Total No. of Questions : 3]

SEAT No. :

P147

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

हिंदी (HINDI)

नया पाठ्यक्रम

(General)(2008 Pattern)

समय : 2 घंटे] *[पूर्णांक :40*

पाठ्य-पुस्तकें: 1) प्रतिनिधि कहानियाँ
हिंदी विभाग, एस.एन.डी.टी.विश्वविद्यालय, मुंबई
2) छायावाद : प्रतिनिधि रचनाएँ
संपादक : नीरा परमार

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

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

i) बाढ़ में पानी बढ़ रहा है।

ii) शेर और बकरी एक घाट पर पानी पीती हैं।

iii) ताजी गाय का दूध दो।

iv) तेरेकू कहाँ जाना है?

v) वह किताब मेज के ऊपर रखी है।

vi) उसने भगवान का दर्शन किया

vii) पचास की नोट फटी है।

viii) बैंक दस बजे खुलेगी।

ix) श्याम किधर को जाता है?

x) पिताजी आ रहा है।

xi) मेरे चाचा की दो लडकियाँ हैं।

xii) उसने एक धागे का स्वेटर बुना।

P.T.O.

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

Human beings suffer from various diseases. Some diseases are seen in individuals from the birth. But most of the diseases are caused either due to infection of pathogens or due to some deficiency in diet or hormones . In this chapter we will study different types of diseases and causal agents and the carriers vectors which are responsible for transmission of diseases.

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

(क) पारसाल नकली लड़ाई के पीछे हम आप जगाधारी जिले में शिकार करने गए थे–हाँ, हाँ–वहीं, जब आप खोते पर सवार थे और आपका खानसामा अब्दुला रास्ते के एक मंदीर में जल चढ़ाने को रह गया।

अथवा

'दो साल से अर्जी दे रखी है की सालो, जमीन के नाम पर तुमने मुझे एक गड्ढ़ा एलॉट कर दिया है, उसकी जगह कोई दूसरी जमीन दो। अगर दो साल से अर्जी यहाँ के दो कमरे ही पार नहीं कर पाई। '

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

(ख) सामान सभी तैयार,
कितने ही हैं असुर, चाहिए कितने तुझको हार?
कर मेखला मुंड–मालाओं से वन मन–अभिरामा–

अथवा

मानव ऐसी भी विरक्ति क्या जीवन के प्रति?
आत्मा का अपमान, प्रेत औ'छाया से रति।।
प्रेम अर्चना यही, करें हम मरण को वरण?
स्थापित कर कंकाल, भरें जीवन का प्राङ्गण।

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

च) 'एक टोकरी भर मिट्टी'कहानी का सारांश लिखिए।

छ) 'पूस की रात'कहानी में चित्रित किसानों की आर्थिक विवश दशा का वर्णन कीजिए।

ज) चौधरी पीरबख्श का चरित्रांकन कीजिए।

झ) 'परमात्मा का कुत्ता' कहानी में गिरते जीवन मूल्यों का वर्णन लेखक ने किस प्रकार किया है?

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

ट) 'जागो फिर एक बार' कविता में कवि क्या संदेश देता है?

ठ) 'एक बार बस और नाच तू श्यामा।'ऐसा कवि क्यों कहता है?

ड) 'सुख–दुख' कविता के आधार पर सुख–दुख का महत्व समझाइए।

ढ) 'ताज' कविता का भावार्थ लिखिए।

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[4317] – 101

Seat No.	

S.Y.B.Sc. (Semester – I) Examination, 2013
MATHEMATICS (Paper – I)
MT – 211 : Calculus of Several Variables
(2008 Pattern)

Time : 2 Hours Max. Marks : 40

N.B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

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

   a) Examine whether $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$ exists or not.

   b) State Young's theorem for the equality of mixed partial derivatives.

   c) Calculate $\frac{\partial^2 z}{\partial y \partial x}$ if z = log (xy).

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

   e) If u = y – x and v = y + x then find J = $\frac{\partial (x, y)}{\partial (u, v)}$

   f) Evaluate $\int_0^1\int_0^1\int_0^1 (x + y + z)\, dxdydz$.

   g) If $u = (x^2 + y^2 + z^2)^{1/2}$ show that $u_{xx} + u_{yy} + u_{zz} = \frac{2}{u}$.

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

   i) If u is a differentiable function of x and y and x, y are differentiable functions of t, then prove that u is a differentiable function of t and $\frac{du}{dt} = \frac{\partial u}{\partial x}\frac{dx}{dt} + \frac{\partial u}{\partial y}\frac{dy}{dt}$.

   ii) If f(x, y) = $\frac{x^3 y}{x^2+y^2}$ when (x, y) $\neq$ (0, 0) and f(0, 0) = 0. Show that $f_{xy}(0, 0) \neq f_{yx}(0, 0)$.

P.T.O.

iii) Let $\frac{4}{x}+\frac{9}{y}+\frac{16}{z}$ = 25. Using Lagrange's method find the values of x, y, z such that x + y+ z is minimum.

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

i) If $u = \tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$, then

show that $x^2 u_{xx} + 2xy\, u_{xy} + y^2 u_{yy} = (1 - 4\sin^2 u)\sin 2u$.

ii) Using differentials, find the approximate value of $\sqrt{(5.98)^2+(8.01)^2}$.

iii) Let f be a real valued function defined in a neighbourhood of (a, b). If f is differentiable at (a, b), then prove that f is continuous at (a, b) and f_x (a, b) and f_y (a, b) both exist.

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

a) i) Find the volume of tetrahedron bounded by coordinate planes and the plane x + y+ z = 1.

ii) Change the order of integration in $\int_0^{2a}\int_{\frac{x^2}{4a}}^{3a-x} f(x, y)\ dydx$

b) i) Evaluate $\iint xy\,(x^2+y^2)^{3/2}\,dxdy$ over the first quadrant of the disc $x^2+y^2 \le 1$.

ii) Evaluate $\iiint_{\substack{x^2+y^2\le 1\\ 2\le z\le 3}} z\,(x^2+y^2)\,dxdydz$.

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Seat No.	

