[5522] - 201

S.Y.B.Sc. (Regular)
MATHEMATICS
MT - 221 : Linear Algebra
(2013 Pattern) (Semester - II) (Paper - I) (81112)

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

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

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

    a)   Let $w = \{(x,1,2) | x \in \mathbb{R}\}$. Is W a subspace of $\mathbb{R}^3$? Justify.

    b)   State sylvester's inequality.

    c)   Let $\mathbb{C}$ be a real vector space, show that $B = \{2+3i, 5-6i\}$ is linearly independent set.

    d)   If $p = x - 5x^3$ and $q = 2 + 8x^2$, compute $\langle p, q \rangle$ using the inner product

$$\langle p,q \rangle = \int_{-1}^{1} p(x)q(x)dx.$$

    e)   Let $\mathbb{R}^4$ have the Euclidean inner product. Find the cosine of the angle between the vectors $\bar{u} = (-1, 2, 3, 4)$ and $\bar{v} = (4, 1, 2, 1)$.

    f)   Determine whether the transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ defined as T(x, y) = (−y, x) is a linear transformation.

    g)   Define similar matrices.

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

    a)   Let V be a n dimensional vector space and $S = \{\bar{v}_1, \bar{v}_2, ..., \bar{v}_r\}$ be linearly independent set in V, r < n then prove that S can be extended to a basis $S' = \{\bar{v}_1, \bar{v}_2, ..., \bar{v}_r, \bar{v}_{r+1}....\bar{v}_n\}$ of V.

b) For $\bar{u}=(x,y), \bar{v}=(x',y')$ in $\mathbb{R}^2$ and $\alpha \in \mathbb{R}$ define vector addition and scalar multiplication as $\bar{u}+\bar{v}=(xx', yy')$, $\alpha\bar{u}=(\alpha x, \alpha y)$.

Determine whether $\mathbb{R}^2$ is a real vector space.

c) Find basis for the subspace of $\mathbb{R}^3$ spanned by the vectors (1,2, –1), (4, 1, 3), (5, 3, 2) and (2, 0, 2).

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

a) Show that for the vectors $\bar{u}=(u_1,u_2)$ and $\bar{v}=(v_1,v_2)$ in $\mathbb{R}^2$,

$\langle u,v \rangle = 3u_1v_1 + 5u_2v_2$ defines an inner product on $\mathbb{R}^2$.

b) State and prove Cauchy - Schwarz inequality.

c) Let $\mathbb{R}^3$ have the Euclidean inner product, use Gram - Schmidt process to convert basis $B=\{u_1u_2,u_3\}$ where $u_1=(1,1,1), u_2=(-1,1,0)$ and $u_3=(1,2,1)$ into an orthonormal basis.

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

a) i) Let T : V → W be a linear transformation then prove that the range of T is a subspace of W.

ii) Let $T:\mathbb{R}^3 \rightarrow \mathbb{R}^2$ be a linear transformation defined by $T(x,y,z)=(x+y+z, y+z)$. Find the matrix of T with respect to the bases $B=(-1,0,2),(0,1,1),(3,-1,0)$ and $B'=\{(-1,1),(1,0)\}$ of $\mathbb{R}^3$ and $\mathbb{R}^2$ respectively.

b) i) Let $T:\mathbb{R}^3 \rightarrow \mathbb{R}^3$ be the linear transformation given by the formula $T(x,y,z)=(x+y-z, x-2y+z, -2x-2y+2z)$ find a basis and dimension of kernel of T.

ii) Show that $B=\{p_1,p_2,p_3\}$ where $p_1=1+2x+x^2$, $p_2=2+x$, $p_3=1-x+2x^2$ is a basis for p_2 the set of all polynomials of degree less than or equal to two.

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[5522] - 202

S.Y.B.Sc.

MATHEMATICS

MT : 222 (A)- Multivariable Calculus - II

(2013 Pattern) (Semester - II) (Paper - II) (811A2)

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

Instructions to the candidates:

1)   All questions are compulsory.

2)   Figures to the right indicate full marks.

Q1) Attempt any five of the following.   **[10]**

a)   If $\overline{f}(t)=(t^2-1)\overline{i}+(4t-3)\overline{j}+\left(2t^2-\dfrac{t}{2}\right)\overline{k}$ then find $\lim\limits_{t\to 2}\overline{f}(t)$.

b)   If $\overline{r}(t)=\cos t\,\overline{i}+\sin t\,\overline{j}+\tan t\,\overline{k}$ then find $\dfrac{d\overline{r}}{dt}$ and $\left|\dfrac{d\overline{r}}{dt}\right|$ at $t=\dfrac{\pi}{4}$.

c)   If $\overline{f}=(2y+3)\overline{i}+(xz)\overline{j}+(yz-x)\overline{k}$ then evaluate $\displaystyle\int_c \overline{f}\cdot d\overline{r}$ along the path

$c:\overline{r}(t)=2t^2\,\overline{i}+t\,\overline{j}+t^3\,\overline{k}$ from $t=0$ to $t=1$.

d)   Determine whether $\overline{F}=(\cos y+y\cos x)\overline{i}+(\sin x-x\sin y)\overline{j}$ is a conservative vector field.

e)   Find gradient of function $\phi=x^2y+2z$ at the point P(2, 1, 0).

f)   State Gauss Divergence Theorem.

g)   If S is any closed surface enclosing a volume V and $\overline{F}=x\overline{i}+2y\overline{j}+3z\overline{k}$

then prove that $\displaystyle\iint_s \overline{F}\cdot\overline{n}\,ds=6V$.

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

a)   Prove that a differentiable vector function $\overline{u}$ of a scalar variable t to be

of constant magnitude if and only if $\overline{u}\cdot\dfrac{d\overline{u}}{dt}=0$.

b) Find the work done by the force field $\overline{F}(x,y,z) = xy\overline{i} + yz\overline{j} + xz\overline{k}$ on a particle that moves along the curve $c : \overline{r}(t) = t\overline{i} + t^2\overline{j} + t^3\overline{k}$, $(0 \le t \le 1)$.

c) Find the surface area of the cone $z = \sqrt{x^2 + y^2}$, $0 \le z \le 1$ by using a parametrization.

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

a) Prove that the following statements are equivalent.

i) $\int \overline{F}.d\overline{r} = 0$ around every closed loop in domain D.

ii) The field $\overline{F}$ is conservative on the domain D.

b) Show that $\overline{r} = \overline{a}\,e^{kt} + \overline{b}\,e^{lt}$ is a solution of the differential equation

$$\frac{d^2\overline{r}}{dt^2} + p\frac{d\overline{r}}{dt} + q\overline{r} = 0 \text{ where } k \text{ and } l \text{ are the roots of the equation}$$

$m^2 + pm + q = 0$, $\overline{a},\overline{b}$ are constant vectors and p,q are constant scalars.

c) Use stoke's theorem to evaluate $\int\limits_c \overline{F}.d\overline{r}$ if $\overline{F} = 4xz\overline{i} - y^2\overline{j} + yz\overline{k}$ over the area in the plane $z = 0$ bounded by $x = y = 0$ and $x^2 + y^2 = 1$.

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

a) Let R be a simply connected plane region whose boundary is a simple, closed piecewise smooth curve C oriented counter clockwise. If M and N are continuous functions of x and y having continuous partial derivatives in R, then prove that $\oint\limits_C (Mdx + Ndy) = \iint\limits_R \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right) dxdy$.

b) i) Find the unit tangent vector and the curvature at a point $p(x, y, z)$ on the curve $x = 3\cos t$, $y = 3\sin t$, $z = 4t$.

ii) Evaluate $\iint\limits_S (x\overline{i} + y\overline{j} + z^2\overline{k}).\overline{n}\,ds$; where S is the closed surface bounded by the cone $x^2 + y^2 = z^2$ and the plane $z = 1$.

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

MATHEMATICS

MT - 222(A) : Multivariable Calculus - II

(2013 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) Attempt any five of the following :   **[10]**

    a)   A function $\bar{f}(t)$ is defined by

$$\bar{f}(t)=\left(\frac{t^2-1}{t-1}\right)\bar{i}+t^3\bar{j} \; ; t \neq 1$$
$$=2\bar{i}+\bar{j} \; ; t=1$$

        Show that $\bar{f}(t)$ is continuous at t = 1

    b)   Find unit tangent vector for the plane curve $\bar{r}(t)=(2t+3)\bar{i}+(5-t^2)\bar{j}$, t > 0.

    c)   Find the Flux of the vector field. $\bar{f}(x,y)=x\bar{i}+y\bar{j}$ across the circle $\bar{r}(t)=\cos t\,\bar{i}+\sin t\,\bar{j}$, $0 \leq t \leq 2\pi$.

    d)   Find curl of the vector field $\bar{f}(x,y,z)=x^2y\bar{i}+2y^3z\,\bar{j}+3z\bar{k}$.

    e)   Evaluate $\int_C 2xdx+2ydy+2zdz$ from (0, 0, 0) to (2, 3, –6) along the line segment C.

    f)   Find a parametrization of the paraboloid $z = x^2 + y^2$, $0 \leq z \leq 4$.

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

a) If $\bar{f}(t)=f_1(t)\bar{i}+f_2(t)\bar{j}+f_3(t)\bar{k}$ is a differentiable vector function of a scalar variable t then show that $f_1(t), f_2(t), f_3(t)$ are differentiable scalar functions of scalar variable t.

b) A coil spring lies along the helix $\bar{r}(t)=\cos 4t\,\bar{i}+\sin 4t\,\bar{j}+t\bar{k}$, $0\le t\le 2\pi$. The spring's density is given by $\delta(x, y, z) = x^2 + y^2 + 2z$. Find the spring's mass.

c) Find the value of $\iint_S \bar{f}.\bar{n}\,ds$ by using Gauss divergence theorem; where

$\bar{f}=x\bar{i}-y\bar{j}+\left(z^2-1\right)\bar{k}$ and s is the cylinder formed by the surface $z=0$, $z = 1$, $x^2 + y^2 = 4$.

