13cm from a diverging lens of focal length 15cm. Locate the cardinal points.   **[5]**

    b)   Two thin convex lenses of same material having focal lengths f_1 and f_2 are separated by a distance 10cm. The combination of lenses satisfies the condition for no chromatic aberration and minimum spherical aberration. Find the values of f_1, f_2 and f.   **[5]**

    c)   In Michelson's intereferometer experiment scale reading for a pair of maximum indistinctness were found to be 0.6939mm and 0.9884mm. If the mean wavelength of the sodium doublet is 5893 Å, find the difference of wavelength of this doublet.   **[5]**

Q4) Attempt the following:

    a)   i)   Explain the construction and working of an astronomical telescope. Derive the expression for its magnifying power in normal adjustment.   **[4]**

        ii)   Explain the phenomenon of interference in thin film due to transmitted light. Obtain the expression for minima and maxima for transmitted light.   **[4]**

<p align="center">OR</p>

i) Prove that for a combination of two thin lenses of focal lengths 'f_1' and 'f_2' separated by a distance 'x', the focal length of the combination is given by – **[4]**

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{x}{f_1 f_2}$$

ii) Distinguish between positive and negative crystals. **[4]**

b) Attempt any one of the following :

i) What is double refraction? **[2]**

ii) Monochromatic light of wavelength 6000Å is incident normally on a diffraction grating. The first order maximum is observed in the direction of 15, calculate the grating element. **[2]**

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[4317] - 208

S.Y. B.Sc. (Semester - II)
BOTANY

BO - 221 : Structural Botany
(Anatomy, Embryology and Palynology)
(Theory) (Paper - I) (2008 Pattern)

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]**

   a)   Enlist the elements of xylem.

   b)   Define embryology.

   c)   Give any two functions of tapetum.

   d)   What is periderm?

   e)   Give any two causes of anomalous secondary growth.

   f)   What is palynology?

   g)   Give any two functions of parenchyma.

   h)   What is mesogamy?

   i)   What is double fertilization?

   j)   What is melittopalynology?

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

   a)   Describe glandular epidermal outgrowths.

   b)   Describe the types of laticiferous tissues.

   c)   Describe the structure of typical ovule.

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

    a)   Polarity in pollen structure.

    b)   Nuclear endosperm.

    c)   Lenticels.

Q4) What are the mechanical tissues? Describe various principles involved in distribution of mechanical tissues in plants.   **[10]**

<div align="center">OR</div>

Describe tetrasporic development of embryo sac with suitable example.

<div align="center">✠✠✠✠</div>

[4317] - 209

S.Y. B.Sc. (Semester - II)
BOTANY
BO - 222 : Fundamentals of Plant Biotechnology
(2008 Pattern) (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 labelled diagrams wherever necessary.*

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

a) Define biomass.

b) What are plasmids?

c) Define synthetic seeds.

d) Give different phases of growth of micro organisms.

e) What is cytoplasmic inheritance?

f) Give the names of any two petro plants.

g) Name any two sources of SCP.

h) Define totipotency.

i) What is embryogenesis?

j) What is waste?

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

a) Describe different substrates used in biotechnology.

b) Explain ethical aspects of genetic engineering.

c) What is enzyme immobilization? Give the different techniques of immobilization and explain any one.

Q3) Write short notes on (any two).   **[10]**

   a)   Advantages and disadvantages of biogas.

   b)   SCP from waste.

   c)   Landfill technology.

Q4) What is bioreactor? Explain the design and working of stirred tank bioreactor.
                                                                         [10]

OR

Describe various stages in anther culture. Add note on importance of haploids.

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[4317] - 212
S.Y. B.Sc. (Semester - II)
GEOLOGY
GL - 221 : Petrology
(Paper - I) (2008 Pattern)

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)   Define 'eutectics'.

    b)   What are polysilicates?

    c)   Define ophitic texture.

    d)   Name any two minerals of high silication.

    e)   Define abrasion.

    f)   Define sphericity.

    g)   What is anthracite coal?

    h)   State the agents of metamorphism.

    i)   Name two rocks showing gneissose structure.

    j)   What is pneumatolytic metamorphism?

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

    a)   Crystallisation of uni-component magma.

    b)   Expansion cracks & Reaction rim micro structures.

    c)   Concordant and discordant bedding.

Q3) Write notes on (any two) : [10]

    a)   Stress and anti-stress minerals.

    b)   Regional metamorphism of Basic igneous rocks.

    c)   Authigenesis as a process of diagenesis.

Q4) Define thermal metamorphism. Explain its effects on Arenaceous rocks. **[10]**

                OR

What are chemical deposits? Explain carbonate and ferrugenous sedimentary deposits.

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[4317] - 213

S.Y. B.Sc. (Semester - II)
GEOLOGY
GL-222 : Stratigraphy and Palaeontology
(2008 Pattern) (Paper - II)

Time : 2 Hours]

[Max. Marks :40

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

Q1) Answer the following questions.

[10]

  a) What is the principle of order of superposition.

  b) Define Biostratigraphy.

  c) What is a stratum.

  d) Define guide or Index fossil.

  e) What is lithological similarity?

  f) What is micro evolution in organisms?

  g) What is nanopalaeontology?

  h) What are foraminifers?

  i) What are the stratigraphic evidences of an unconformity?

  j) Mention the biostratigraphic units.

Q2) Write notes on (any two) :

[10]

  a) Uniformitarianism.

  b) Correlation by lateral continuity of strata.

  c) Biological factors affecting stratification.

Q3) Explain the following (any two) : [10]

    a)   Evolutionary trends in the globella of trilobites.

    b)   Morphology of pollens and spores.

    c)   Types of hinges in ostracods.