S.Y. B.Sc. (Semester – I) Examination, 2013
MATHEMATICS – II
MT-212 (A) : Differential Equations
Paper – II (2008 Pattern)

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) State the order and degree of the equation

$$\left(\frac{d^3y}{dx^3}\right)^2 - 6\left(\frac{dy}{dx}\right)^4 + 5xy = 0 .$$

b) Solve the differential equation $\frac{d^2y}{dx^2} = 12x^2 + 3x - 7$.

c) Solve $\frac{dy}{dx} - 2y = e^{2x}$.

d) Define Bernoulli's equation.

e) Find an integrating factor of the differential equation

$x^2ydx - (x^3 + y^3)dy = 0.$

f) Form the differential equation of family of circles with center at origin.

g) Solve the differential equation $(D^4 + 3D^3 + 2D^2)y = 0.$

P.T.O.

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

   a) Solve that if $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ then the equation Mdx + Ndy = 0 is exact.

   b) Solve the differential equation

   $$\frac{dy}{dx} + 2xy + xy = 0 .$$

   c) Find the orthogonal trajectory of the family of parabolas, having vertices at (0, 0) and their foci on the y-axis.

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

   a) Prove that $\frac{1}{D^2 + a^2}$ cos ax = $\frac{x}{2a}$ sin ax.

   b) Use the method of variation of parameters to solve

   $$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = \sin(e^{-x}).$$

   c) Obtain the general solution of the $(D^3 – 3D^2 + 3D – 1)y = e^x$.

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

   a) i) Explain the method of undetermined coefficients to solve a non-homogeneous linear differential equation.

      ii) Solve $(D^3 + 4D)y = 6 \sin x$.

   b) i) Explain the method of reduction of order to solve the differential equation

   $$\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R,$$

   where P, Q and R are functions of x alone.

      ii) Solve :

   $$\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 8(x^3 + e^{2x}).$$

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Seat No.	

S.Y. B.Sc. (Semester – I) Examination, 2013
MATHEMATICS – II
MT-212 (B) : Numerical Analysis
(2008 Pattern) (Paper – II (B))

Time : 2 Hours Max. Marks : 40

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

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

a) An approximate value of π is given by 3.14278152 and its true value is 3.14159265. Find the absolute and relative errors in the value of π.

b) Use Descarte's rule of signs to show that the equation
$x^{10} – 4x^6 + x^4 – 2x – 3 = 0$
has atleast four unreal roots.

c) Obtain Newton Raphson formula for finding square root of a given number.

d) State the normal equation for fitting an exponential function $y = ce^{dx}$.

e) With usual notations, prove that
$\Delta - \nabla \equiv \Delta\nabla$

f) State Newton Gregory formula for forward Interpolation.

g) Find a function whose first forward difference is e^x.

h) State fourth order Runge Kutta formula.

i) Evaluate $\int_0^{\pi/4} \tan x \, dx$ by trapezoidal rule from the values provided in the following table :

x	0	$\pi/8$	$\pi/4$
tan x	0	0.4141	1

j) Using Euler's Method, find y (0.05) given that $\frac{dy}{dx} = 1 + y^2$, y(0) = 0 and h = 0.05.

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

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

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

   c) Find the value of y at x = 5, given that

x	1	3	4	8	10
y	8	15	19	32	40

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

   a) Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ with $h = \frac{1}{6}$ by Simpson's $\frac{1^{rd}}{3}$ and $\frac{3^{th}}{8}$ rule. Compare the results with the actual value.

   b) Derive Lagrange's Interpolation Formula for unequally spaced points.

   c) Determine y(0.02) using Euler's Modified Method, given that

   $\frac{dy}{dx} = x^2 + y,\ y(0) = 1,\ h = 0.01.$

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

   a) Find the best values of a, b and c, so that the parabola $y = a + bx + cx^2$ fits the data :

x	1	1.5	2	2.5	3	3.5	4
y	1.1	1.2	1.5	2.6	2.8	3.3	4.1

   b) Solve the following system of equations by Gauss Seidel iteration method.

   $10x_1 + 2x_2 + x_3 = 9$

   $2x_1 + 20x_2 - 2x_3 = -44$

   $-2x_1 + 3x_2 + 10x_3 = 22.$

   (Take four iterations).

Total No. of Questions : 4]

SEAT No. :

P122

[Total No. of Pages : 2

[4317]-103
S.Y.B.Sc. (Semester - I)
PHYSICS
PH - 211 : Mathematical Methods in Physics
(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) ***Use of calculator and log table is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt all of the following :

a) Define the term Homogeneity. **[1]**

b) Determine the value of 'n' if **[1]**

$ln\,(n) = 1.7917 + i\,\pi.$

c) If $\phi = 2xz^4 - x^2y$, Find $\nabla\phi$. **[1]**

d) Define vector triple product. **[1]**

e) State the condition of irrotational vector field. **[1]**

f) Find the value of p which makes vectors **[1]**

$\vec{A} = p\vec{i} + 2\vec{j} + 3\vec{k}$

$\vec{B} = -\vec{i} + 5\vec{j} + p\vec{k}$ perpendicular

g) If $dF = (y^2 - y + 2xy)dx + (x^2 - x + 2xy)dy$, Check up whether dF is an exact differential. **[1]**

h) Define volume integral of a vector field. **[1]**

i) Simplify $i + i^2 - i^3 + i^4 - i^5$. **[1]**

j) State exponential form of complex number and represent it graphically. **[1]**

P.T.O.

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

a) Simplify and show that the given sum is a rational number. **[5]**

$$\frac{(3+2i)}{(2-5i)}+\frac{(3-2i)}{(2+5i)}$$

b) Show that $\vec{\nabla}\times(\phi\vec{A})=(\vec{\nabla}\phi)\times\vec{A}+\phi(\vec{\nabla}\times\vec{A})$. **[5]**

c) A wooden cylinder of radius 7 cm and height 10 cm is to be coated with thin silver sheet of thickness 0.1 cm. Find volume of silver sheet. **[5]**

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

a) Prove that $\nabla^2\left(1/r\right)=0$. **[5]**

b) If $X\sqrt{1+Y}+Y\sqrt{1+X}=0$ show that $\frac{dY}{dX}=-1/(1+X)^2$. **[5]**

c) Show that $x = -1$ is regular singular point of Legendre's differential equation $(1-x^2)\,y'' - 2xy' + l\,(l+1)\,y = 0$. **[5]**

Q4) Attempt the following :

a) i) Obtain quadratic equation in 'Z' if its roots are $(1+i)$ and $(1-i)$. **[4]**

ii) Show that $\overline{A}=(2x^2+8xy^2z)\vec{i}+(3x^2y-3xy)\vec{j}-(4y^2z^2+2x^3z)\vec{k}$ is not solenoidal. **[4]**

OR

i) If $\vec{r},\vec{s},\vec{t}$ be three vectors such that $\vec{r}+\vec{s}+\vec{t}=0$ Prove that $\vec{r}\times\vec{s}=\vec{s}\times\vec{t}=\vec{t}\times\vec{r}$.

ii) If $F=2x^3y^2+y^3$ Find F_x, F_y, F_{xx}, F_{yy}.