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

a) Let $\bar{f}$ be a vector field whose components are continuous throughout an open connected region D in Space. if there exists a differentiable function f such that $\bar{f}=\nabla f$ then prove that for all points A and B in D

the value of $\displaystyle\int_A^B \bar{f}.d\bar{r}$ is independent of the path from A to B in D.

b) Find the curvature for the helix $\bar{r}(t)=a\cos t\,\bar{i}+a\sin t\,\bar{j}+bt\bar{k}$, $a, b \ge 0$ and $a^2 + b^2 \ne 0$.

c) By using parameterization, find the surface area of a sphere of radius a.

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

a) Let $\bar{f}(t)=f_1(t)\bar{i}+f_2(t)\bar{j}+f_3(t)\bar{k}$ be a vector function of a scalar variable t and $\bar{L}=l_1\bar{i}+l_2\bar{j}+l_3\bar{k}$ be a constant vector function. Then show that $\displaystyle\lim_{t\to t_0}\bar{f}(t)=\bar{L}$ if and only if $\displaystyle\lim_{t\to t_0}f_1(t)=l_1, \lim_{t\to t_0}f_2(t)=l_2, \lim_{t\to t_0}f_3(t)=l_3$.

b) i) Find work done by $\overline{f} = z\overline{i} + x\overline{i} + y\overline{k}$ over the curve $C : \overline{r}(t) = \sin t\,\overline{i} + \cos t\,\overline{j} + t\overline{k}\ \ 0 \le t \le 2\pi.$

ii) Show that $\iint_s (ax\overline{i} + by\overline{j} + cz\overline{k}).\overline{n}\, ds = \dfrac{4}{3}\pi(a+b+c);$ where s is the surface of the sphere $x^2 + y^2 + z^2 = 1.$

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S.Y.B.Sc.

MATHEMATICS (Paper - II)

MT - 222 (B) : Numerical Methods and Its Applications

(2013 Pattern) (Semester - II) (811B2)

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 non programmable scientific calculator is allowed.

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

   a)   IF $y = \operatorname{cosec}^2 x$ then find the error in 'x'.

   b)   Evaluate the sum $S = \sqrt{3} + \sqrt{5} + \sqrt{11}$ to four significant digits and find its relative error.

   c)   Show that $\mu = \dfrac{1}{2}\left(E^{\frac{1}{2}} + E^{-\frac{1}{2}}\right)$.

   d)   Prove that $\delta = E^{-\frac{1}{2}} \Delta$.

   e)   Write normal equations to fit second degree polynomial.

   f)   State simpson's $\dfrac{1}{3}$ rd rule.

   g)   Round - off the following numbers to four decimal places.
       $2 \cdot 7694,\ 40 \cdot 0468, 0 \cdot 467268,\ 2 \cdot 26357,\ 35 \cdot 472163$

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

   a)   Find the root of the equation $3x = \cos x + 1$ using iteration method.

   b)   Using newtons Raphson method, find root of $x + \log x = 2$.

   c)   Marks obtained by the candidates in an examination are given as under

Marks obtained	10-20	20-30	30-40	40-50	50-60
No. of Candidates	42	45	39	48	19

Find the number of candidates who obtained less than 44 mark.

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

a) Find the missing figures in the following:

x	2.0	2.1	2.2	2.3	2.4	2.5	2.6
y	0.135	?	0.111	0.100	?	0.082	0.074

b) Derive Newton general interpolation formula.

c) Find the function of the type $y = ce^{xd}$ for the data

x	1	2	3	4
y	60	30	20	15

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

a) i) Derive simpson's $\frac{3}{8}$th rule.

   ii) By using Runge kutta fourth order method find $y(1)$ if $\frac{dy}{dx} = \frac{x^2 + y^2}{10}$ $y(0) = 1, h = 1$.

b) i) Evaluate $\int_0^1 x^2 dx$ by Trapezoidal Rule take $h = 0.1$.

   ii) Use Euler's modified method to find $y(0.02)$. Given $\frac{dy}{dx} = x^2 + y$ with $y(0) = 1$. Take $h = 0.01$.

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S.Y. B.Sc. (Regular)
PHYSICS
PH - 221: Oscillations, Waves and Sound
(2013 Pattern) (Semester- II) (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) *Draw the neat diagrams wherever necessary.*
4) *Use of logtables and calculator is allowed.*

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

a)   State the differential equation for angular simple harmonic motion.

b)   What are forced oscillations? Give two examples.

c)   Give the condition for overdamped oscillations.

d)   The equation of wave motion is Y=7sin $(0.1\,\pi\,X - 40\,\pi\,t)$. Find frequency of wave motion.

e)   The value of capacitor is 1×10^{-6} F, inductor 40×10^{-3} H and resistance $100\,\Omega$ joined in series. Determine electrical oscillatory circuit.

f)   Why "Universe is expanding"?

g)   State on which factors velocity of longitudinal wave depends.

h)   Calculate the change in intensity level, when intensity level increase by 10^{6} time its original intensity.

i)   What are Lissajous figures.

j)   Define :

   i)   Decibel

   ii) Intensity of sound.

Q2) Attempt any Two of the following :

a) Define quality factor in damped oscillations. Show that the frequency of damped oscillations is expressed as $v_d = v\sqrt{1 - \dfrac{1}{4Q^2}}$ where Q is quality factor. **[5]**

b) Give an analytical treatment for composition of two S.H.M.s perpendicular to each other and having their frequencies in the ratio 1 : 2. Discuss the case when the phase difference is zero and $\dfrac{\pi}{2}$ radians. **[5]**

c) Define reverberation time of a hall. Explain clearly what causes reverberation and how it can be minimized. **[5]**

Q3) Attempt any Two of the following :

a) The motion of oscillator along X-axis is determined by equation $\left(\dfrac{d^2x}{dt^2}\right) + 4\left(\dfrac{dx}{dt}\right) + 8x = 20\sin 2t$ where quantities are in SI unit. If motion starts from the origin, find **[5]**

   i) Amplitude

   ii) Phase difference between the applied force and displacement

   iii) Period

   iv) Frequency of steady state vibrations.

b) A 5.0 kg block extends a spring 25cm from its unstretched position. The block is removed and a body 0.7 kg is hung from the same spring.If the spring is then stretched and released, what is its period of motion? **[5]**

c) The equation for critically damped motion given in the form

   $5\left(\dfrac{d^2x}{dt^2}\right) + 20\left(\dfrac{dx}{dt}\right) + kx = 0$

   Determine the value of k. **[5]**

Q4) A) Attempt any One

    a) i) Discuss the phenomenon of sharpness of resonance and show how it depends on the damping factor. **[4]**

       ii) The equation of longitudinal wave is expressed by $l=l_0 \sin 2\pi (0.1X-34t)$ where X and t are measured in meters and seconds respectively. Find the wave velocity. **[4]**

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

    b) i) Obtain an expression for energy density of plane progressive wave propagating through a medium. **[4]**

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

  B) Attempt any One

    i) A auditorium of volume $5500 m^3$ is found to have a reverberation time 2.5sec. The sound absorbing surface area $750 m^2$ Calculate the average absorption coefficient of the auditorium. **[2]**

    ii) Explain the term violet shift. **[2]**

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S.Y.B.Sc. (Regular)
PHYSICS - II
PH-222: Optics
(2013 Pattern) (Semester - II) (Paper - II)

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

Instructions to the candidates:
1) *All the questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of calculators and log tables are allowed.*
4) *Neat diagrsms must be drawn wherever necessary.*
5) *Symbols have their ususal meanings.*

Q1) Attempt all of the following
a) What are the seidel aberrations? **[1]**
b) Find the distance between the two lenses of focal lengths 12.cm and 8cm, if their combination is free from spherical aberration. **[1]**
c) Define the term "Magnification" by the lens. **[1]**
d) The angle of polarization for a glass plate is 57°. calculate refractive index of glass plate. **[1]**
e) What do you mean by power of the lens? **[1]**
f) Why is the Ramsden eyepiece is called positive eye piece? **[1]**
g) State the cause of chromatic aberration. **[1]**
h) What do you mean by fringes of equal thickness. **[1]**
i) State the term, 'Resolving power' of an optical instrument. **[1]**
j) What is double refraction? **[1]**

Q2) Attempt any two of the following:
a) Draw the ray diagram of simple microscope and derive an expression for MP of microscope under conditions. **[5]**
   i) image at DDV and
   ii) image at infinity
b) Discuss the formation of interference fringes due to wedge shaped film and obtain the Eq^n of path difference $\Delta = 2\mu d \cos(\beta + \gamma)\dfrac{-\lambda}{2}$. **[5]**
c) Explain, what is meant by spherical aberration for a lens. Explain any three ways to minimise it. **[5]**

Q3) Attempt any Two of the following.

    a)   The focal lengths of lenses in Huygen eyepiece are 6cm. and 2cm Find the distance between the lenses, equivalent focal length, Principal points and locate them.   **[5]**

    b)   Unpolarized light falls on two polarizing sheets placed one on top of other what must be the angle between the characteristic directions of the sheets if intensity of transmitted light is one third of intensity of incident beam.   **[5]**

    c)   Transperent parallel sided film of thickness 1.5×10^{-6}m and refractive index 1.33 is illuminated by white light incident at angle 45°. The light reflected by it is examined by spectrometer. The dark band corresponding to wavelength 4850A° is observed calculate the order of corresponding dark band.   **[5]**

Q4) A)   Attempt (a) or (b) of the following.

    a)   i)   Considering the refraction of light at two curved faces, derive the leans maker's formula.   **[4]**

            ii)   Obtain the condition of achromation when two co-axial thin lenses are kept apart by finite distance.   **[4]**

    b)   i)   Show that the distance of the second principal plane from the second lens of optical system is given by $\beta = \dfrac{xf}{f_1}$.   **[4]**

            ii)   Explain the Rayleigh criterion of resolution.   **[4]**

  B)   Attempt one of the following.

    a)   Two thin lenses of focal length 10cm and 15cm are arranged coaxially. Find the equivalent focal length of combination when the lenses are i) incontact ii) separated by distance 4cm.   **[2]**

    b)   State the two differences between ordinary ray and extra ordinary ray.   **[2]**

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S.Y. B.Sc. (Regular)
CHEMISTRY - II
CH - 222 : Organic and Inorganic Chemistry
(2013 Pattern) (Semester-II) (Paper-IV)

Time : 2 Hours] *[Max. Marks : 40*
Instructions to the candidates:
   1) *Answer of the two sections should be written on same answer books.*
   2) *All questions are compulsory.*
   3) *Neat diagram must be drawn wherever necessary.*