Q4) What is lithostratigraphic classification? Describe its units in detail. [10]

<p align="center">OR</p>

Explain the morphology of the hard parts of ostracods.

<p align="center">✠✠✠✠</p>

[4317] - 216

S.Y. B.Sc. (Semester - II)
GEOGRAPHY
Gg-221 : Distribution, Development and Planning of Resources
(Paper - I)(2008 Pattern)

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 stencil is allowed.*

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

 a)   What are the various types of iron ore?

 b)   What is bauxite?

 c)   List the types of coal.

 d)   List the major countries producing petroleum.

 e)   State two disadvantages of wind energy.

 f)   State any two disadvantages of solar energy.

 g)   Give any two examples of sparsely populated areas of the world.

 h)   What is under population?

 i)   State any four economic uses of mineral resources.

 j)   What is resource planning?

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

 a)   World production of natural gas.

 b)   Population as a resource

 c)   Need of resource planning

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

    a) Give an account of coal production in India.

    b) Explain the concept of over population.

    c) Explain the role of land resources in economic development.

Q4) Give an account of distribution and production of iron ore in India. [10]

<div align="center">OR</div>

Explain the role of water resources in economic development.

<div align="center">✠✠✠✠</div>

[4317] - 217

S.Y. B.Sc. (Semester - II)
GEOGRAPHY
Gg - 222 : Surface Water and Ground Water Hydrology
(Paper - II) (2008 Pattern)

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 stencil is allowed.*

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

a) Define evaporation.

b) Define potential evapotranspiration.

c) What is hydrograph?

d) What is meant by stream flow?

e) What is runoff?

f) What do you mean by intermediate zone?

g) Define capillary zone.

h) Define ground water hydrology?

i) Write any two effects of urbanization on runoff.

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

a) Snowmelt hydrology.

b) River regimes.

c) Salt water intrusion.

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

    a)   Explain the causes of flood.

    b)   Describe the storm water management model.

    c)   Explain the ground water flow.

Q4) Describe the peak flow method for urban areas. [10]

<div align="center">OR</div>

Define transpiration. Explain the controlling methods of transpiration in detail.

<div align="center">✠✠✠✠</div>

[4317] - 218

S.Y. B.Sc. (Semester - II)
MICROBIOLOGY
MB-221 : Bacterial Systematics and Analytical Microbiology
(Paper - I) (2008 Pattern)

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.

    4)   Use of Calculators, log tables and statistical tables is allowed.

    5)   Use graph paper if necessary.

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

    a)   Define Numerical taxonomy.

    b) $\dfrac{d}{dx}(x^2 + 2x + 3)$ = ―――――

    c)   State true or false:

        Stratified random sampling procedure is followed when the population is not homogenous.

    d)   Sanger's dideoxy method is used for _____

        i)   Protein sequencing

        ii)   DNA sequencing

        iii) DNA hybridization

        iv) G+C content determination

    e)   Find the value of $\log_2^8$

    f)   Determine mode for the following data.

        18, 20, 25, 20, 35, 20, 60, 27, 30

    g)   State true or false :

        If G+C content of given DNA is high then the Tm is also high.

P.T.O.

h) What is a dendogram?

i) The midpoint of the class interval 44.5 to 54.5 is

    i) 39.5

    ii) 49.5

    iii) 1.5

    iv) 40.5

j) The bacterial kingdom is divided into _____ sections as per Bergey's manual of systematic bacteriology.

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

a) Describe 16S rRNA analysis and its role in bacterial classification.

b) Draw Graph of following linear equation.

$x + y < 2, x > 0, y > 0.$

c) Draw a pie diagram of following data:

Distribution of blood groups among the anoemic females in Maharashtra are

Blood group	Number of females
A	744
B	971
O	888
AB	207
Total	2810

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

a) Evaluate $\int \dfrac{t^3 + 7t^2 - 5t + 3}{t^2} dt$

b) Alpha particles are emitted by radioactive source at the rate of three per every minute on the average. The number of particles is distributed according to the poisson distribution. Calculate the probability of getting exactly 5 emissions in one minute.

c) Describe any one technique used for detection of DNA homology and give its significance.

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

a) Comment on " Chemotaxonomy based on protein profile and lipid content".

b) Calculate the mean, the variance, the standard deviation and the coefficient of variation from the following data.

Sample A	40	46	47	39	42	54	50	49	40	41
Sample B	46	51	49	40	41	49	60	61	55	49

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[4317] - 219

S.Y. B.Sc. (Semester - II)
MICROBIOLOGY
MB - 222 : Applied Microbiology I
(Paper - II) (2008 Pattern)

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)   Enlist any two air borne infections.

   b)   Define B.O.D.

   c)   Enlist any two precautions to be taken for preventing contamination of fermentation media.

   d)   In fed batch fermentation, volume of fermentation medium...(increases, decreases, remains constant, none of these)

   e)   Define distilled water.

   f)   Give any two methods of air sampling.

   g)   MPN of muncipal tap water should be .... (0, 100, 5, 200).

   h)   What is meant by seed culture in microbial fermentation?

   i)   Enlist any two chemical pollutants of air with their sources.

   j)   Name any two temperature sensing devices used in monitoring fermentation process.

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

   a)   Justify : Air flora is transient.

   b)   Comment on any one method of secondary treatment of waste water.

   c)   Describe the sterilization of fermentation medium using filteration and add a note on its significance.

P.T.O.

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

   a)   Give the ecological effect of industrial pollutants with respect to eutrophication and biomagnification.

   b)   Enlist the different parts of a typical CSTR with their functions.

   c)   Write the principle of C.O.D. determination and give its significance.