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

i) Show that $\sin 2\theta=\frac{e^{i\theta}-e^{-i\theta}}{2i}$, $\cos\theta=\frac{e^{i\theta}+e^{-i\theta}}{2}$ **[2]**

ii) State Gauss divergence theorem and Stoke's theorem. **[2]**

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Total No. of Questions : 4]

SEAT No. :

P123

[Total No. of Pages : 4

[4317]-104
S.Y.B.Sc. (Semester - I)
PHYSICS
PH - 212 (a) : Electronics
(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 log - tables & calculators are allowed.***
4) ***Neat circuit diagrams must be drawn wherever necessary.***
5) ***Symbols have their usual meanings.***

Q1) Attempt all of the following :

a) What is mean by inductive reactance? Give its S.I. unit. **[1]**

b) State various types of capacitor. **[1]**

c) State superposition theorem. **[1]**

d) Define intrinsic stand. off ratio of UJT. **[1]**

e) Define CMRR. **[1]**

f) If V_{NL} = 7 V & V_{FL} = 5 V, find percentage load regulation. **[1]**

g) Define ripple factor. **[1]**

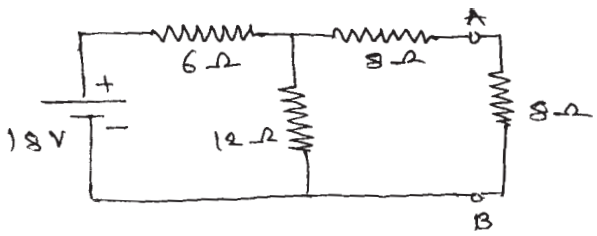
h) Draw the block diagram of regulated power supply. **[1]**

i) State drawbacks of bridge rectifier circuit. **[1]**

j) Convert $(2g)_{10}$ in to binary. **[1]**

Q2) Attempt any two of the following :

a) State Norton's theorem. Explain how to Nortonize the following circuit. **[5]**



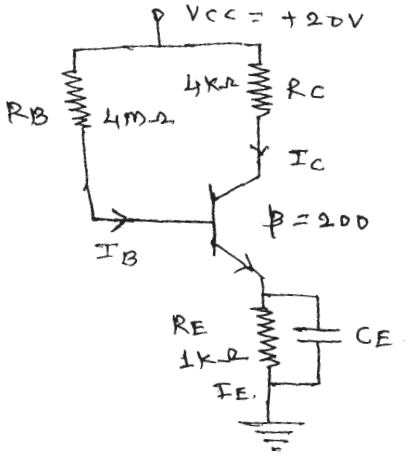
b) What is mean by transistor characteristics? Explain input and output transistor characteristics of common base configuration. **[5]**

c) Explain with circuit diagram Op - Amp as an adder. Show that output voltage is equal to the negative sum of all the inputs. **[5]**

P.T.O.

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

a) Calculate values of I_E, I_B & I_C in a given common emitter transistor circuit. **[5]**

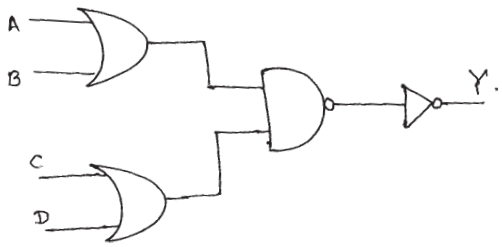


b) What is negative feedback amplifier? In a negative feedback amplifier A = 100, β = 0.02 & Vi = 100 MV. find **[5]**

i) Gain with feedback
ii) Output voltage
iii) Feedback factor
iv) Feedback voltage

c) Find the Boolean expression for the output of following logic circuit. Also find it's output when **[5]**

i) A = 0 , B = 1, C = 1, D = 1
ii) A = 1, B = 1, C = 0, D = 1



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

i) 1) What is mean by transistor biasing? Describe voltage divider bias method. **[4]**

2) What is mean by oscillator? Describe phase - shift oscillator using IC 741. **[4]**

ii) 1) What is a logic gate? Explain basic gates with symbol & truth table. **[4]**

2) Explain working of transistor series voltage regulator. State it's advantages & limitations. **[4]**

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

i) Explain various losses in transformer. **[2]**

ii) State Thevenin's theorem. Give it's limitations. **[2]**

Total No. of Questions : 4]

P123

[4317]-104
S.Y.B.Sc. (Semester - I)
PHYSICS
PH - 212 (b) : Instrumentation
(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 calculators and logtables are allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Symbols have their usual meanings.***

Q1) Attempt all of the following :

a) What is sensitivity of an instrument? **[1]**

b) Define absolute pressure. **[1]**

c) Define Reproducibility. **[1]**

d) Define hysteresis. **[1]**

e) What is a transducer? **[1]**

f) What is humidity? **[1]**

g) State the principle used in resistive transducer. **[1]**

h) State the use of pyranometer. **[1]**

i) Which mechanical transducer is used for measurement of pressure. **[1]**

j) Calculate heart rate in bpm if chart speed is 50 mm/sec and the distance between successive R - R interval is 30 mm. **[1]**

Q2) Attempt any two of the following :

a) What are examples of second order system. Write note on U tube manometer as a second order system of measurement. **[5]**

b) What do you mean by cantilever beam? Explain how it is used for the measurement of force. **[5]**

c) Draw the ECG waveform and explain physical interpretation of the same. **[5]**

Q3) Attempt any two of the following :

a) A pitot tube is fixed in a water pipeline of diameter 30 cm, a difference of pressure indicated by the gauge is 5 cm of water column. Calculate the rate of flow of water through the pipe. **[5]**

b) When input voltage of an instrument changes from 12 V to 16 V, the corresponding output voltage changes from 80 V to 100 V. What will be the sensitivity of the instrument? **[5]**

c) An iron rod of 0.1 m^2 area of cross section is subjected to a magnetising field of 1000 AM^{-1}. Calculate its magnetic permeability.