SECTION - I
(Organic Chemistry)

Q1) Attempt the following: **[5]**
   a) Draw chair form of β - D Glucopyranose.
   b) Identify wether following compounds are aromatic or non aromatic.
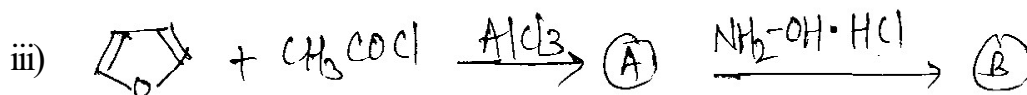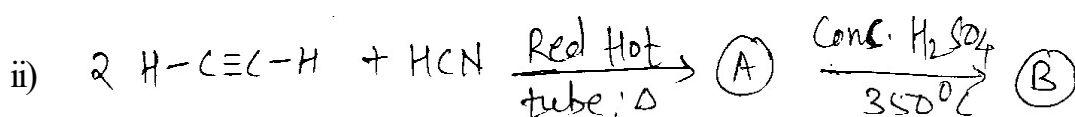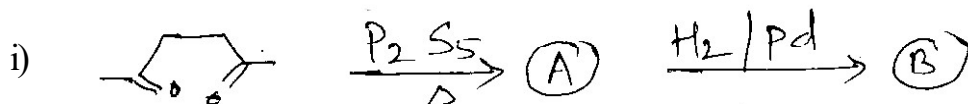

   c) Give the reagent to convert ethylacetate to ethanol.
   d) What is reagent used for Birch reduction.
   e) What is isoelectric point of amino acid.

Q2) a) Answer any two of the following: **[6]**
   i) Give skraup synthesis.
   ii) Discuss the mechanism of formation of trans diol using per acid.
   iii) What are proteins? Dicuss steps involved in formation of dipeptide.
   b) Assign A & B in the following reaction (any two) **[4]**

   i)

   ii) $2\ H-C\equiv C-H + HCN \xrightarrow[\text{tube}; \Delta]{\text{Red Hot}} (A) \xrightarrow[350^\circ C]{\text{Conc. } H_2SO_4} (B)$

   iii)

Q3) Attempt any two of the following: [5]
    a) Write a note on Birch reduction.
    b) Discuss Ruff degradation method for aldohexose.
    c) What are proteins? Explain primary and secondary structures of protein.

SECTION - II
(Inorganic Chemistry)

Q4) Answer the following: [5]
    a) Write electronic configuration of Cr. [At. No.=24]
    b) What is metal carbonyl>
    c) Name the metal ion in ouch-ouch disease.
    d) Define the acid & base according to lewis concept
    e) What is Amphiprotic solvents?

Q5) a) Answer any two of the following: [6]
      i) What is spin only formula? Calculate the magnetic moment of Cr^{2+}, and Co^{2+} using spin only formula [At. No. Cr = 24, Co = 27]
      ii) Explain the catalytic cycle for Hydroformylation.
      iii) What is levelling effect? Explian the levelling effect on strength of acids. [4]
    b) Attempt any two of the following:
      i) Why HI is stronger acid than HF? Explain.
      ii) Count the total number of electron in following metal carbonyls. [At. No Fe = 26, Ni = 28]
        a) $Fe (Co)_5$
        b) $Ni (Co)_4$
      iii) Why the compounds of d - block elements are coloured? Explain.

Q6) Answer any two of the following: [5]
    a) Draw the structure of
      i) $Ir_4 (Co)_{12}$
      ii) $Cr (Co)_6$
    b) Write a short note on biochemical methylation
    c) What are the 'd' block elements? Explain the catalytic behaviour of d-block elements?

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[5522] - 208
S. Y. B. Sc (Regular)
BOTANY
BO:221:Plant Anatomy and Embryology
(2013 Pattern) (Semester-II) (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)   What is parenchyma?

    b)   What is epidermal tissue?

    c)   What is incompressibility?

    d)   Give the type of V.B. in monocot stem.

    e)   What are tyloses?

    f)   Define embryology.

    g)   What is microsporogenesis?

    h)   Define ovule.

    i)   What is entomophily?

    j)   What is Anomalous Secondary growth?

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

   a)   Explain the structure and functions of phloem.

   b)   Describe epidermal out growths.

   c)   Explain the process of development of Helobial endosperm.

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

   a)   Principle of inextensibility

   b)   Tetrasporangiate an ther

   c)   Structure of female gametophyte.

Q4) Describe the process of normal secondary growth in <u>Helianthus annus</u> stem.
                                                                                                                                [10]

OR

What is embryosac? Explain the process of development of monosporic embryo sac with suitable example.   **[10]**

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S. Y. B. Sc.(Regular)
BOTANY
BO-222:Plant Bio technology
(2013 Pattern) (Semester-II) (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.*

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

   a)   Define gene cloning.

   b)   What are nanofertilizers?

   c)   Write any two industrial applications of fermentation.

   d)   What is enzyme immobilization?

   e)   Enlist any two vectors used in plant genetic engineering.

   f)   What are transgenic plants?

   g)   Write any two applications of nanobiotechnology.

   h)   Give any two importance of biotechnology in medicine.

   i)   Enlist any two methods of phytoremediation.

   j)   What is SCP?

P.T.O.

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

    a)   Describe acceptability of SCP.

    b)   Explain advantages of plant genetic engineering in herbicide resistance.

    c)   Describe restriction enzymes.

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

    a)   Structure of DNA

    b)   Biolistic gene transfer method

    c)   Phyto stabilization.

Q4) What are enzymes? Describe production of amylase and add a note on it's applications. **[10]**

OR

What are bioreactors? Describe in detail tubular tower bioreactor. **[10]**

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[5522]-210

S.Y. B.Sc.

ZOOLOGY (Regular)

ZY - 221 : Animal Systematics and Diversity-IV

(2013 pattern) (semester- II) (paper-I)

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

Instructions to the candidates:

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

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

    a)   Write any two examples of subclass neornithes.

    b)   Write the names of any two chambers of heart of scoliodon.

    c)   Write any two advantages of bird migration.

    d)   Write any two names of poisonous snakes.

    e)   Mention the names of I^{st} and X^{th} cranial nerves of scoliodon.

    f)   What is holobranch?

    g)   Write any two examples of aquatic mammals.

    h)   What is homodont dentition.

    i)   Enlist any two eye ball muscles of scoliodon.

    j)   Write any two examples of tearing and piercing beak.

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

    a)   Desert adaptations in reptiles.

    b)   Ampullae of lorenzini.

    c)   Cursorial and swimming types of feet in birds.

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

    a)   Write distinguishing characters of subclass diapsida.

    b)   Sketch and label dorsal view of brain of scoliodon.

    c)   Write any five aerial adaptations in birds.

Q4) Describe female reproductive system of scoliodon.   **[10]**

OR

Explain general characters of class mammalia and distinguishing charactersof prototheria.

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[5522]-211

S.Y. B.Sc.

ZOOLOGY

ZY - 222 : Applied Zoology - II

Apiculture and Sericulture

(2013 Pattern) (Paper - II) (Semester - II)

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

Instructions to the candidates:

1) All questions are compulsory and carry equal marks.

2) neat labelled diagrams must be drawn wherever necessary.

3) Figures to the right indicate full marks.

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

     a)   What is nuptial flight?

     b)   Write any two pests of silkworm.

     c)   Enlist any two protozoan diseases of Honey bee.

     d)   What is moriculture?

     e)   Explain alarm dance in Honey bee.

     f)   Write the biological name of mulberry silkworm.

     g)   Write the use of bee smoker.

     h)   What is multivoltine?

     i)   Write any two uses of bee venom.

     j)   Write the fungal disease of silkworm.

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

     a)   Worker Honey bee

     b)   Mounting methods of silkworm larvae

     c)   Wax moth

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

     a)   Sketch and label Honey extractor.

     b)   Describe post harvest processing of cocoons.

     c)   Describe muscardine disease in silkworm.

Q4) What is bee keeping? Explain seasonal management.

                                                [10]

OR

Describe life cycle of Bombyx mori.

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[5522] - 213
S. Y. B. Sc.
GEOLOGY
GL 222: Stratigraphy and Paleontology
(2013 Pattern) (Semester - II) (Paper - II)

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

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

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

a) Index fossil

b) Calliper log

c) Assembledge zone

d) Enlist physical factors affecting stratification

e) Satelre lines in Ammonoids

f) What is outcrop?

g) Evaporites

h) Marker bed

i) Magneto Stratigraphy

j) Palaeo-ecological significance of astracodes.

Q2) Answer the following (any two)   [10]

a)   Explain laboratory techniques for seperation of microfossils

b)   Explain the principles of stratigraphy

c)   Enlist physical evidences for correlation and explain uses of electrical log in correlation.

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

a)   Explain the branches of micropalaentology

b)   Litho Statigraphic Units

c)   Patterned succession

Q4) Define term Evolution, write a note on evolutionary trends in trilobites.   [10]

OR

Give the systematic position, morphology, environment, and palaeoecology of foraminifers.   [10]

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[5522]-214

S.Y. B.Sc. (Regular)
STATISTICS
ST - 221 : Statistical Methods and Use of R-Software
(2013 Pattern) (Semester - II) (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 scientific calculator and statistical table is allowed.*
4) *Symbols and abbreviation have their usual meaning.*

Q1) Attempt each of the following.

    a) Choose the correct alternative for each of the following.   **[1 each]**

        i) If $4y + 16x_1 - 8x_2 = 90$ is the equation of regression plane of y on x_1 and x_2 then the value of regression coefficient by $x_1 \cdot x_2$ is equal to

            a) 4   b) -4

            c) $\dfrac{1}{4}$ d) $-\dfrac{1}{4}$

        ii) Tyep I error is
            a) accepting H_0, When it is true
            b) rejecting H_0, When it is true
            c) accepting H_0, When it is false
            d) rejecting H_0, When it is false

        iii) The following death rate is used for comparison of mortality of two populations A and B.
            a) CDR
            b) infant death rate
            c) male death rate
            d) standardized death rate

    b) State whether each of the following statements is true or false. **[1 each]**
        i) Null hypothesis is rejected if p-value is greater than the level of significance.
        ii) Fertility rate mainly depends on female population of child bearing age.
        iii) When number of arrivals have Poisson distribution then interarrival service times follows exponential distribution.

c) Define infant mortality rate. **[1]**

d) Define level of significance (l.o.s). **[1]**

e) Define traffice density in queuing theory. **[1]**

f) Write a commond in R-Software to draw a random sample of size 5 out of 50 units by SRSWOR and store it in a vector. **[1]**

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

a) Derive the formula for partial correlation coefficient $r_{yx_1 \cdot x_2}$ $(ie\, r_{12.3})$ in terms of total correlation coefficients.

b) Describe the test procedure to test $H_0 : P = P_0$ against $H_1 : P > P_0$ or P α P_0 or P $\neq P_0$, where P is the unknown population proposition and P_0 is its given value. State the assumptions.

c) The yields (in kg per plot) of jute from 9 plots in subdivision A and 7 plots in subdivision B are given below:

A : 57, 81, 71, 85, 86, 37, 72, 51, 63

B : 55, 56, 54, 45, 72, 80, 60

Write commands in R-Software to test at 2% l.o.s. Whether subdivision A has greater variability field per plot as compared to subdivision B.