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

   a)   Enlist the sources of following components and give their nutritional aspects in microbial fermentation media.

   i)   Carbon

   ii)   Nitrogen

   iii) Minerals

   iv)   Inducers

   v)   Vitamins.

   b)   Describe the bacteriological analysis of water for potability with respect to

   i)   Eijkman test

   ii)   Membrane filter technique.

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SEAT No. :

[Total No. of Pages : 1

[4317] - 220

S.Y. B.Sc. (Semester - II)
PSYCHOLOGY
Health Psychology
(Paper - I) (2008 Pattern)

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

Instructions to the candidates:
  1)   *All questions are compulsory.*
  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)   What is health psychology?
  b)   What is conflict?
  c)   What is physical illness?
  d)   How stress is inflected by culture?
  e)   How do you blame yourself?
  f)   What is drinking?
  g)   What is poor nutrition?
  h)   State the effects of over eating?

Q2) Attempt any two in 8/10 sentences :   **[8]**
  a)   Explain positive effects of stress.
  b)   Explain the mind - body connection.
  c)   Explain problem focused constructive coping.

Q3) Write short note on any two of the following :   **[8]**
  a)   Smoking
  b)   Post traumatic stress disorders (PTSD)
  c)   AIDS.

Q4) Explain in detail models of illness.   **[8]**

OR

Explain appraisal focused constructive coping.

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[4317] - 221
S.Y. B.Sc. (Semester - II)
PSYCHOLOGY
Counselling Psychology
(Paper - II) (2008 Pattern)

Time : 2 Hours]
[Max. Marks :40

Instructions to the candidates:
  1) *All questions are compulsory.*
  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 counselling.
  b) What is systematic training for effective parenting?
  c) Differentiate ethics and law.
  d) How physiological changes that affect counselling?
  e) Who is associated with person centered counselling?
  f) What is confidentiality?
  g) Whose name is associated with gestalt psychology?
  h) What is ethical conduct?

Q2) Attempt any two of the following in eight or ten sentences.
  [8]
  a) Explain the patterns of erroneous thinking.
  b) Explain how to work with parents.
  c) Describe normative events.

Q3) Write short note on any two of the following
  [8]
  a) Predictable counselling agendas
  b) Assessment tools.
  c) Communicating.

Q4) Explain the characteristics of good counsellor.
  [8]

OR

Describe fully the person centered counselling.

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[4317] - 227

S.Y. B.Sc. (Semester - II)
DEFENCE AND STRATEGIC STUDIES
DS - 202 : India's National Security
(2008 Pattern) (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.*

Q1) Answer in two to four sentences.   **[16]**
   a) State the meaning of Air space security.
   b) State the meaning of Strategic raw materials.
   c) Write the meaning of National core values.
   d) Write any two objectives of India's Foreign policy.
   e) Write the meaning of Human development.
   f) Define Strategic Doctrine.
   g) State the meaning of land border management.
   h) Define Insurgency.

Q2) Answer in 8 to 10 sentences (Any Two) :   **[8]**
   a) Explain India's Military Objectives.
   b) Discuss the causes of Kargil War.
   c) Write a note on India's Freedom movement.

Q3) Write short notes on (Any Two) :   **[8]**
   a) Human security.
   b) Energy security.
   c) India's border management.

Q4) Answer in 16 to 20 sentences (Any One) :   **[8]**

   a) Write a note on India's maritime security and its management.

   b) Write an essay on Internal security challenges to India's security.

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[4317] - 228

S.Y. B.Sc. (Semester - II)
DEFENCE AND STRATEGIC STUDIES
DS-203 : Military Geography
(Paper - III) (2008 Pattern)

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 two or four sentences each.   **[16]**
  a)   State the meaning of D.Z.
  b)   What do you mean by "Military Geography"?
  c)   Who are the users of military geography?
  d)   Define 'Strategy"
  e)   Why the study of plain warfare is necessary for us?
  f)   State any two names of great tacticians with example.
  g)   Define "Logistics".
  h)   Write the ideal period for jungle warfare.

Q2) Answer in 8 or 10 sentences (any two) :   **[8]**
  a)   Discuss in brief the concept of military geography.
  b)   Explain in short the characteristics of high attitude.
  c)   Write any two "means" of grand strategy.

Q3) Wrtie short notes on (any two) :   **[8]**
  a)   Concept of tactics.
  b)   Logistics : Definition of analysis.
  c)   Characteristics of "Desert".

Q4) Answer in 16 to 20 sentences (any one) :   **[8]**
  a)   Explain an environment as a factor of national security.
  b)   Discuss in detail "cooperation" as a principle of logistics.

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[4317] - 229

S.Y. B.Sc. (Semester - II)
ENVIRONMENTAL SCIENCE
ENV-201 : Biological Diversity
(Paper - I) (2008 Pattern)

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)   What is meant by species Diversity?

  b)   Define Hotspots.

  c)   Write the full form of GMO.

  d)   Define Feral plants.

  e)   Define In-situ conservation.

  f)   Name any 2 megadiversity countries.

  g)   Name any 2 characteristic animals of the himalayas.

  h)   What is meant by genetic drift?

  i)   Define species-evenness

  j)   Write the full form of WWF.

Q2) Write a short note on (any two):   **[10]**
  a)   Habitat destruction & fragmentation.
  b)   Megadiversity countries centres.
  c)   Measurement of genetic diversity based on DNA & Chromosomes.

P.T.O.

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

a) Explain Endemism & its types. Discuss in brief - Endemism/Endemic species in India.

b) Discuss the different types of aquatic ecosystem with suitable examples.

c) Describe the various Ex-situ conservation methods with suitable examples.