(Given : Susceptibility of iron is 599) **[5]**

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

i) 1) Write a note on C - type Bourdan tube. **[4]**

2) Explain different standards of measurements. **[4]**

ii) 1) Explain with neat diagram working of LVDT. **[4]**

2) Explain sound pressure level and sound power level. **[4]**

b) Attempt any one of the following :

i) Define blood pressure and state the methods of its measurements. **[2]**

ii) A manufacturer calibrates a temperature gauge of 100°C range with ±0.5°C. If it is used for temperature measurement of 70°C, what will be the probable minimum and maximum value of temperature shown by gauge? **[2]**

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P136

[Total No. of Pages : 1

[4317]-119
S.Y.B.Sc. (Semester - I)
PSYCHOLOGY
EP - 211 : Psychology of Adjustment
(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) Define cohabitation.

b) What is psychoanalysis?

c) What is career?

d) Who is adjustment?

e) Define happiness?

f) Explain the concept of 'Unemployment'.

g) What is job stress?

h) What is anxiety?

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

a) Describe the behavioristic approach of adjustment.

b) Explain the criteria's of abnormal behaviour.

c) Describe the stages of career choice.

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

a) Holland's career choice model.

b) Divorce

c) Well - being and happiness.

Q4) Describe in detail personality disorder. **[8]**

OR

Explain the predictors of marital success.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P137

[Total No. of Pages : 1

[4317]-120
S.Y. B.Sc. (Semester - I)
PSYCHOLOGY
EP - 212 : Experimental 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) What is space perception.
b) What is colour blindness?
c) Define visual acuity.
d) What is colour mixing?
e) What is reinforcement?
f) Define problem solving.
g) What is spontaneous recovery?
h) What is conditioned response (CR)?

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

a) Explain instrumental conditioning.
b) Describe the process of light and dark adaptation.
c) Explain classical conditioning.

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

a) Insight in thinking.
b) Stereoscopic vision.
c) Role of wave length and intensity in relation to visual stimulus.

Q4) Explain monocular cues in visual perception. **[8]**

OR

Describe conceptual process in thinking.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P138

[Total No. of Pages : 2

[4317]-123
S.Y.B.Sc. (Semester - I)
ELECTRONIC SCIENCE
EL - 211 : Analog Circuits and Systems
(Common to Old & New) (Paper - I)

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

Instructions to the candidates:

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

Q1) Answer all of the following

a) Define the term 'Differential mode gain' of differential amplifier. **[1]**

b) What is the frequency range of an I/P signal of Audio frequency amplifier. **[1]**

c) State the names of any two block's used in op - amp. **[1]**

d) Which type of feedback is used in an oscillator circuit. **[1]**

e) "Negative feedback increases the bandwidth of amplifier ckt" comment **[2]**

f) "Center tap transformer used in push pull amplifier provides two sine waves with 180° phase shift" comment. **[2]**

g) Calculate the output voltage of op - amp used as inverting voltage adder. Given $V_1 = 0.1$ volt, $V_2 = 0.2$ volt, $R_f = 2K\Omega$ and $R_{in} = 1K\Omega$. **[2]**

h) Calculate the frequency of Hartly oscillator. Given $L_1 = 0.1$ mH $L_2 = 0.4$ mH and $C = 0.1\mu f$. **[2]**

Q2) Answer any two of the following.

a) State the classification of amplifiers on the basis of operating point (Q point) and draw the graph of I/P and O/P waveforms. **[4]**

b) State the configurations of differential Amplifier and draw the circuit diagram of any one. **[4]**

c) Draw the circuit diagram of class - B push pull amplifier and explain the working along with cross over distortion. **[4]**

P.T.O.

Q3) Answer any two of the following.

a) Draw the circuit diagram of class - A amplifier with resistive load and prove that its efficiency is 25%. **[4]**

b) Draw the circuit diagram of differential amplifier and explain the common mode gain and differential mode gain. **[4]**

c) Explain the different steps to plot the DC load line of transister connected to $+V_{CC}$, R_C and R_E. **[4]**

Q4) Answer all of the following.

a) Draw the circuit diagram of schmitt trigger by using op - amp. State the equations of output voltage for positive and negative saturation. Draw the output waveform for sine wave input. **[6]**

b) State the different types of feedbacks. Derive the expression for the gain when positive feedback is used. **[6]**

OR

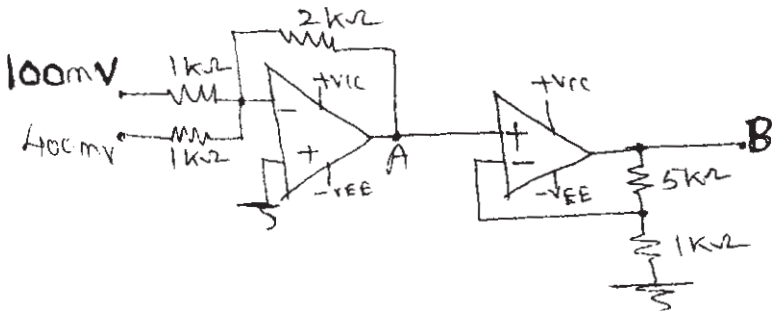
a) A germanium transister is biased with the help of voltage divider circuit by using $R_1 = 10K\Omega$, $R_2 = 10K\Omega$, and $+ V_{CC} = 20$ volt. Plot the DC load line and find the location of operating point if $R_C = 1K\Omega$ and $R_E = 1K\Omega$. **[4]**

b) When negative voltage is feedback an amplifier circuit gives output of 20volt for an Input of 0.5 volt. If feed back is removed then amplifier circuit requires 0.25 volt Input to give the same output. Calculate **[4]**

i) Gain with feedback

ii) Gain without feedback

c) Calculate the value of voltages at pt A & B for the circuit diagram shown below. **[4]**



♦♦♦♦

Total No. of Questions : 4]

P139

[4317]-124
S.Y. B.Sc. (Semester - I)
ELECTRONIC SCIENCE
EL - 212 : Electronic Instrumentation - II
(Paper - II) (Old Course)

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

Instructions to the candidates:

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

Q1) Answer all of the following.

a) Define accuracy of the measuring system. **[1]**

b) What are the types of CRO? **[1]**

c) List different signal sources in electronics. **[1]**

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

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

f) "Least count of the analog multimeter is vital in measurements." Comment. **[2]**

g) Calculate the frequency of sine signal observed on CRO, if time base knob is on 7μs/div and display for one cycle is 4 div. **[2]**

h) Determine static error if a digital voltmeter reads 3.57 V and true value of the voltage is 3.5 V. **[2]**

Q2) Attempt any two of the following.