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

a) Construct $100\,(1- \alpha)$ % confidence interval for testing $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 \neq \mu_2$, where μ_1 and μ_2 are two population means and population variances σ_1^2 and σ_z^2 are known.

b) One customer arrives at a counter in a bank after every 15 minutes. Staff on the counter take 10 minutes on an average for serving a customer. Under the assumption for applying $M\,/\,M\,/1 : \infty\,/$ FCFS model, find

i) Average queue length.

ii) A second counter will be started if waiting time of customer in the queue is at least 15 minutes. Can you justify a need of second counter?

c) Find G.F.R. and T.F.R. for the following data

Age-group (in yrs.)	15-25	25-35	35-45	45-55
No. of Females	2400	2000	1500	500
No. of Births	80	120	75	01

Q4) Attempt any one of the following.

a) i) If $x_1 = y_1 + y_2$, $x_2 = y_2 + y_3$ and $x_3 = y_3 + y_1$ where y_1, y_2 and y_3 are mutually uncorrelated variables with mean zero and unit S.D each. Find the value of multiple correlation coefficient between x_1 and (x_2, x_3) i.e R 1.23. **[5]**

ii) Out of 60 turnip seeds of first tyep, 48 germinated and out of 40 turnip seeds of second type, 24 germinated. Test at 5% l.o.s., Whether the two population proportions of germinated seeds differ significantly? **[5]**

b) i) Describe the test procedure for testing $H_0 : \mu_1 = \mu_2$ against $H_1 : \mu_1 > \mu_2$ or $\mu_1 < \mu_2$ or $\mu_1 \neq \mu_2$ where μ_1 and μ_2 are two population means and population variances σ_1^2 and σ_2^2 are known. **[5]**

ii) For a trivariate data on (x_1, x_2, x_3) if $\bar{x}_1 = \bar{x}_2 = \bar{x}_3 = 0$, $\sigma_1 = \sigma_2 = \sigma_3 = 1$ and $r_{12} = r_{13} = r_{23} = k$ then obtain the equation of least squares regression plane of x_1 on x_2 and x_3. **[3]**

iii) For a trivariate data, are the following data consistent?
$r_{12} = 0.6$, $r_{13} = -0.4$, $r_{23} = 0.7$ **[2]**

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[5522]-215

S.Y. B.Sc.

STATISTICS

ST-222 : Sampling Distributions and Inference

(2013 Pattern) (Semester - II) (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 abbreviation have their usual meaning.*

Q1) Attempt each of the following :

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

   i)   If x_1, x_2,........., x_{10} are independent and identically distributed N(0, 1) variates then the probability distribution of

$$\frac{3x_9}{\sqrt{\sum_{i=1}^{10}\left(X_i - \bar{X}\right)^2}} \text{ is}$$

   A) t-distribution with 10 d.f   B)   Chi-square with 10-d.f.

   C) Chi-square with 9 d.f   D)   t-distribution with 9 d.f.

   ii)   Let X follows F - distribution with (10, 11) d.f. and $Y = \dfrac{1}{X}$. Hence mean of the distribution of Y is

   A) $\dfrac{11}{10}$ B) $\dfrac{11}{9}$

   C) $\dfrac{10}{8}$ D) $\dfrac{11}{8}$

iii) A 4 × 3 contigency table was obtained. To test

H$_0$: Two attributes A and B are independent then under H$_0$, the distribution of test statistic used in the test is

A) χ^2 with 6 d.f

B) χ^2 with 12 d.f

C) χ^2 with 7 d.f

D) χ^2 with 11 d.f

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

i) The moment generating function (m.g.f) of Chi-square distribution with 10 degrees of freedom is $(1 - 2t)^{-5}$.

ii) Statistic is a function of sample values involving unknown population parameter.

iii) Chi-square test for goodness of fit is always right tailed test.

c) Give one real life situation where two sample t-test is used for independent samples. **[1]**

d) State the relationship between t and F-distribution. **[1]**

e) State 100 (1 – α)% confidence interval for population mean, when population variance σ² is unknown. **[1]**

f) State mode of Chi-square distribution with 5 d.f. **[1]**

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

a) Define Chi-square variate with n-degree of freedom. (d.f.). Find it's mean and variance.

b) If a r.v T follows student's t-distribution with n-d.f. then prove that the probability distribution of r.v. T tends to N(0, 1), as $n \to \infty$.

c) Let $\overline{X}$ and S² be the mean and variance of a random sample of size 25 from N(3,100) distribution. Evaluate P[0 < $\overline{X}$ < 6, 55.2 < S² < 145.6].

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

a) Derive the expression for r^{th} raw moment of F-distribution with n_1 & n_2 d.f. Hence find mean of the distribution.

b) Explain paired t-test for testing $H_0 : \mu_d = 0$ against $H_1 : \mu_d \neq 0$. Give the two real life situations of it.

c) If $X \sim \chi_{10}^2$ and $Y \sim \chi_9^2$ are independent r.v.s then find
   i) $P[12.242 < Y < 21.666]$
   ii) Median of Y.
   iii) $P[X + Y \geq 21.689]$

Q4) Attempt any one of the following :

a) i) Distinguish between parameter and statistic.
   ii) Write a short note on Mc Nemar's test.
   iii) The table given below, shows the number of accidents that occured in the certain factory on the various days of a particular week.

Days of Week	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	6	4	9	7	8	10	12

   Test whether the accidents are uniformly distributed over the different days, at 1% L.O.S. **[2 + 3 + 5]**

b) i) If $X \rightarrow F(n_1, n_2)$ and $Y \rightarrow F(n_2, n_1)$ then show that

   $$P[X \geq a] + P\left[Y \geq \frac{1}{a}\right] = 1.$$

   ii) Explain the following terms :
   A) Sampling distribution of a statistic.
   B) Standard error of a statistic.

   iii) The following are the values (in thousands of inch) obtained by two engineers in 10 succesive measurements with the same micrometer.

Engineer A	503	505	497	505	495	502	499	495	510	501
Engineer B	502	497	492	498	499	495	497	496	498	500

   Test the hypothesis, $H_0 : \sigma_A^2 = \sigma_B^2$ against the alternative $H_1 : \sigma_A^2 \neq \sigma_B^2$ at 10% level of significance. **[2 + 2 + 6]**

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[5522]-217

S.Y. B.Sc.

GEOGRAPHY - II

Watershed Management - II

(2013 Pattern) (Semester - II) (Paper - II)

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

Instructions to the candidates:

  1)   *All questions are compulsory.*

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

  3)   *Draw neat diagrams and sketches wherever necessary.*

  4)   *Use of map stencil is allowed.*

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

  a)   What is Resource Appraisal?

  b)   Give any two pre-questionnaire measures of survey.

  c)   What is meant by Resource Mapping?

  d)   Give any two benefits of survey.

  e)   What is rainfed catchment?

  f)   Give any two methods of small rainfed catchments.

  g)   Define cost sharing.

  h)   Give any two benefits of participatory planning.

  i)   What is landscape Restoration?

  j)   What is soil erosion?

  k)   What is check Dam?

  l)   Give any two traditional methods of storage of water.

  m)   Write any two watershed based farming systems.

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

    a)   Food Security.

    b)   Importance of Watershed Planning.

    c)   Contour bunding.

    d)   Energy Plants.

Q3) Answer the following questions in 100 words: (any two) **[10]**

    a)   Explain survey method of a resource appraisal..

    b)   Describe the importance of watershed planning in national development.

    c)   Explain role of Livelihood Security in watershed planning.

    d)   Explain differnet benefits of survey method.

Q4) Answer the following question in 200 words. (any one) **[10]**

    a)   What is soil conservation? Describe any two methods of soil conservation.

    b)   Explain the watershed development programme activities of 'Dryland Farming' and 'Livestock Production'.

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[5522]-218

S.Y.B.Sc (Regular)
MICROBIOLOGY
MB-221-Bacterial Genetics
(2013 Pattern) (Semester - II) (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) *Draw neat labelled diagrams wherever necessary.*

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

 a) Write components of nucleotides of DNA.

 b) Draw structure of cytosine.

 c) State the role of primase enzyme.

 d) Name the initiation codon.

 e) Define - silent mutation.

 f) Define - Transition mutation.

 g) Name any two intercalating agents.

 h) Define - 'plasmid curing'

 i) In prokaryotes,the ribosomal binding site on mRNA is called shine-Dalgarno sequence.(T/F).

 j) Ti plasmid is tumor inducing plasmid.(T/F).

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

 a) what are physical mutagens. Discuss the role in mutation with one suitable example.

 b) Explain in detail types of plasmid.

 c) What is semi-conservative mode of DNA replication? Explain the mechanism of plasmid replication.

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

    a)   Describe the experiment of Mcleod, McCarty and Avery that proves DNA is genetic material.

    b)   Describe replica plate technique with suitable diagram.

    c)   Draw a neat labelled diagram of B-Form of DNA and write its key features.

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

    a)   What is framshift mutation? Enlist Various mutagenic agents responsible for it and explain the mechanism with two suitable agents.

    b)   What is transcription? explain the role of RNA polymerase enzyme and discuss in detail Rho dependant termination mechanism.

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[5522]-219

S.Y. B.Sc.