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

a) Discuss the criteria for hot-spot identification & give an account of western ghats as a hotspot.

b) Discuss any 5 factors responsible for the loss of biodiversity with suitable examples.

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[4317] - 230
S.Y. B.Sc. (Semester - II)
ENVIRONMENTAL SCIENCE
ENV-202 : Soil Science
(Paper - II) (2008 Pattern)

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 the term : soil

     b)   State the difference between microscopic & capillary water.

     c)   Name any two beneficial soil microbes.

     d)   Define : soil profile.

     e)   Give the composition of soil organic matter.

     f)   Define the term : soil pollution.

     g)   What is meant by suspension?

     h)   Give any two roles of bacteria in soil.

     i)   State the difference between salinization & water logging.

     j)   Define the term : shifting cultivation.

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

     a)   Soil classification

     b)   Biofertilizers.

     c)   Reclaimation of saline soils.

Q3) Answer any two from the following : [10]

    a)   Explain any five factors affecting soil organic matter.

    b)   Give the functions & deficiency syndromes of K & Zn.

    c)   Describe in detail soils of maharashtra with suitable examples.

Q4) Attempt any one of the following. [10]

    a)   Discuss the role of any five nutrients in plant growth.

    b)   Write a detailed account on soil biology.

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[4317] - 237

S.Y. B.Sc. (Semester - II)
INDUSTRIAL CHEMISTRY
VOC - 221 : Unit processes in Organic Industries
(Vocational Paper - I) (2008 Pattern)

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.*

Q1) Answer the following questions.   **[16]**

  a) Explain mesomeric effect with an example.

  b) Give balanced equation with conditions for following reaction.
     Anthracene to Anthraquinone.

  c) Give balanced equation with condition for the following reaction
     Commercial manufacture of acetaldehyde.

  d) Give the equation for hydrolysis of ethyl benzoate with hot aq.NaOH.

  e) How is methyl bromide converted to acetic acid?

  f) Give balanced equation with condition for the following reaction
     Nitrobenzene to p-amino alcohol.

  g) Give the unit process for the hydrogenation of oils.

  h) Give balanced equation with condition for following reaction
     Chloroacetic acid → Glycine.

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

  a) Discuss the orientation effects in nitration of substituted benzene with
     suitable examples.

  b) Name the hydrogenation catalysts and describe any two of them.

  c) Discuss the different esterification processes with suitable examples.

P.T.O.

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

    a)   Different sulphonating agent

    b)   Friedel crafts reaction.

    c)   Manufacture of vinyl acetate.

Q4) What is halogenation? Discuss the manufacture of chlorobenzene with the help of flow-sheet. [8]

OR

Describe the manufacture of chloral from ethyl alcohol.

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[4317] - 238

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
Voc. Biotech - 221 : Plant and Animal Tissue Culture
(2008 Pattern) (Vocational 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) *All questions carry equal marks.*

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

a) What is micropropagation?

b) Give the role of GA_3 in PTC.

c) What is a culture medium?

d) Enlist any two methods of sterilization.

e) What do you mean by hardening in PTC?

f) Name any two culture media used in ATC.

g) Define continuous cell lines.

h) What is a cell bank?

i) What is organotypic culture?

j) Write any two applications of ATC in medicine.

Q2) Write short notes on any two of the following.   **[10]**

a) Micropropagation.

b) Laminar air flow cabinet.

c) Cell line characterization.

P.T.O.

Q3) Attempt any two of the following. [10]

    a)   Write a note on applications of PTC in agriculture.

    b)   Describe in brief method of monolayer culture.

    c)   Write a note on advantages and limitations of ATC.

Q4) Give detailed account of designing of plant tissue culture laboratory. [10]

OR

What is primary culture? Describe in detail primary culture.

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[4317] - 239

S.Y. B.Sc. (Vocational) (Semester - II)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Colour Photography
(Paper - I) (2008 Pattern)

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

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

Q1) Answer in short. **[16]**

a) Explain the three major attributes of a colour.

b) Explain why is the daylight more blue than a tungsten light.

c) Give suitable examples and explain the difference between a continuous and an intermittent light source.

d) Mention the characteristics of blackbody radiation.

e) State the purpose of the top coat and the subbing in a B/W film.

f) Draw a suitable sketch and explain the rule of golden points in photographic composition.

g) Discuss any two requirements of architectural photography.

h) Discuss the effect of over exposure and under exposure on a photographic image.

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

a) Draw a diagram and explain the colour negative image.

b) Give suitable examples and discuss how is a polarizing filter useful in colour photography.

c) Give suitable examples and compare a hard light source and a soft light source.

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

    a)   Use of 'Histogram' in digital photography.

    b)   Human vision.

    c)   Image formation in a B/W film.

Q4) Attempt any one of the following. **[8]**

    a)   Draw a suitable sketch and explain the typical lighting plan used for a portrait. Clearly mention the nature and the purpose of various lights used in such setup.

    b)   Draw a suitable diagram and discuss the construction of a colour film. Clearly explain the importance of different parts of the film.

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[4317] - 240

S.Y. B.Sc. (Semester - II)
ELECTRONIC EQUIPMENT & MAINTENANCE
VOC - EEM - 221 : Audio, Video and Office Equipments - B
(2008 Pattern) (Vocational Course) (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) *Use of log tables and calculator is allowed.*

Q1) Attempt <u>all</u> of the following :

a) Give two points of comparison between PC and multimedia PC. **[1]**

b) Give different softwares required for multimedia PC. **[1]**

c) What is rolling display? Where is it used? **[1]**

d) Give two applications where touch screens are used. **[1]**

e) What is CCD? Which device of PC use it. **[2]**

f) What is Bar code? State its two applications. **[2]**

g) What is EPABX? Give its Features. **[2]**

h) What is burn in? How to avoid it ? **[2]**

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

a) What is DLP? Compare it with OHP. **[4]**

b) How does a touch screen work? **[4]**

c) Describe the various types of memories used in PC. Give examples with merits. **[4]**

P.T.O.