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

b) Draw the block diagram of D.C. to D.C. converter. State basic principle of D.C. to D.C. converter. **[4]**

c) Sketch various periodic signal waveforms with their characteristics. **[4]**

Q3) Attempt any two of the following.

a) Explain the terms

i) Sensitivity

ii) Resolution **[4]**

b) Draw the block diagram of dual trace CRO and explain function of each block in biref. **[4]**

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

Q4) Attempt all of the following.

a) What is tachometer? Draw the block diagram of tachometer and explain each block in brief. **[6]**

b) State working principle of electronic voltmeter. Draw the block diagram of electronic voltmeter and give its specifications. **[6]**

OR

Attempt all of the following.

a) Calculate the percent load regulation for power supply if V_{NL} = 10 V and V_{FL} = 9.7 V. State ideal values for load regulation. **[4]**

b) Draw the circuit diagram of DC ammeter by using PMMC and calculate the value of R_{SH} for the measurement of 0 to 100 mA with internal resistance of 100 Ω and full scale deflection current is 1 mA. **[4]**

c) Consider voltage divider circuit in which a fixed resistor of 100 KΩ is connected in series of LDR. If change in LDR resistance is 50Ω, when light is incident on it, calculate output voltage across LDR.
[Given V_{in} = 100 V]. **[4]**

♦♦♦♦

SEAT No. :

Total No. of Questions : 4] Total No. of Pages : 4]

P139

[4317]-124
S.Y. B.Sc. (Semester - I)
ELECTRONIC SCIENCE
EL - 2A1 : Digital System Design
(Paper - II) (New Course)

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

Instructions to the candidates:

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

Q1) Answer all of the following :

a) What is parity generator? **[1]**

b) Define logic family. **[1]**

c) State the principal on which flash ADC works. **[1]**

d) What do you mean by state diagram. **[1]**

e) "Synchronous counter is faster than Asynchronous counter". comment. **[2]**

f) "Propagation delay time puts the limit on switching speed". Comment. **[2]**

g) For 4 digit non - multiplexed display, each segment draws 10 mA current. How much current is required to display number 8888. **[2]**

h) Convert following Gray numbers into Binary numbers. **[2]**
   i) 10100
   ii) 11101

Q2) Attempt any <u>two</u>.

a) Using K - map design Half adder circuit. **[4]**

b) Design MOD - 5 counter using J - K Flip - Flop. **[4]**

c) With block diagram, explain auto parking system. **[4]**

P.T.O.

Q3) Attempt any <u>two</u> :

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

b) With the help of circuit diagram, explain the working of binary weighted resistor DAC. **[4]**

c) Define the following parameters of digital IC family **[4]**

i) Figure of merit
ii) Noise margin
iii) Fan out
iv) Fan - IN

Q4) Answer all of the following :

a) Design 4 - bit binary to gray code convertor and implement using logic gate. **[6]**

b) What is shift register? Explain with the help of logic diagram 4 - bit universal shift register. **[6]**

OR

Answer all of the following :

a) Calculate conversion time of 12 - bit successive approximation type ADC with 10 MHz clock. **[4]**

b) Design 4 to 2 priority encoder using K - map. **[4]**

c) What will be output voltage from 4 - bit ladder for digital input 1010. Assume logic '0' = 0 volts and logic '1' = 10 volts. **[4]**

Total No. of Questions : 4]

SEAT No. :

P140

[Total No. of Pages : 1

[4317]-125

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

DEFENCE AND STRATEGIC STUDIES

DS - 101 :International Relations & Foreign Policy

(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.***

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

a) Define 'Sovereign State'.
b) Define 'International Relations.
c) Define 'Balance of Power'.
d) Define 'Alliances'.
e) Define 'Nation and State.
f) Introduce 'National Power'.
g) Define cold war.
h) Write the concept of 'Panch Sheel'.

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

a) Write about idealist Theory.
b) Write about Realist Theory.
c) Write about the significance of National interest.

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

a) Basic Tenets of India's Foreign Policy.
b) Type of National interest.
c) Elements of National power.

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

a) Explain about the determinants of Foreign policy.
b) Discuss nature, scope and subject matter of International relations.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P141

[Total No. of Pages : 1

[4317]-126
S.Y.B.Sc. (Semester - I)
DEFENCE AND STRATEGIC STUDIES
DS - 102 : Elements of 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 2 to 4 sentences each : **[16]**

a) Define Nation state.

b) What do you mean by strategic threat?

c) State the meaning of military diplomacy.

d) What do you mean by security planning.

e) State the meaning of Emerging perspective in defence planning.

f) What do you mean by 'New world order'?

g) Write the meaning of determinants of National Defence.

h) What do you mean by Defence Industrialisation?

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

a) Explain the concept of state.

b) Explain the objectives of National Security.

c) Explain the various dimension of National power.

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

a) Political Diplomacy.

b) Research & Development.

c) New perspectives on South Asian Security.

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

a) Write a note on challenges to India's National security.

b) Explain determinants of defence policy.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P142

[Total No. of Pages : 1

[4317]-127
S.Y.B.Sc. (Semester - I)
DEFENCE & STRATEGIC STUDIES
DS. - 103 : Geopolitics
(2008 Pattern) (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.***

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

a) Define 'Buffer State".
b) What do you mean by E.E.Z.?
c) Define "State".
d) What do you understand by L.A.C?
e) State the meaning of geopolitics.
f) Write any one example of artificial boundary.
g) What do you mean by Delimitation?
h) State the location of Andaman & Nicobar Islands.

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

a) Explain in brief "Problems & solution" of Buffer States.
b) Write in brief territory as a factor of geopolitics.
c) Explain the concept of "Territorial sea".

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

a) Concept of Strategic Minerals.
b) Necessity of Demarcation & Boundaries.
c) Geostrategic importance of Jammu & Kashmir.