MICROBIOLOGY

MB-222 : Air and Water Microbiology

(2013 Pattern) (Semester - II) (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 diagram whenever necessary.*

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

    a)   Define air sanitation.

    b)   Define distilled water.

    c)   Cholera is water borne infection. T/F.

    d)   Staphy lococcus aureus is a coliform organism. T/F.

    e)   Fish bioassay is used for _____ test.

    f)   Faecal coliform produce _____ colonies on EMB agar.

    g)   Enlist two air pollutants.

    h)   Enlist micro organisms involved in trickling filter process.

    i)   Full form of BIS is _____.

    j)   Presence of _____ in water body is indication of prolonged faecal pollution.

        i)   Staphy lococcus aureus

        ii)   Clostridium perfringens

       iii)   E.coli.

       iv)   M. tuberculosis.

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

a) Describe air sampling by impingement in liquid.

b) Write short note on biomagnification.

c) Explain anaerobic sludge digestion by septic tank.

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

a) What is BOD? Explain Winkler's method of BOD estimation.

b) Explain the chemical methods of air sanitation.

c) Describe bacteriological analysis of drinking water by presumptive test.

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

a) What are ideal characteristics of bacteriological indices of faecal pollution of water? Describe E.coli and Bifidobacterium as indicator of faecal pollution of water.

b) What is sewage? Describe waste water treatment by

   i) oxidation ponds

   ii) trickling filter.

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[5522]-221

S.Y.B.Sc (Regular)
PSYCHOLOGY
Psychological Testing & Assessment
(2013 Pattern) (Semester - II) (Paper-II)

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

Instructions to the candidates:
1) *Attempt all questions.*
2) *Draw diagrams & figures wherever neussary.*
3) *Figures to the right indicate full marks.*

Q1) Answer in Two or Four sentences: **[16]**

    a)   What is an aplitude?

    b)   Define psychological test.

    c)   What is DSM?

    d)   Define drug addiction.

    e)   What is motivation?

    f)   Define attitude.

    g)   What is cognition?

    h)   Define Intelligent quotient (IQ).

Q2) Answer any two of the following in 8-10 sentences: **[8]**

    a)   Write in detial clinical interview.

    b)   Describe the difference between checklist & rafing scales.

    c)   Describe any one type of general intellectual ability test.

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

    a)   Interest test (any one).

    b)   General achievement test any one.

    c)   Graduate record examination (GRE)

Q4) Explain in detail neuro psychological Examination.   **[8]**

OR

Define personality write in detail any two types of personality assessment.

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[5522]-224

S.Y. B.Sc.

ELECTRONIC SCIENCE (Regular)

EL - 221 : Electronic Instrumentation

(2013 Pattern) (Semester-II) (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)   Draw neat diagram whenever necessary.

    4)   Use of non-programmable calculator is allowed.

Q1) Attempt all of the following:

    a)   Define the term occuracy of the system.   **[1]**

    b)   What is mean by signal generator?   **[1]**

    c)   What is unregulated power supply?   **[1]**

    d)   What is tachometer?   **[1]**

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

    f)   "In analog function generator basic signal is triangular wave" comment.**[2]**

    g)   Find the static error, if digital voltmeter reads 6.30 volt and true value is 6.25 volt.   **[2]**

    h)   Calculate the value of series resistance in DC milliameter for a range 0-100 mA with internal resistance 100 Ω and full scale deflection 1 mA.   **[2]**

Q2) Attempt any two of the following:

    a)   Explain DC to DC converter in brief.   **[4]**

    b)   Write in brief current to voltage coverter in DMM.   **[4]**

    c)   Explain with neat block diagram function generator.   **[4]**

Q3) Attempt any two of the following:

    a)   Explain with neat diagram basic measurement system.   **[4]**

    b)   Write difference between dual beam and dual trace CRO.   **[4]**

    c)   With the help of neat block diagram, explain lux meter.   **[4]**

Q4) Attempt all of the following

    a)   What is CVCC? Explain with neat diagram, CVCC power supply. **[6]**

    b)   Explain the procedure to construct multirange analog voltmeter. **[6]**

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

Q4) Attempt all of the following:

    a)   Calculate the speed in RPS and RPM if number of pulses per second is 300 and number of teeth on rotor is 30. **[4]**

    b)   Calculate the output voltage of variable power supply having R_1=20kΩ and R_2=10kΩ when regulated input voltage 12 volt. **[4]**

    c)   Calculate % duty cycle of square wave, when T_{ON}=0.4 ms and T_{OFF} = 0.6ms. Also determine the percentage duty cycle when T_{ON}=T_{OFF} **[4]**

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[5522] - 225

S.Y.B.Sc. (Regular)
ELECTRONIC SCIENCE
EL : 222- Communication Electronics
(2013 Pattern) (Semester - II) (Paper - II)

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 indicates full marks.*

Q1) Answer all of the following.

    a)   Define simplex communication. **[1]**

    b)   What is frequency modulation? **[1]**

    c)   write full form of PCM and PPM. **[1]**

    d)   What is the role of pre-emphasis in FM transmitter. **[1]**

    e)   "Demodulation of PWM is very simple"- Justify statement. **[2]**

    f)   "Single tuned discriminator method is not reliable FM detector"-Justify.**[2]**

    g)   Calculate signal to noise ratio of a receiver having input signal power 1.5μw and noise power is 0.2μw. **[2]**

    h)   Calculate modulation index. If modulating signal is 40 sin ωmt and carrier signal 50 sin ωct. **[2]**

Q2) Attempt any two of the following.

    a)   Distinguish between pulse dialing and DTMF dialing method. **[4]**

    b)   Explain working of Foster - Seelay discriminator. **[4]**

    c)   Explain diode amplitude modulator circuit with neat diagram. **[4]**

Q3) Attempt any two of the following.

a) Draw the block diagram of pulse position modulation and state its advantage & dis - advantage. **[4]**

b) Write any four applications of electronic communication in detail. **[4]**

c) Explain with neat circuit diagram the working of balanced slope detector.**[4]**

Q4) Attempt all of the following.

a) Explain with block diagram digital communication system. What do you mean by UART? **[6]**

b) What is Tuned Radio frequency receiver? Explain working of TRF using suitable diagram. **[6]**

OR

a) Estimate the power in each Side band if carrier power is 420w with modulation index of 60%. **[4]**

b) Two resistors having value of 10kΩ & 20kΩ are connected in series at room temperature (290ºK) calculate thermal noise voltage for bandwidth of 100kHz. **[4]**

c) What is the bandwidth required for FM signal if modulating frequency is 2kHz and maximum deviation is 8 kHz. **[4]**

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S.Y. B.Sc. (Regular)
DEFENCE AND STRATEGIC STUDIES
DS-201; Conflicts Management and Resolution
(2013 Pattern) (Semester- II) (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.**

Q1) Answer in two to four sentences.   **[8×2=16]**
   a)   Define self determination
   b)   State the meaning of peace making
   c)   State the meaning of conflicts is men made environment
   d)   What do you mean by conflict transformation?
   e)   Define world organizations
   f)   Define municipal law
   g)   What do you mean by nuclear war?
   h)   What are the characteristics of state?

Q2) Answer in 8 to 10 sentences (any two)   **[2×4=8]**
   a)   Write a note on the scope of peace studies
   b)   Explain power and functions of general assembly
   c)   Assess contribution of world Health organization

Q3) Write short notes on (any two).   **[2×4=8]**
   a)   Peace by peaceful means
   b)   Arms control and UN
   c)   Conflicts and communication

Q4) Answer in 18 to 20 sentences (any one)   **[1×8=8]**
   a)   Write a note on the role of world organization in maintaining world peace
   b)   Explain contribution of international law in maintaining world peace

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[5522]-227

S.Y.B.Sc (Regular)
DEFENCE AND STRATEGIC STUDIES
DS.NO.DSSY.202-Geopolitics
(2013 Pattern) (Semester - II) (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 20 sentences each.   **[16]**

  a)   Define E.E.Z.

  b)   State the meaning of Geopolitics.

  c)   What do you mean by territorial sea?

  d)   How you would like to define nation?

  e)   State the location a lakshadeueep Islands?

  f)   What do you understand by boundary?

  g)   State any two problems of butter state.

  h)   Write the location of Diego-Gareia Islands.

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

  a)   Explain the concept of strategic minerals

  b)   Write in brief territory as factor of geopolitics.

  c)   Explain in short "Line of Actual Control".

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

  a)   Sia-Chen glacier.

  b)   Utility of Territorial sea.

  c)   Energy production resources.

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

  a)   Explain the geostrategic position & importance of Diego-Garcia Islands.

  b)   Dismiss " Power" as a field of geopolitics.

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[5522]-228

S.Y. B.Sc. (Regular)
DEFENCE AND STRATEGIC STUDIES - III
DS-203 : Contemporary World and Security
(2013 Pattern) (Semester - 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.   **[8 × 2 = 16]**

   a)   State any two characteristics of nation.

   b)   State the meaning of dynamics of geopolitics.

   c)   Write any two dimensions of human rights.

   d)   Define counter insurgency.

   e)   Define ethnic conflicts.

   f)   Write any two features of non state actor.

   g)   Define comprehensive security.

   h)   Write any two features of nuclear war.

Q2) Answer in 8 to 10 sentences. (any two)   **[2 × 4 = 8]**

   a)   Write a note on India and central Asia.

   b)   Explain India's strategic relationship with Russia.

   c)   Discuss Indian oceans is India's ocean.

Q3) Write short notes on (any two) :   [2 × 4 = 8]

    a)   Role of geography in military planning.

    b)   Objectives of national security.

    c)   Environment and national security.

Q4) Answer in 18 to 20 sentences (any one)   [1 × 8 = 8]

    a)   Write a note on role of USA in South Asian Politics.

    b)   Explain non-military issues of strategic concern.

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[5522]-229

S.Y. B.Sc. (Regular)
ENVIRONMENTAL SCIENCE
EVS 201 : Biological Diversity & its Conservation
(2013 Pattern) (Paper-I) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 40*
Instructions to the candidates:
1) *All questions are compulsory.*
2) *Neat and labeled diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*

Q1) Answer the following in 1-2 lines   **[10]**
     a) Define biodiversity.
     b) What is species even ness?
     c) What do you mean by endemism?
     d) Explain the concept of JFM
     e) What do you mean by over-exploitation?
     f) Give any two examples of Human-wildlife conflict.
     g) Enlist the factors affecting genetic diversity.
     h) Give any two examples of national conservation efforts
     i) What do you mean by PBR.
     j) What are sacred groves.