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

    a)   Give printer types? Explain the operation of any one of them.   **[4]**

    b)   With neat diagram explain the working principle of rolling display.   **[4]**

    c)   Write a note on light pen.   **[4]**

Q4) Attempt the following.

    a)   List different display systems used in electronic equipments. Explain large screen display.   **[6]**

    b)   Describe the steps in creating a plate copy using xerox machine.   **[6]**

<div align="center">OR</div>

    a)   List different scanners. Explain any one of them in details.   **[6]**

    b)   Write short notes on: **[6]**

        i)   Fax.

        ii)   LCD.

<div align="center">✠✠✠✠</div>

[4317] - 241

S.Y. B.Sc. (Vocational) (Semester - II)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
Microprocessor & Interfacing Techniques
(Paper-I) (2008 Pattern)

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: **[4 × 1 = 4]**

  i)   What is Plotter?

  ii) Write full form of WAN?

  iii) Write the storage capacity of a DVD.

  iv) List different types of scanner.

  b) Attempt the following: **[4 × 2 = 8]**

  i)   What is Multimedia PC?

  ii) List the different types of Mouse available.

  iii) Write atleast two function that a LAN performs?

  iv) What is Magnetic disk? State any one advantage of Magnetic disks.

Q2) Attempt any two of the following: **[2 × 4 = 8]**

  a) What is BIOS? Explain functions of BIOS.

  b) Describe computer system peripherals in brief.

  c) Compare Asynchronous and Synchronous Serial Data Communication Protocols.

Q3) Attempt any two of the following: [2 × 4 = 8]

a) Write a note on Green PC.

b) Explain the different types of printer and their advantages and disadvantages.

c) Explain the concept of speech recognition.

Q4) Attempt any two of the following: [2 × 6 = 12]

a) Explain function of display adaptors and write features of any one-display adaptor commonly used.

b) List different storage devices with the storage media they use. Describe their typical features.

c) Describe features of Bluetooth wireless communication standard. State application areas of Bluetooth protocol.

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[4317] - 242

S.Y. B.Sc. (Semester - II)
SEED TECHNOLOGY
Vegetable Seed Production
(Vocational Paper-III) (2008 Pattern)

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 × 1 = 10]**

a) What is sexual reproduction?

b) Define self incompatibility.

c) Give the types of hybridization.

d) Write any two applications of population improvement.

e) Give diagrammatic representation for classifying the vegetable crops based on growing season in vegetables crops.

f) What is the isolation distance for foundation seed production in Okra?

g) Which type of nursery bed is required for growing onion seedlings?

h) Define seed drying.

i) What is CMS?

j) Write any two objectives of vegetable seed production.

Q2) Attempt any Two of the following: **[2 × 5 = 10]**

a) Explain any two vegetative methods of reproduction in vegetable crops.

b) Discuss genetic male sterility in detail.

c) Write the objectives of hybridization techniques in vegetable crops.

Q3) Write notes on (Any Two) :   **[2 × 5 = 10]**

   a) Bulk method.

   b) Progeny selection.

   c) Classification of vegetable crops based on plant parts used for consumption.

Q4) Give an account of seed production in Okra with reference to land requirement, isolation, nursery management, cultural practices, roguing, plant protection, harvesting seed extraction, drying and storage.   **[10]**

                              OR

Give an account of seed production in Onion with reference to land requirement, isolation, nursery management, cultural practices, roguing, plant protection, harvesting, seed extraction, drying and storage.

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[4317] - 243

S.Y. B.Sc. (Semester -II)
INDUSTRIAL MICROBIOLOGY
VOC-IND-MIC-221 : Microbial Fermentations and Downstream Processing
(Vocational) (Paper I) (Theory) (2008 Pattern)

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 the following :   **[10]**

a) Define : 'Primary metabolite'.

b) State whether the statement is true or false glutamic acid is a secondary metabolite.

c) Fill in the blank :

Podbialniak extractor is useful in recovery of _____ antibiotic.

d) Name the enzyme used for removing side chain of penicillin G.

e) Give another name for vitamin B_{12}.

f) Define : 'Partition coefficient'.

g) Name the organism used as bioinoculant for solubilizing phosphate.

h) State any two applications of enzyme amylase.

i) Fill in the blank :

_____ enzyme can be used to lyse fungal cells.

j) Give the action of detergents in the recovery of intracellular products.

Q2) Attempt <u>any two</u> of the following: **[10]**

 a) Enlist the range of centrifuges used for separation of microbial cells from harvested fermentation broth and describe any one in detail.

 b) Draw the flowchart explaining the process of production of bioinoculants.

 c) List the physical methods used for cell disruption. Describe any two of them.

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

 a) Describe the process of manufacturing vinegar.

 b) With the help of diagram explain drying as a process used for final stage of manufacturing of fermentation product.

 c) Explain the principle of affinity chromatography and state how it is used for purifying a product.

Q4) Attempt <u>any one</u> of the following: **[10]**

 a) Describe the phases of methane production by microorganisms using agricultural waste.

 b) Describe the process of batch and continuous distillation process and give its importance in solvent recovery.

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[4317] - 244

S.Y. B.Sc. (Semester - II)
INDUSTRIAL CHEMISTRY
VOC-222 : Industrial Pollution
(Paper - II) (Vocational Course) (2008 Pattern)

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.*

Q1) Answer the following questions. **[16]**

  a) Define salinity of water.

  b) Name of the ill effects of NO_x on materials.

  c) Define lithosphere.

  d) Define biotrophication?

  e) Define fixation of nitrogen.

  f) Define sullage and refuge.

  g) What are the major contents of air?

  h) What is meant by reverse osmosis?