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

a) Discuss the geostrategic position & importance of "Siachen Glacier" from Indias security point of view.
b) Evaluate the role of E.E.Z. in relation to the economic development of a country.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P143

[Total No. of Pages : 1

[4317]-128

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

ENVIRONMENTAL SCIENCE

ENV - 201 : Ecology & Ecosystem

(Paper - I) (2008 Pattern)

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

a) Define - Limiting Factor.
b) Who is attributed to have coined the term Ecology & when?
c) Define - Environmental Resistance.
d) State the difference between food chain & food web.
e) Define - Environmental Dynamism.
f) What is meant by Biotic Potential?
g) Define - Biome. Give 2 examples.
h) What are Biogeochemical cycles.
i) Define - Fecundity.
j) What is meant by climax in ecological succession? Give an example.

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

a) Interdisciplinary nature of 'Ecology'.
b) Population size & distribution patterns.
c) Sulphur cycle with diagram.

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

a) Describe Levels of Ecology.
b) Explain the types of food chain with suitable examples.
c) Discuss the various impacts of human on nutrient cycle.

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

a) Describe 4 each of the interspecific & intraspecific relationships with examples.
b) Explain the mechanism of ecological succession. Describe the Hydrosere model.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P144

[Total No. of Pages : 1

[4317]-129
S.Y.B.Sc. (Semester - I)
ENVIRONMENTAL SCIENCE
ENV - 202 : Hydrology
(2008 Pattern) (Paper - 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) Attempt the following in 1 - 2 lines each. **[10]**

a) Give any 2 fresh water sources.
b) What is magmatic water?
c) Give the chemical composition of sea water.
d) Define water Harvesting.
e) What is meant by catchment area?
f) Enlist any 2 types of water pollutants.
g) Define Aquifer.
h) Give 2 examples of fresh water lakes of India.
i) Give difference between harvesting and recharging.
j) What is interception in hydrological process?

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

a) Scope of Hydrology.
b) Sources and consequences of water pollution.
c) Ground water quality in different provinces of India.

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

a) What are the problems caused by fluoride? Explain with suitable case study?
b) What are the issues related to rain water harvesting.
c) What is meant by ground water balance? Explain its methods of estimation.

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

a) Discuss the problems of overexploitation of ground water resources & add a note on its remediation.
b) Describe various Hydrological processes with suitable examples.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P145

[Total No. of Pages : 3

[4317]-130
S.Y.B.Sc. (Semester - I)
OPTIONAL ENGLISH
Enriching Oral and Written Communication in English
(2008 Pattern)

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

Instructions to candidates:

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

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

a) Imagine that you are the head of an organization. What measures would you take to ensure a healthy communication system?

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

i) Open hands

ii) Tilting of head

iii) Frown

iv) Clenched hands

v) Standing with arms folded in front of your body.

c) State whether communication in each of the following situations would be formal or informal.

i) group discussion in a classroom

ii) business meeting

iii) Job interview

iv) an announcement at a railway station.

v) internet chatting.

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

a) Guess the meaning of the underlined word in the sentences below.

i) I <u>can</u> swim.

ii) I lost a <u>can</u> of paint.

b) Write two words using the prefixes/suffixes given below.

i) bi -

ii) multi -

iii) - ess

iv) - er

P.T.O.

c) Match the synonyms in the two columns.

	'A'	'B'
i)	charm	daybreak
ii)	prior	quick
iii)	dawn	previous
iv)	brisk	allure

d) Choose the appropriate word from the alternatives given and fill in the blanks.
   i) Did you _____ (remember/remind) to bring your hall ticket?
   ii) Can you _____ (remember/remind) me to ring her up tomorrow?

e) Write down one literal and one figurative meaning each for the words given below.
   i) lame
   ii) hot

f) Write down two words each, closely related in meaning to the followig words :
   i) stone
   ii) look

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

a) Write four words/phrases belonging to the following lexical webs.
   i) Hospital
   ii) Traffic

b) Give the meaning of the underlined word in the following sentences.
   i) It was May, and the apple trees were all in <u>flower</u>.
   ii) Many young men were killed in the <u>flower</u> of their youth.

c) Choose the correct spellings.
   i) thyroid, thairoid, trighroid
   ii) squirel, squirrel, squiral

d) Give the meanings of the following phrases and use them in sentences.
   i) boil over
   ii) boil down

e) Fill in the blanks in column 'B' with words starting with the letter 'b' which are the same or almost the same in meaning as that of the corresponding word in column 'A'.

	'A'	'B'
i)	endure	b _____
ii)	fence	b _____
iii)	exchange	b _____
iv)	elementary	b _____

f) Write two four letter words using the letters in the following words.
   i) barricade
   ii) fabrication

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

a) Write one sentence each for the following situations.
   i) seeing off someone
   ii) giving support and reassurance
   iii) encouraging
   iv) greetings
   v) expressing thanks

b) Place the accent in front of the right syllable in the following words.

noun/adjective	verb
desert	desert
permit	permit
perfect	perfect
present	present
object	object

c) Write the phonetic transcription for the following words
   i) arm
   ii) tame
   iii) urge
   iv) smile
   v) heap

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P149

[Total No. of Pages : 2

[4317]-134

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

ARABIC

Functional Arabic

(2008 Pattern)

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

Q.I. Translate into Arabic any Five of the Following Sentences:- (10)

(1) This School is good.

(2) The Boy is Bright.

(3) Ali is returning with Fatema from the market.

(4) His office is far from his home.

(5) There is a newspaper on the table.

(6) On the window there is a curtain.

(7) There is a Student in the class—.

(8) No. His college is closed ——.

Q.2. Define with Examples any Two of the following topics:- (10)

(١) اَلْمُبْتَدَأُ وَالْخَبَرُ - (٢) اَلضَّمَائِرُ -

(٣) أَجْزَاءُ الْكَلِمَةِ - (٤) حُرُوفُ الْجَرِّ -

P.T.O.

Q.3. Translate in English any Five (10)
of the following Sentences:-

(١) تِلكَ الحَافِلَةُ ذَاهِبَةٌ إِلَى الجَامِعَةِ.

(٢) عَلَى الطَّاوِلَةِ جَرِيدَةٌ ـــــ.