Q2) Write notes on any two of the following: **[10]**
     a) species Inventory
     b) Nature and origion of Genetic variation.
     c) Vavilov's Centers
     d) Genetically modified organisms.

Q3) Answer any two of the following: **[10]**
     a) Discuss the merits and demerits of ex-sity conservation.
     b) Explain various threats to wildlife habitats.
     c) Write a note on origion and evolution of agrobiodiversity.
     d) Justify Western ghats is hot-spot of biodiveristy.

Q4) Answer any one of the following   **[10]**
     a) Discuss major ecosystem types of world with their physical & biological characteristics.
     b) Explain international conservation efforts with reference to LUCN and CITEs.

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[5522]-230

S.Y. B.Sc. (Regular)
ENVIRONMENTAL SCIENCE
EVS - 202 : Pollution Control & Environmental Technology
(2013 Pattern) (Semester-II) (Paper-II)

Time : 2 Hours] *[Max. Marks : 40*
Instructions to the candidates:
   1) *All questions are compulosry.*
   2) *Neat and labelled diagrams must be drawn wherever necessary.*
   3) *Figures to the right indicate full marks.*

Q1) Answer the following in 1-2 lines. **[10]**
   a) Define : reverse Osmosis
   b) Define : Acid leaching
   c) Enlist nuclear waste alleaste (3)
   d) Define : Biopesticides.
   e) Define: Pyrolysis
   f) What is immobilization of Metals?
   g) Define : Incineration
   h) Define : Ocean dumping
   i) Enlist 2 demerits of sanitary sand-fills
   j) Define : Soil Pollution

Q2) Write short note on any two of the following: **[10]**
   a) Acid Rain
   b) Wet scrubbing
   c) Activated sludge process

Q3) Answer any two of the following: **[10]**
   a) Explain : Any two Primary water pollution control methods?
   b) Explain "The process of Bioremediation".
   c) Explain : How job rotation is usefull in industries.

Q4) Answer any one of the following **[10]**
   a) Explain : Advance treatment w.r.t. carbon Adsorption R.O. and Ion exchange
                           OR
   b) Explain : Control of solid waste w.r.t. infection well, gasification and ocean dumping.

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[5522] - 231

S.Y.B.Sc. (Regular)
ENGLISH (Optional)
Literary Vistas
(2013 Pattern) (Semester - 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) a)   Attempt any one of the following in about 100 words.   **[5]**
        i)   What is Rosemary's reaction when Philip refers to the lady as 'astonishing pretty'?
        ii)   How does the narrator react to the changes made to his features in the photograph?

    b)   Attempt any one of the following in about 100 words.   **[5]**
        i)   Draw the character sketch of Rosemary Fell?
        ii)   Explain the central idea of the essay 'With the Photographer'?

Q2) a)   Attempt any one of the following in about 100 words.   **[5]**
        i)   What kind of advice does the poem 'If' convey for any good life?
        ii)   Does the poem Ozymandias prove that art survives? Give reasons.

    b)   Attempt any one of the following in about 100 words.   **[5]**
        i)   Describe the everlasting impact the sight of the daffodils has on the speaker.
        ii)   Bring out the central theme of the poem 'Ozymandias.

Q3) Attempt any two of the following.   **[10]**
    a)   Write a short paragraph of about 100 words on the topic 'How can you save the environment?'
    b)   Rekha, Pankaj, Kunal and Swati are given the topic 'Social Media: A boon or a bane for society and individuals' for a group discussion. Write the transcript in a dialogue form.

c) Prepare five slides of 20 words each for a power point presentation on any one of the topics from your textbook.

d) Imagine that you are interviewing the Education Minister of Maharashtra. Write a transcript of the interview consisting of five questions and the responses of the minister.

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

a) Write an essay on 'The Problems of City Slums and possible humane solutions'.

b) Write review of a book that you have recently read.

c) Write a brief newspaper report of two paragraphs on 'A Road Accident' that you have recently witnessed.

d) Summarize the following paragraph to one third of its length.

BPOs have often been faulted for the lack of women in their senior managerial positions. "Communication and self - expression are the key challenges that women working in the BPO sector face today. These problems arise from lack of confidence," says the CEO for women who work in BPOs. Not all BPO women are considered to be confident and on per with their male colleagues. Women at the senior level may be very confident but lower rung employees have a long way to go. Another interesting angle to the debate on female self-expression is the number of women from small towns and conservative backgrounds who are new to the BPO culture. What awaits them at the industry is a complete cross-cultural dilemma–a new work culture pressure of the deadline and never experienced before graveyard shifts. Such dilemmas tend to worsen when self-expression is curtailed or not encouraged. Employers do not present the full picture of the industry to prospective candidates. All is not rosy at the hiring stage. No employer comes forward to tell the flip side of the story. "Life has taken a turn since I started blogging. I hardly get time to talk to friends or family members because of work pressure. But my blog helps me express my thoughts and feelings to so many people who are facing problems similar to mine," says a BPO employee. The sector wants more women to join. The companies, especially, are looking at women for the stability factor. The current man-woman ratio in the BPO sector is 63:31 and the numbers of women are set to rise. So the blog is a platform that women can use to express their concerns.

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S.Y. B.Sc.

मराठी (Marathi) (Theory)

व्यावहारिक मराठी (Vyavharik Marathi)

नवा अभ्यासक्रम

(2013 पॅटर्न) (Semester - II)

वेळ : 2 तास]   */एकूण गुण: 40*

सूचना :–   *1)*   सर्व प्रश्न सोडविणे आवश्यक आहे.

            2)   उजवीकडील अंक प्रश्नांचे गुण दर्शवितात.

प्र.1) अ)   पुढील उताऱ्याचे मराठीत भाषांतर करा.   **[10]**

You are what you think you are . You feel what you want to feel. Do you frequently hear yourself saying or thinking ' I can't?' If you say or think in this manner. You will soon believe it. It will become a self fulfilling prophecy and you will feel more powerless and out of control.

Adopt turn around mentality. Believe in yourself positive, encouraging statements. If your goal requires a response or approval from others. You can sometimes feel helpless and out of control. Work at feeling good about yourself and become more self -reliant. Seek help when you need it. There is immense power in positive thinking. Research proves people who have a sunny, optimistic outlook live longer and recover faster than those who are constantly worrying.

ब)   पुढील उताऱ्याचा शीर्षकासह एक तृतीयांश सारांश लिहा.   **[10]**

मनाला केवळ आनंद देणे किंवा मनाचे निव्वळ रंजन करणे हाच कलेचा हेतू आहे, असे म्हणणाऱ्या अडाणी माणसांची कीव करावीशी वाटते. त्यांना निसर्गाच्या उत्क्रांतिमय जीवनाचे रहस्य मुळीच कळलेले नाही, असे म्हणावयाला पाहिजे. सुंदर चित्र पाहिल्याने, मधुर गायन ऐकल्याने किंवा उत्कृष्ट मूर्ती पाहिल्याने आपल्याला आनंद तर होतोच होतो. पण त्यामुळे आपली जीवनशक्ती अधिक समृद्ध होते. भावनांचा विकास होतो आणि बुद्धीची उत्क्रांती होते. कलेच्या उपभोगाने आपण अधिक सुखी, अधिक तृप्त आणि अधिक उन्नत होतो. म्हणून निसर्गाच्या उत्क्रांतीचे अपरिहार्य कार्य चालू ठेवणे, हेच कलावंताच्या आयुष्याचे ध्येय आहे. म्हणूनच समाजाच्या आनंदासाठी, प्रगतीसाठी आणि उद्धारासाठी कलेची आणि कलावंताची जरूरी आहे. कलावंतांच्या पावलांनी समाज चालत असतो, कलावंतांच्या डोळ्यांनी समाज पाहात असतो आणि कलावंताच्या बुद्धीने समाज विचार करीत असतो. हजारो वर्षांच्या काळात मानव जातीने प्रगतीचा आणि संस्कृतीचा जो टप्पा आज गाठलेला आहे, त्याच्या श्रेयाचा मोठा वाटा कलावंतांनाच द्यायला पाहिजे. कलावंतांची कला ही समाजासाठी आहे; आणि कलावंतांवाचून समाज हा सर्वस्वी असहाय्य आहे.

P.T.O.

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

    अ)   'अवयव दान' या विषयावर वर्तमानपत्रासाठी 200 शब्दांत लेख लिहा.

    ब)   'ग्रामस्वच्छता' या विषयावर आकाशवाणीसाठी 200 शब्दांत भाषणसंहिता तयार करा.

    क)   'प्लास्टिक मुक्त देश' या विषयावर पर्यावरण तज्ज्ञांची दूरदर्शनसाठी 5 मिनिटांची मुलाखत तयार करा.