Q2) Attempt <u>any two</u> of the following **[8]**

  a) Describe a method to estimate any two of the following:

  i) chlorine

  ii) Pb

  iii) Hg

  b) Discuss the type of smog.

  c) Discuss methods to remove radio activity from water.

P.T.O.

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

    a)   Organic particulate matter and its ill effect - Explain.

    b)   Write a note on radiation pollution.

    c)   Write a note on tannery waste.

Q4) Describe smog. What are the types? Describe any one briefly.   **[8]**

                      OR

Name the sources of air pollution and describe any two in detail.

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[4317] - 245

S.Y. B.Sc. (Semester - II)
BIOTECHNOLOGY
VOC. Biotech : 222 : Immunology
(Vocational Paper - II) (2008 Pattern)

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.*

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

   a)   Define : Immunogen.

   b)   Give function of IgM in immunity.

   c)   Explain the role of eosinophiles in immunity.

   d)   Give the role of HAT selection in monoclonal antibody production.

   e)   Enlist two examples of attenuated vaccines.

   f)   Name the immunologicals involved in type III hypersensitivity reaction.

   g)   What is Humoral immunity?

   h)   Name atleast any one chemokine.

   i)   What are the cells involved in graft rejection?

   j)   What is neutralisations?

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

   a)   Recombinant vaccines

   b)   Phagocytosis

   c)   NK cells

P.T.O.

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

    a)   Explain in detail IgG and IgM mediated hyper sensitivity.

    b)   Compare and contrast primary and secondary immune response.

    c)   Comment on radial immunodiffusion technique.

Q4) Explain in great detail the types and applications of ELISA.   **[10]**

<p align="center">OR</p>

What are antibodies? Explain in detail the types of antibodies.

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[4317] - 246

S.Y. B.Sc. (Semester - II)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION (Vocational)
Principles & Applications of Analog and Digital Communications
(Paper - II) (2008 Pattern)

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 questions.

  a) State whether the following statements are True or False. **[2]**

  i) AGC is used to keep the receiver output constant.

  ii) Digital communication is preferred over analog communication.

  b) Comment on the following statements. **[4]**
  i) FM is preferred over AM.

  ii) M-QAM and M-PSK are normally used in MODEM for high data transfer rate, where M denotes number of symbols.

  c) Attempt the following. **[6]**

  i) For a PAM transmission of a voice signal with $W = 3kHz$, calculate the transmission bandwidth B_T, if the width of each pulse, τ = $0.1 Tc$ and the sampling frequency $f_s = 8kHz$.

  ii) An ASK transmitter transmits 5kbps. Calculate the minimum bandwidth. Assume transmission to be half duplex.

  iii) A carrier is frequency modulated with a sinusoidal signal of 2kHz resulting in a maximum frequency deviation of 5kHz. Find the modulation index.

Q2) Explain any two of the following. **[8]**

a) Explain the FDM system with the help of a diagram.

b) What are the different types of modulation? Compare the analog and digital modulation.

c) Draw a block diagram and explain the basic communication system.

Q3) Explain any two of the following. **[8]**

a) Explain the sampling theorem on the channel capacity. What is the importance of channel Bandwidth?

b) Compare the Pulse Analog Modulation.(Hint : PAM, PWM and PPM)

c) What is QAM? Explain the 16-QAM with constellation diagram.

Q4) Attempt any two of the following. **[12]**

a) The output voltage of a transmitter is given by $500(1+0.4 \sin 6280t) \sin 3.14 \times 10^7 t$. This voltage id fed to a load of 600 ohm. Determine the carrier frequency, modulating frequency, carrier power and the mean power output.

b) Explain the types of data representation.

c) Explain PCM and discuss encoder and decoder circuit related to it.

OR

Attempt any two of the following.

a) Explain DM and give advantages and disadvantages of digital communication.

b) Explain the working of multiplexer and Concentrator MODEM and compare them.

c) Explain the working of super heterodyne AM receiver with a neat block diagram.

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[4317] - 247

S.Y. B.Sc. (Semester - II) (Vocational)
ELECTRONIC EQUIPMENT MAINTENANCE (EEM)
VOC - EEM-222 : Maintenance & Repair of Audio, Video, Office and Communication Equipment
(2008 Pattern) (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 log table/calculator is allowed.*

Q1) Answer all of the following :

a) What is 'MP3' file ? **[1]**

b) State the advantages of PA system. **[1]**

c) State the operating principle of VCR. **[1]**

d) State the function of 'vertical blanking pulse'. **[1]**

e) Define the working principle of FM radio receiver. **[2]**

f) State the alignment procedure of dish TV system. **[2]**

g) State the possible causes if PC do not boot. **[2]**

h) List the common tools required for troubleshooting of TV. **[2]**

Q2) Answer any two :

a) Draw block diagram of PA system and state the common faults in it. **[4]**

b) State the difference between VCD and DVD. **[4]**

c) State the working principle of LCD monitor. Give its advantages over CRT based monitor. **[4]**

P.T.O.