(٣) التِّلمِيذُ ذَاهِبٌ إِلَى المَدرَسَةِ ـ

(٤) الكُرسِيُّ مُرِيحٌ ـ (٥) فِي الثَّلَّاجَةِ لَحمٌ ـ

(٦) حَدِيقَةُ الجَامِعَةِ كَبِيرَةٌ ـــــ

(٧) هَل مَدرَسَتُكَ مُغلَقَةٌ ـ

(٨) وَالِدِي عَامِلٌ فِي مَزرَعَةٍ ـ

Q.4. Write in Arabic any Ten of the (10)
following Terminologies:-

(1) Computer. (2) Motion. (3) Matter. (4) Atom
(5) Science. (6) Astrology (7) Liquid.
(8) Voltage. (9) Micro Scop. (10) Coolness.
(11) Artificial. (12) Solid. (13) orbit.
(14) Freezing Point. (15) Solid. (16) Heat.

♦♦♦♦

Total No. of Questions : 4]

SEAT No. :

P315

[Total No. of Pages : 3

[4317] - 114
S.Y. B.Sc. (Semester - I)
STATISTICS
ST - 212 : Continuous Probability Distributions - 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) ***Use of scientific calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Attempt each of the following:

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

i) If the M.G.F. of a r.v. X is

$M_x(t) = \left(1-\frac{t}{3}\right)^{-1}$, then M.G.F. of 3 X is

1) $(1-t)^{-1}$

2) $= (1-3t)^{-1}$

3) $3(1-t)^{-1}$

4) $=(3-t)^{-1}$

ii) If (X,Y) is a bivariate random variable with joint p.d.f.

$f(x,y) = c\,xy \quad ; \quad 0<x<1, 0<y<1$

$= 0 \quad ; \quad$ otherwise

then, value of c is

1) $\frac{1}{4}$ 2) 4

3) 2 4) 1

P.T.O.

iii) Let $X \sim N(4,25), Y \sim N(5,36)$. If X and Y are independent random variables, then X + Y follows

1) N (9, 121)
2) N (9, 25)
3) N (9, 61)
4) N (9, 36)

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

i) If $X \sim G(1,1)$, then distribution of X is same as that of standard exponential distribution.

ii) If $X \sim U(2,14)$, then var (X) is 14.

iii) If X is a continuous random variable on $(0,\infty)$, with p.d.f. $f(x)$, then its geometric mean is Antilog $[E(X)]$.

c) If (X,Y) is a continuous bivariate random variable, then define $E[g(X,Y)]$, where g (X,Y) is a function of (X,Y). **[1]**

d) If $X \sim N(\mu, \sigma^2)$, such that $Q_1 = 12$, $Q_3 = 22$, then find μ. **[1]**

e) State 'lack of memory property' of exponential distribution. **[1]**

f) If $M_X(t) = \left(1 - \frac{t}{2}\right)^{-1}$, find the third Cumulant. **[1]**

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

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

$$f(x) = \frac{3}{2}x^2 \quad ; \quad -1 \le x \le 1$$

$$= 0 \quad ; \quad \text{otherwise}$$

find p.d.f. of $Y = X^2$.

b) If $X \sim U(a,b)$, find mean of X. Also find probability distribution of

$$Y = \frac{X - a}{b - a}$$

c) Let $X \sim G(\alpha, \lambda)$. Obtain the expression for r^{th} raw moment of X. Hence find variance of X.

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

a) If the joint p.d.f. of (X,Y) is

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

Find M.G.F. of (X,Y). Hence find M.G.F. of Y.

b) Let $X \sim Exp(\alpha)$. Obtain the distribution function of X. Hence find Q_3.

c) i) Let $X \sim N(\mu, \sigma^2)$. Find μ_3.

ii) Let $X \sim G(2,1)$ and $Y \sim G(2,3)$. If X and Y are independent random variables. Find the probability distribution of X + Y.

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

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

$$f(x,y) = 4xy \quad ; \quad 0<x<1, \ 0<y<1$$
$$= 0 \quad ; \quad \text{otherwise}$$

1) Find the marginal distribution of X.
2) Find the marginal distribution of Y.
3) Verify whether X and Y are independent random variables.
4) Find the conditional distribution of X given Y = y.

ii) Suppose that the life time of a particular electronic component is exponentially distributed with a mean life 800 hours. What is the probability that the component will survive after 600 hours. **[3]**

b) i) Let X be a continuous r.v. with c.d.f. **[6]**

$$F(x) = 0 \quad ; \quad x<-1$$
$$= \frac{x+1}{2} \quad ; \quad -1 \le x<1$$
$$= 1 \quad ; \quad x \ge 1$$

Find:

1) $P\left(\frac{1}{4}<X<\frac{3}{4}\right)$
2) p.d.f. of r.v. X.
3) E (X).

ii) If X is a continuous r.v. with M.G.F. **[4]**

$M_x(t) = e^{2t+8t^2}$, find $P[2 \le X \le 3]$.

Total No. of Questions : 4]

SEAT No. : ____

P124

[Total No. of Pages : 2

[4317]-105
S.Y. B.Sc. (Semester - I)
CHEMISTRY
CH-211: Physical 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) ***Use of logarithmic table and calculator is allowed.***
4) ***Neat diagrams must be drawn wherever necessary.***

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

a) Define 'Vapour pressure of a liquid'.

b) What are the limitations of third law of thermodynamics?

c) Write the equilibrium constant expression for the reaction.

$$CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$$

d) State Nernst Distribution Law.

e) The osmotic pressure of 0.1 m solutions of glucose and sodium chloride are not equal. Why?

f) Draw a diagram for variation of mutual solubility of phenol water system with temperature.

g) Define 'Standard free energy of formation'.

h) What are azeotropes?

i) Define Van't Hoff factor.

j) What is the normality of the solution containing 10 gm of NaOH (Eq. Wt = 40) in 1000 ml solution?

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

i) What is osmosis? Derive a relationship between osmotic pressure and concentration of dissolved solute.

ii) State and explain Le-Chateliar-Braun Principle.

iii) Discuss the methods of assignment of absolute entropies of solids.

P.T.O.