प्र.3) खालील पारिभाषिक संज्ञांना मराठी प्रतिशब्द लिहा. (कोणतेही – 5) **[05]**

    i)   Project

    ii)   Laboratory

    iii)   Solar Energy

    iv)   Square

    v)   Pollution

    vi)   virus

    vii)   Microbiology

    viii)   Density

    ix)   Research

    x)   Merit

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S.Y. B.Sc. (Regular)

हिंदी (Hindi)

सामान्य (General)

पाठ्यपुस्तकें : 1) भारती गद्य संग्रह संपा. डॉ. मधु धवन

2) कवितायन संपा. डॉ. भोलानाथ तिवारी

(2013 पॅटर्न) (Semester - II)

समय : 2 घंटे]

[पूर्णांक : 40

सूचनाएँ :– 1) सभी प्रश्न आवश्यक हैं।

2) दाहिनी ओर लिखे अंक प्रश्न के पूर्णांक हैं।

प्र.1) अ) निम्नलिखित पारिभाषिक शब्दों में से किन्हीं आठ के हिन्दी पर्याय लिखिए। **[8]**

i) Aviation

ii) Catalyst

iii) Diagnosis

iv) Electrocution

v) Fleet

vi) Light year

vii) Ontogeny

viii) Statistics

ix) Technology

x) Vibration

आ) निम्नलिखित परिच्छेद का एक – तिहाई शब्दों में सार–लेखन कर उसे उचित शीर्षक दीजिए। **[4]**

पर्यावरण की रक्षा करना मनुष्य का बड़ा ही महत्त्वपूर्ण कर्तव्य है। आधुनिक समय में यह देखा जाता है कि विभिन्न कारणों से पर्यावरण एवं प्रकृति धोखे में पड़ी हुयी है। वृक्षों का संगोपन – संवर्धन करना आज के समय की बड़ी आवश्यकता है मगर आदमी को आधुनिकता के इस दौर में केवल अपना स्वार्थ ही दिखायी देता है। वृक्षों की बेशुमार कटाई हो रही है। जीवन की रफ्तार इतनी तेज है कि इन सारी आवश्यक बातों को अनदेखा किया जा रहा है। वृक्षों के मनुष्य जीवन पर बड़े भारी उपकार हैं। अपनी हरी–भरी गर्द टहनीयों में उन्होंने तमाम चिड़ियों को आश्रय दिया। चिलचिलाती धूप में वहीं वृक्ष मानव के सिर पर छत्र छाया धर उसे शितलता प्रदान करते रहे।

प्र.2) अ) निम्नलिखित गद्य अवतरण की ससंदर्भ व्याख्या कीजिए। **[4]**

क) ''हे संत, तुम्हारे उस बलिदान का संदेश मैं कभी न भूलूँ। न जाने अभी जीवन कितना है, और न जाने अभी कितनी बार ऐसे पहियों के नीचे होकर जाना है।''

अथवा

''प्रारंभ से ही आप मेधावी छात्र रहे हैं। कक्षा में आप सदा प्रथम आते थे। इस कारण न केवल आपकी फीस कम कर दी गई, बल्कि आपको सुब्रह्मण्यम छात्रवृत्ति भी प्राप्त हुई।''

आ) निम्नलिखित पद्य अवतरण की ससंदर्भ व्याख्या कीजिए। **[4]**

ख) ''मेरे जैसे करोड़ों हैं

जिनसे इतिहास का काम

इसी तरह सधता है

कि थे – नहीं है।''

अथवा

''आज से सौ बरस बाद

मेरी रचनाएँ पढ़कर तुम यह जानोगे

इस संकटकाल में तो अर्जुन एक मैं ही था ,

मैं ही दृष्टिहीनों की दुनिया में

आँखे खोल देखता रहा था यथार्थ को।''

प्र.3) अ) निम्नलिखित में से <u>किन्हीं दो</u> प्रश्नों के उत्तर लिखिए। **[10]**

ग) हरिवंशराय बच्चन ने अपनी बीती यादों को किस प्रकार प्रस्तुत किया है?

घ) चीन रेशम की जानकारी किस तरह छिपा रहा था?

ङ) मेधावी गणितज्ञ रामानुजन का परिचय लिखिए।

आ) निम्नलिखित में से <u>किन्हीं दो</u> प्रश्नों के उत्तर लिखिए। **[10]**

च) अखबार पढते ही भवानीप्रसाद मिश्र के मन में कौनसे विचार आए?

छ) अज्ञेय क्यों हँसना चाहते हैं?

ज) 'बृहन्नला' कविता का आशय समझाइये।

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SEAT No. :

[Total No. of Pages : 2

[5522]-234

S.Y. B.Sc.

संस्कृत (Sanskrit)

गीर्वाणभारती (Girvānabharatī)

(2013 Pattern) (Semester - II)

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

Instructions to the candidates:

    1)   *All questions are compulsory.*

         सर्व प्रश्न अनिवार्य आहेत.

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

         उजवीकडील अंक पूर्ण गुण दर्शवितात.

Q1) Write short answers of the following questions (2 - 4 lines):   **[16]**

   पुढील प्रश्नांची उत्तरे लिहा. (2 - 4 ओळीत)

    a)   What is the meaning of the word आयुर्वेद?

         'आयुर्वेद' या शब्दाचा अर्थ काय?

    b)   Which are the four types of trees according to vanaspatiśastra?

         वनस्पतिशास्त्रानुसार वृक्षांचे चार भेद कोणते?

    c)   How did poet describe the 'Dhira' ?

         कवीने धीराचे वर्णन कसे केले आहे?

    d)   Explain - 'विवेकभ्रष्टानां भवति विनिपात: शतमुख:'

         'विवेकभ्रष्टानां भवति विनिपात: शतमुख:' हे स्पष्ट करा.

    e)   What is the method of examining uttamābhumih?

         'उत्तमाभूमि:' ची परीक्षण पद्धती लिहा.

    f)   What is the defination of śāstra?

         शास्त्र शब्दाची व्याख्या लिहा.

    g)   Which is the famous epic on Savarkara? Who is the author of that epic?

         सावरकरांवरील प्रसिद्ध महाकाव्य कोणते? या महाकाव्याचे कवी कोण?

    h)   Who edited saddharmapundarikasūtra?

         सद्धर्मपुण्डरीकसूत्राचे संपादन कोणी केले?

Q2) Write short notes (any two) : [8]

संक्षिप्त टीपा लिहा. (कोणत्याही दोहोंवर)

a) Jyotisaśāstram

  ज्योतिषशास्त्रम्

b) Purpose of saddhrmapundarikakatha

  सद्धर्मपुण्डरीककथेचे प्रयोजन

c) Construction of town

  नगररचना

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

संक्षिप्त टीपा लिहा. (कोणत्याही दोन)

a) Ideal life of couple according to Bhavabhutī

  भवभूतीच्या मतानुसार आदर्श दाम्पत्य जीवन

b) Types of friendship in Nitiśatak

  नीतिशतकातील मैत्रीचे प्रकार

c) शीलं परं भूषणम्

Q4) Answer any one of the following. [8]

पुढीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा.

Write the summary of the lesson शास्त्रपरिचय II.

'शास्त्रपरिचय II' या पाठाचा सारांश लिहा.

<div align="center">OR/किंवा</div>

Explain the thought which is reflected in the lesson 'Amarasandesak'

'अमरसन्देशः' या पाठातून व्यक्त झालेला विचार स्पष्ट करा.

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[5522]-235
S.Y.B.Sc. (Regular)
FUNCTIONAL ARABIC
Arabic : Functional
(2013 Pattern) (Semester - II)

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

Instructions to the candidates :

　　1)　**All questions are compulsory.**

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

1. Translate into English/Urdu/Marathi any two of the following passages:　　10

(أ) القرآن كتابٌ - العلمُ مفيدٌ - الكتابُ عربيٌّ - الاسلامُ دينٌ - الأدبُ واجبٌ - الدرسُ سهلٌ - العملُ ضروريٌّ للعالم - الرحمنُ نائبٌ لله - الاستاذُ جالسٌ على الكرسيّ - القلمُ لازمٌ للكتابة - والكتابُ لازمٌ للقراءة - أنا ولدٌ -

(ب) العلمُ لذةٌ للإنسان - أنا جالسٌ على الكرسيّ وهو واقفٌ على الأرضِ - الجملُ طويلٌ - أنا مشغولٌ بالقراءة وهو مشغولٌ باللعبِ - أنا مسلمٌ وهو الضابطُ مسلمٌ - من أحبيٰبيٰ بالقراءة وذلك حبيبيٰ في اللعبِ -

(ج) هذا الرسمُ جميلٌ جداً - ما في الرسمِ يا عزيزتي؟ في الرسمِ قفصٌ - ما في القفصِ؟

في القفص طائر ـ أذلك الطائر ببغاء ؟

في هذا الرسم أميص ـ وفي ذلك الأميص

عرص على ذلك القرص ـ ورق ـ وورد ـ

2. Translate and explain any five of the following verses: 10

(١) دنياك حبيبة ــــــ حُسنها والطيبة ـ

(٢) لكنها عائرة ــــ خداعة غرّارة ـ

(٣) ليس لصاحبك ــ زوّ المغارب ـ

(٤) عترير هذا ذليل ــ كثيرها قليل ـ

(٥) يحظى بها اللبيب ــ ويتعب الأديب ـ

(٦) وقل من الكلام ــ ما لاق بالمقام ـ

(٧) نرائق الأشعار ـ وطيب الأخبار ـ

3. Answer in Arabic any five of the following: 10

(١) متى أنت ؟

(٢) هل أنت كبير ؟

(٣) هَلْ ذَلِكَ كَثِيرٌ؟

(٤) أَيْنَ الْكِتَابُ؟

(٥) أَيُّ حَيَوَانٍ طَوِيلٌ؟

(٦) كَيْفَ الْغُرَابُ؟

(٧) أَيْنَ السَّمَكُ؟

4. Write the letter in Arabic to your mother.
10

اُكْتُبِ الرِّسَالَةَ فِي الْعَرَبِيَّةِ إِلَى أُمِّكَ

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S.Y.B.Sc.

URDU (General Paper-II)

(2013 Pattern)(Semester-II)

Time : 2 Hours]

[Max. Marks : 40

Instructions to the candidates:

1) *Attempt All questions.*

2) *Figures to the left indicate full marks.*

[10] سوال نمبر ا: منشی پریم چند کی حیات وشخصیت پرنوٹ لکھئے۔
یا
پریم چند کی افسانہ نگاری کی اہم خصوصیات بتائیے۔

[10] سوال نمبر۲: مختصر افسانہ کے آغاز پر روشنی ڈالئے۔
یا
افسانے کے اجزائے ترکیبی بیان کیجئے۔

[10] سوال نمبر۳: کسی دو کرداروں کا تجزیہ کیجئے۔
ا۔شری کنٹھ ۲۔ آنندی ۳۔ الوپی دین ۴۔عباسی

[10] سوال نمبر۴: نیچے دیئے گئے سائنٹفک اصطلاحات میں سے کوئی دس کا اردو میں ترجمہ کیجئے۔

1) Conduction	2) Boiling point
3) Nuclear force	4) Irregular reflection
5) Solar Eclips	6) Biomass
7) Radiation	8) Biomass
9) Density	10) Atomic weight
11) Pesticide	12) Voltage
13) Components	

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S.Y. B.Sc. (Vocational - II)
INDUSTRIAL CHEMISTRY
222 : Industrial Pollution
(2013 Pattern) (Paper - II) (Semester - II)

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

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

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

a) Name two constituents of London smog.

b) Define herbicide write one example.

c) Write the major constituents present in air.

d) What is meant by 'Lagooning'?

e) Define batch discharge.

f) Write two ill effects of NO_X on plants and animals.

g) Define and explain temporary hardness.

h) What is the importance of O_3 in atmosphere?