Q3) Attempt any two :

    a)   Discuss installation plan for a TV receiver and its antenna.   **[4]**

    b)   Explain common faults in inkjet printer and their remedies.   **[4]**

    c)   Write a note on mobile phone. State the common faults in it.   **[4]**

Q4) Answer the following :

    a)   Draw block diagram of B/W TV receiver. State the common faults if it. **[6]**

    b)   Explain with a neat diagram the optical section of ACD player. State the preventive maintenance procedure of ACD player.   **[6]**

<div align="center">OR</div>

Answer the following :

    a)   Explain alignment procedure for AM radio receiver.   **[4]**

    b)   Draw block diagram of LASER printer. Discuss the common faults in it.   **[4]**

    c)   Discuss the procedure for troubleshooting of tape recorder.   **[4]**

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[4317] - 248
S.Y. B.Sc. (Semester - II)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
Computer System Management - II
(Vocational Paper - II) (2008 Pattern)

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: **[4 × 1 = 4]**

     i)   What is a Utility Software?

     ii)   List one PDA Device.

     iii)   State any one Role of a Security Administrator.

     iv)   List one use of a ROUTER.

     b)   Attempt the following :   **[4 × 2 = 8]**

     i)   What is a Device Driver?

     ii)   Give any two roles of a End User.

     iii)   Give any two Flavors of Linux Operating System.

     iv)   List any two Network Devices.

Q2) Attempt any two of the following: **[2 × 4 = 8]**

     a)   What are different roles and responsibilities of a system administrator?

     b)   Write a note on Operations Management.

     c)   Explain the importance of PDA Devices in Modern World.

Q3) Attempt any two of the following :   [2 × 4 = 8]

    a)   Explain the Procedure for Disposal of a Storage Media.

    b)   Give steps to Install a Device Driver for an Ethernet Card in WinXP.

    c)   Give uses of the following:

        i)   Camera.

        ii)   Keyboard.

        iii) Pendrive.

        iv) MIC.

Q4) Attempt any two of the following :   [2 × 6 = 12]

    a)   What are the various components required for assembling a desktop PC?

    b)   Give steps to Install WinXP on a Desktop Harddrive.

    c)   Classify Different types of Users in a Computer System.

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[4317] - 249

S.Y. B.Sc. (Semester - II)
SEED TECHNOLOGY
Seed Quality Control
(2008 Pattern) (Vocational Paper - III)

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 × 1 = 10]**

   a)   Write any one concept of seed quality.

   b)   Define foundation seed.

   c)   Name any two seed certification agencies.

   d)   Write any two objectives of field inspection.

   e)   What is the minimum qualification required for a field inspector?

   f)   Define control legislation.

   g)   Write any two duties of seed inspector.

   h)   Who is responsible for establishment of central seed committee?

   i)   What is the maximum period of a member on central seed committee?

   j)   Draw any two walking patterns in field inspection.

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

   a)   Describe standards for seed certification.

   b)   Comment on seed certification agencies and its organization.

   c)   Explain the powers of seed inspector.

Q3) Write notes on (any two):   [2 × 5 = 10]

   a)   Seed legislation in India.

   b)   Central seed testing laboratory.

   c)   Specific crop standards.

Q4) Describe any two agencies and statutory bodies established in India.   [10]

                    OR

Describe in brief technique of field inspection for seed production plots of straight varieties in cotton.

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SEAT No. :

[Total No. of Pages : 2

[4317] - 250
S.Y. B.Sc. (Vocational Paper - II)
INDUSTRIAL MICROBIOLOGY
VOC. IND.MIC-222 : Quality Assurance in Industrial Products
(Semester - II) (Theory) (2008 Pattern)

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.*

    4)   *Figures to the right indicate full marks.*

    5)   *Use of log tables, calculator is allowed.*

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

    a)   Define "Teratogen".

    b)   What is 'commercially sterile' means?

    c)   State whether the following statement is TRUE/FALSE

         The fluoride content of toothpaste keeps the product sterile.

    d)   AGMARK stands for : _____.

    e)   What is the difference between mutagen and carcinogen?

    f)   Name pathogenic bacteria possibly occur in milk or milk product.

    g)   What is packaged drinking water?

    h)   State whether the following statement is TRUE/FALSE "
         Back mutants are able to grow on medium containing histidine in Ames'
         test.

    i)   State the names of two organisms used in growth promotion assay.

    j)   Give any two desired characters of a test organism used for bioassay.

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

    a)   State the role of SOPs in fermentation industry with the help of suitable example.

    b)   Define allergen. Explain the RAST test in detail.

    c)   Enlist the quality assurance tests carried out for injectable. Describe any one test in detail.

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

    a)   Enlist the biological assays used for assay of fermentation product & Explain turbidometric method in brief.

    b)   Explain the advantages of modified Ames' test.

    c)   Discuss the role of FPO.

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

    a)   Enlist the quality assurance tests carried out for cosmetics & explain any one of them in detail (for suitable product).

    b)   Describe the procedure of checking the presence of pyrogen in an injectible using in vivo method

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[4317] - 214
S.Y.B.Sc. (Semester - II)
STATISTICS
ST - 221 : Statistical Methods and National Income
(2008 Pattern) (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) *Use of calculator and statistical tables is allowed.*
  4) *Symbols and abbreviations have their usual meanings.*

Q1) Attempt each of the following :

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

   i) The regression planes coinside if _____ .

   A) $|R| = 0$ B) $|R| = 1$

   C) $|R| > 0$ D) $|R| \# 1$

   ii) If r is sample correlation coefficient then Fisher's Z transformation gives Z = _____ .

   A) $\frac{1}{2}\log_e\left(\frac{1-r}{1+r}\right)$ B) $\log\left(\frac{1+r}{1-r}\right)$

   C) $\log\left(\frac{1-r}{1+r}\right)$ D) $\frac{1}{2}\log\left(\frac{1+r}{1-r}\right)$

   iii) In order to combine two series of index numbers,

   A) Recalculate all index numbers

   B) Use splicing

   C) Use deflating

   D) Shift base years of both series

iv) If var $(X_{1.23}) = 0$ then
A) $R_{1.23} = 0$ B) $R_{1.23} = 1$

C) $R_{1.23} = \dfrac{1}{2}$ D) $R_{1.23} = \dfrac{1}{4}$

b) State whether the given statement is true or false in each of the following : **[1each]**
   i) $b_{12.3} \ b_{13.2} = r^2_{1.23}$
   ii) NNP is greater than GNP.