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

a) Explain flash evaporation method used in desalination of water.

b) Write a note on atmosphere.

c) Write the chemical reactions involved in formation of smog.

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

    a)   Methods for removal of temporary hardness of water.

    b)   Reverse Osmosis.

    c)   Electrostatic precipitator.

Q4) Describe the aerobic and anaerobic digestion process in sludge treatment.**[8]**

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

What is ultrafiltration? How it is different from electrodialysis? **[8]**

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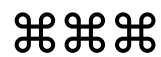
[5522]-245

S.Y. B.Sc. (Vocational - II)
BIOTECHNOLOGY

Voc. Biotech - 222 : Immunology and Medical Microbiology
(2013 Pattern) (Paper - II) (Semester - 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) *All questions carry equal marks.*

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

   a)   Define antibody.

   b)   What is immunogenicity?

   c)   Name any two antigen presenting cells.

   d)   Give the role of Tc cell.

   e)   What is innate immunity?

   f)   Enlist any two examples of vaccines.

   g)   Define autoimmune diseases.

   h)   What is humoral immune response?

   i)   Give the etiological agent of typhoid.

   j)   Give any two morphological features of <u>Staphylococcus aureus</u>.

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

   a)   Phagocytosis.

   b)   Dermatomycosis.

   c)   Attenuated vaccines.

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

a) Describe type II hypersensitivity.

b) Compare and contrast primary immune response and secondary immune response.

c) Explain HINI in detail.

Q4) What is ELISA? Explain any two types of ELISA. Add a note on its applications. [10]

OR

Describe syphilis with respect to etiological agent, characterization, morphology, preventive measures and control.

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[5522]-246

S.Y. B.Sc. (Vocational - II)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION - II
Principles & Applications of Analog and Digital Communications
(2013 Pattern) (Paper - IV) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 40*
Instructions to the candidates:
   1)   All questions are compulsory.
   2)   Draw neat and labeled diagrams wherever necessary.
   3)   Figures to the right indicate full marks.

Q1) Attempt the following questions.

   a)   State whether the following statements are true or false with reason. **[2]**

      i)   Cellular telephone is a transceiver.

      ii) Modulation increases medium efficiency.

   b)   Comment on the following statements.   **[4]**

      i)   It is not the intent of the PSTN operator to provide high-fidelity communications between telephone users, only intelligible connections.

      ii) Analog multipliers are never used to generate DSB signals.

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

      i)   For the transmission of radio signals of 100MHz, the antenna height must be a multiple of ($\lambda/4$). Find the minimum antenna height.

      ii) Compare ASCII, EBCDIC and BAUDOT code.

      iii) The system sends a signal that can assume 8 different voltage levels. It sends 400 of these signals per second. What is the bit rate?

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

   a)   Write short note on TDM & FDM.

   b)   Write short note on crosstalk.

   c)   Write short note on Gaussian noise.

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

   a) Compare frequency modulation and phase modulation techniques in communication system.

   b) Explain DSB generation using phase sift method.

   c) Write short note on VSB signal modulation technique.

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

   a) What are the phase states of the carrier for the bit stream 1001101100 is applied to a 4-QAM modulator.

   b) Compare FH-SS and DS-SS systems.

   c) Why is spread spectrum used in GPS?

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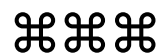
[5522]-247

S.Y. B.Sc. (Vocational - II)
ELECTRONIC EQUIPMENT MAINTENANCE
Voc - EEM - 222 : Audio, Video & Office Equipment - B
(New Course) (2013 Pattern) (Paper - II) (Semester - II)

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

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

Q1) Answer the following.

a) What is multimedia?   **[1]**

b) Give name of two type of displays.   **[1]**

c) What is the purpose of multimedia?   **[1]**

d) Give long form of DLP.   **[1]**

e) Give the name of two multimedia softwares.   **[2]**

f) What is a Rolling display?   **[2]**

g) What is a TFT display screen?   **[2]**

h) Give name of latest processor used in PC.   **[2]**

Q2) Answer any two of the following.

a) Draw neat labelled diagram of Desktop PC.   **[4]**

b) Explain with neat diagram the working of any one type of mouse.   **[4]**

c) Draw neat labelled diagram of CRT monitor.   **[4]**

Q3) Answer any two of the following.

a) Discuss faults in dot-matrix printer.   **[4]**

b) Explain troubleshooting of Ink-Jet printer.   **[4]**

c) Draw neat labelled diagram of LASER printer.   **[4]**

Q4) Answer the following:

a) Explain with neat diagram the working of flat bed scanner. State typical faults in it. **[6]**

b) Draw neat labelled diagram of Photocopying machine. **[6]**

OR

Answer the following:

a) What is Bar code? Draw block diagram of Bar code printer. **[6]**

b) Draw block diagram of Laptop computer. Discuss troubleshooting procedure of it. **[6]**

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[5522]-248

S.Y. B.Sc. (Vocational - II)
COMPUTER HARDWARE & NETWORK ADMINISTRATION
Computer System Management - II
(New 2013 Pattern) (Paper - II) (Semester - 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) a) Attempt the following. **[4×1=4]**

     i) What is application software?

     ii) List any four Bluetooth devices that can be interfaced to a computer system.

     iii) List various portable devices.

     iv) What are utility software's?

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

     i) What is function of ROM?

     ii) What is Antivirus? List various antivirus software's available in market.

     iii) What is PDA?

     iv) What is Mainframe?

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

   a) Explain in brief the need for upgrading PC.

   b) List any four types of users? Explain their roles and responsibilities.

   c) Explain in brief installation procedure of printer.

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

   a)   Explain in brief features of Blackberry.

   b)   List various network devices and explain any one in brief.

   c)   Write a short note on Android OS.

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

   a)   List various hardware and software components of a desktop system. Explain in detail assembly procedure of a desktop PC.

   b)   What is OS? Explain in brief installation procedure of any Operating system.

   c)   What is Computer Network? State various Network operations. Explain in brief LAN controls.

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[5522]-249

S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY
Seed Quality Control
(2013 Pattern) (Semester - II) (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 and labelled diagrams wherever necessary.*

Q1) Attempt the following.   **[10×1=10]**

    a)   What are biofertilizers?

    b)   Define foundation seed.

    c)   Enlist 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)   What are green manures?

    g)   Write any two duties of seed inspector.

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

    i)   What is the maximum period for a member on central seed committee.

    j)   Draw any one walking pattern in field inspection.

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

    a) Comment on seed law enforcement.

    b) Comment on organization of seed certification agency.

    c) Explain the powers of seed inspector.

Q3) Write notes on: [2×5=10]

    a) Seed legislation.

    b) Central seed testing laboratory.

    c) Offenses and Penalties for seed law enforcement.

Q4) Explain in detail the method of field inspection with suitable example. [10]

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

What is organic farming? Comment on biopesticides, and pheromones.

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[5522]-250

S.Y. B.Sc. (Vocational)
INDUSTRIAL MICROBIOLOGY
VOC - IND - MIC - 222 : Quality Assurance for Industrial Fermentation Products
(2013 Pattern) (Semester - II) (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) *All questions carry equal marks.*
4) *Draw neat labeled diagrams wherever necessary.*
5) *Use of scientific calculators is allowed.*

Q1) Answer each sub-question in one or two lines.   **[10]**

a)   What is the ISO 9000 definition of 'Quality Control'?

b)   List the methods used for sterility testing of a pharmaceutical product.

c)   Incubation time recommended for sterility testing is _____ days.

d)   Greek word 'Pharmakon' means _____.

e)   What is a negative control?

f)   _____ is used as a test strain for quality assurance tests in pharmaceutical industries.

g)   List the QA tests recommended for Penicillin.

h)   The first edition of USP was published in the year _____.

i)   _____ is suitable for growth of anaerobic microorganisms.

j)   What is diluting fluid?

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

    a) Write the importance of 'Reference standard'.

    b) Discuss the process of LAL test.

    c) How to determine shelf life of a pharmaceutical product?

Q3) Write a short note on any two of the following: [10]

    a) Quality assurance.

    b) MPN.

    c) IP.

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

    a) Define potency and with the help of a suitable example discuss the process of determining potency of a drug.

    b) How to determine purity of Vitamin B_{12}?

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[5522]-252

S.Y. B.Sc.
NANOSCIENCE AND NANOTECHNOLOGY
NS - 222 : Advance Techniques for Characterization of Nanomaterials
(2013 Pattern) (Paper - II) (Semester - II)

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

Instructions to the candidates:

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

Q1) Attempt all of the following.

a)   What is the principle of FESEM?   **[1]**

b)   What is mean by lock in amplifier?   **[1]**

c)   State the principle of DSC.   **[1]**

d)   What are the limitations of SEM?   **[1]**

e)   What is the function of pulse processor in E DAX?   **[1]**

f)   Define Josephson junction.   **[1]**

g)   What are the basic components of EDS?   **[1]**

h)   What is mean by fluorescent substances?   **[1]**

i)   Define ion milling process.   **[1]**

j)   What is mean by process time?   **[1]**

Q2) Attempt any two of the following.

a)   With neat labelled diagram explain the working of environmental SEM.**[5]**

b)   With block diagram explain EDS system in brief.   **[5]**

c)   Explain fluorescence microscopy with neat labelled diagram.   **[5]**

Q3) Attempt any two of the following.

a)   Give the applications of differential scanning calorimetry technique. **[5]**

b)   Explain bright field imaging mode in TEM with neat diagram.   **[5]**

c)   Explain TDA microscopy in detail.   **[5]**

Q4) a) Attempt (i) or (ii) of the following:

    i)   1)   Explain sample preparation method for transmission electron microscopy. **[4]**

            2)   Explain the types of SQUIDS. **[4]**

    ii)   Draw the block diagram of vibrating sample magnetometer and also explain it's working & construction in brief. **[8]**

  b)   Attempt any one of the following:

    i)   Draw the neat labelled diagram of dark field imaging. **[2]**

    ii)   What is mean by DSC microscopy? **[2]**

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