   .

c) Define the term 'statistic'. **[1]**
d) Define the term 'Real wages'. **[1]**
e) A sample of 900 ball bearing is found to have average weight of 12.5 grams. Can we assume that a sample is coming from a population with mean 13? It is given that population standard deviation is 1 gram. **[1]**
f) Find $R_{1.23}$ if $r_{12} = 0.6$ and $r_{13.2} = 0.4$. **[1]**

Q2) Attempt any TWO of the following : **[5 each]**
a) With usual notations, prove that necessary and sufficient condition for the three regression planes to coinside is $r^2_{12} + r^2_{13} + r^2_{23} - 2r_{12} \ r_{13} \ r_{23} = 1$.

b) Derive the formula for multiple correlation coefficient $R_{1.23}$ in terms of total correlation coefficients.

c) Describe the test procedure to test H_0: $p = p_0$ against the alternative hypothesis:
   i) $H_1 : p > p_0$ ii) $H_1 : p < p_0$ iii) $H_1 : p \neq p_0$

Q3) Attempt any TWO of the following : **[5 each]**
a) Find the value of cost of living index number for year 2012 using following information:

Group of items	Price in 2011	Price in 2012	Percentage Expenditure
Food	200	250	30
House rent	140	150	20
Clothing	125	140	15
Fuel	120	125	15
Others	150	175	20

b) Explain any one method of estimating national income.

c) Explain the large sample test procedure to test $H_0 : \rho_1 = \rho_2$ against

i) $H_1 : \rho_1 < \rho_2$ ii) $H_1 : \rho_1 > \rho_2$ iii) $H_1 : \rho_1 \# \rho_2$ where ρ_1 and ρ_2 are the population correlation coefficients of two different bivariate normal parent populations from which independent samples are drawn.

Q4) Attempt any one of the following :

a) i) Derive the expression for the partial correlation coefficient $r_{12.3}$ in terms of total correlation coefficients. Also show that if $r_{12.3} = 0$ then $r_{12} \neq 0$. **[6]**

   ii) Discuss the advantages and disadvantages of chain base index number as compared to fixed base index number. **[4]**

b) i) Derive the equation of least square regression plane of X_1 on X_2 and X_3. **[7]**

   ii) Determine NNP at factor cost given the following : **[3]**

   GNP at market prices = 1,00,000 crores Rs.

   Indirect taxes = 7000 crores Rs.

   Subsidies = 2000 crores Rs.

   Depreciation = 9000 crores Rs.

   Further find NDP if net income from abroad is 2000 crores Rs.

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S.Y.B.Sc. (Semester - II)
STATISTICS

ST - 222 : Continuous Probability Distributions - II and Demography
(2008 Pattern) (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 meanings.*

Q1) a) Choose the correct alternative in each of the following :   **[1 each]**

   i) A chisquare random variable has variance 12, then its mode is _____.

   A) 6   B) 24

   C) 4   D) Does not exist

   ii) If X follows t distribution with 5 degrees of freedom then X^2 follows _____ .

   A) t_{25} B) $F_{(1,5)}$

   C) $F(5,1)$ D) χ^2_{25}

   iii) Crude Death Rate (CDR) per person gives the probability of a _____ .

   A) male will die in a year of reference

   B) female will die in a year of reference

   C) person will die in a year of reference

   D) person will survive in a year of reference

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

    i) Chisquare distribution is symmetric.

    ii) Critical region is a subset of sample where null hypothesis is rejected.

    iii) Gross Reproduction Rate (GRR) is always greater than Net Reproduction Rate (NRR).

c) State the moment generating function of chisquare distribution with 10 degrees of freedom. **[1]**

d) If X and Y are independent chisquare random variables with 10 and 12 degrees of freedom, state the probability distribution of $U = 12\,X\,/\,10Y$. **[1]**

e) State the test statistic used to test the significance of population correlation coefficient ρ. **[1]**

f) Give one situation where paired t test can be used . **[1]**

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

a) State and prove additive property of chi-square distribution.

b) If X follows f distribution with n_1 and n_2 degrees of freedom, then find the probability distribution of $\dfrac{1}{X}$.

c) Describe the test procedure for testing equality of means of two normal populations whose variances are unknown but equal.

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

a) If X follows F distribution with degrees of freedom n and n; then show that the first and the third quartiles are reciprocals of each other.

b) Derive the mean and variance of t distribution with n degrees of freedom.

c) Write a note on chi-square test for goodness of fit.

Q4) Attempt any one of the following :

a) i) Show that t distribution tends to N(0,1) as the degrees of freedom tend to infinity. **[5]**

ii) Let $\overline{X}$ and S^2 be the mean and variance of a random sample of size 25 from N(3,100) distribution. Compute

$P (0 \le \overline{X} \le 6, 55.2 \le S^2 \le 145.6)$. **[5]**

b) i) The following table shows the classification of persons according to residential area and respiratory diseases.

Residential area	Respiratory Disease	
	Present	Absent
Farm	20	130
Around Factory	40	60

Test whether respiratory disease depend upon residential area. Use 5% level of significance. **[5]**

ii) Compute General Fertility Rate (GFR) and Total Fertility Rate (TFR) for the following population.

Age - group	20-25	25-30	30-35	35-40	40-45
Female population	8000	10000	12000	6000	2000
Number of births	40	110	84	35	2

[5]

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