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

i) During a reversible compression of one mole of an ideal gas, its pressure increases from 1.013×10^5 pascal to 10.13×10^6 pascal. The compression was carried out at 300 K. Calculate changes in free energy and entropy of the gas.
($R = 8.314$ J mole^{-1} K^{-1})

ii) When 0.946 gm of a sugar is dissolved in 150 gm of water, the resulting solution is observed to have a freezing point of – 0.0651ºC. What is the molecular weight of sugar?
(Freezing point of water = 0ºC and K_f for water = 1.86)

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

i) State Henry's law and give its applications.

ii) Explain any two applications of Nernst distribution law.

iii) Define the terms :

1) Freezing point 2) Molality

3) Isotonic solutions

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

i) The mixture of an immiscible liquid and water boils at 98ºC at 755 mm of pressure. The vapour pressure of water at 98ºC is 712 mm of Hg. Find the weight composition of distillate.
(Molecular weight of immiscible liquid = 204)

ii) When 64 gm of Oxygen gas and 42 gm of nitrogen gas are mixed at constant temperature. Assuming these gases do not react chemically. Calculate entropy of mixing.
(R = 8.314 J, At.wt of oxygen = 16 and Nitrogen = 14)

Q4) a) Derive clausius-clapeyron equation in integrated form for liq $\rightleftharpoons$ Vap equilibrium **[6]**

OR

Draw vapour pressure-temperature curve for solvent and solution. Prove that elevation of boiling point of solution is a colligative property.

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

i) Discuss partially miscible liquid pairs with lower critical solution temperature with suitable example.

ii) Explain the properties and significance of change in Gibb's free energy.

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Total No. of Questions : 4]

SEAT No. : ____

P125

[Total No. of Pages : 2

[4317]-106
S.Y. B.Sc. (Semester - I)
CHEMISTRY
CH-212: Organic Chemistry
(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 structures and diagrams if necessary.***

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

a) Define the diastereoisomer.

b) Acetone gives haloform reaction. Explain.

c) What is the action of $NaOH/Br_2$ on benzamide?

d) M.P. and B.P. of amines are lower than those of alcohols of comparable molecular weight. Explain.

e) Why Furan is aromatic?

f) Give the importance of biochemistry in agriculture.

g) Draw the structure of sucrose.

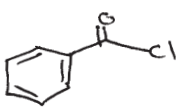
h) State the functions of lipids.

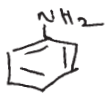
i) What are hormones?

j) Give the specific use of Sn/HCl.

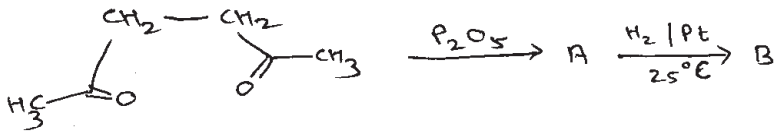
Q2) a) Assign Ⓐ and Ⓑ (any three) : **[6]**

i) $C_6H_5CHO \xrightarrow{CH_3MgBr} (A) \xrightarrow{H^{\oplus}/H_2O} (B)$

ii)  $\xrightarrow{NH_3} (A) \xrightarrow{H^{\oplus}/H_2O} (B)$

iii)  $\xrightarrow[0^{\circ}C]{HNO_2} (A) \xrightarrow{CuCN} (B)$

P.T.O.

iv) 

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

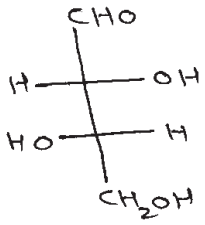
i) Ethyl alcohol to acetamide.
ii) Benzaldehyde to cinnamaldehyde.
iii) Acetylene to 1-butyne.
iv) Nitrobenzene to benzene diazonium chloride.

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

a) Draw chair and boat conformation of cyclohexane, with Newmann projection formula. Explain why is chair form more stable than boat?
b) What are polysaccharides? Discuss the structure of Amylose and Amylopectin.
c) What are proteins? Explain primary and secondary structure of proteins.

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

i) Define Erythro and Threo isomers. Assign 'R' and 'S' configuration of the following molecule.



ii) What are ketones? How will you prepare following :
1) Acetone from 2-propanol and
2) Acetophenone from benzene
iii) Give functions of RNA.

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

i) What are heterocyclic compounds? What action of $CHCl_3$ / KOH on thiophene?
ii) Why enzyme catalysed reactions are faster?

OR

i) Explain Claisen Ester condensation.
ii) What are waxes? Give properties of waxes.

Total No. of Questions : 4]

SEAT No. :

P126

[Total No. of Pages : 1

[4317]-107

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

BOTANY

BO-211: Fundamentals of Plant Systematics and Plant Ecology

(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) ***Draw neat labelled diagrams wherever necessary.***

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

a) Give any two objectives of Taxonomy.
b) What is pioneer phase of Taxonomy?
c) What is Binomial nomenclature?
d) Enlist any two embryological characters used as data source in Taxonomy.
e) Write the botanical name of any one plant of family Asclepiadaceae.
f) What is climax?
g) What is synecology?
h) Define food chain.
i) What are Xerophytes?
j) What is ecesis?

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

a) Give the limitations of Bentham and Hookers System of classification.
b) Give the general rules for coining of generic names.
c) What is ecological pyramid? Explain the pyramid of Biomass.

Q3) Write short notes on ANY TWO of the following : **[10]**

a) External adaptive features of hydrophytes.
b) Diagnostic features of family Solanaceae.
c) Succession on Rock.

Q4) Give the salient features floral formula, floral diagram and economic importance of family liliaceae. **[10]**

OR

Enlist abiotic components of ecosystem and explain their role in an ecosystem.

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Total No. of Questions : 4]

SEAT No. :

P127

[Total No. of Pages : 1

[4317]-108
S.Y. B.Sc. (Semester - I)
BOTANY - II
BO-212: Fundamentals of Plant Physiology
(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) Give any two applications of plant physiology.
b) What are Long Day Plants?
c) What is active absorption of water?
d) Define guttation.
e) Give any two applications of vernalization.
f) What is grand period of growth?
g) Define photo periodism.
h) What are antitranspirants?
i) Define bioenergetics.
j) What is imbibition?

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

a) Explain different types of transpiration.
b) Give practical applications of Gibberellins.
c) Describe root pressure theory of ascent of sap.

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

a) Physicochemical properties of water.
b) Ion Exchange theory.
c) Arc Auxanometer.

Q4) What is diffusion? Give an account of mechanism and laws of diffusion. Add a note on its significance in plants. **[10]**

OR

What is mineral nutrition? Give criteria for essentiality of elements. Add a note on role and deficiency symptoms of phosphorus.

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Total No. of Questions : 4]

SEAT No. :

P128

[Total No. of Pages : 1

[4317]-109
S.Y. B.Sc. (Semester - I)
ZOOLOGY
ZY - 211: General Zoology and Biological Techniques - I
(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 labelled diagrams must be drawn wherever necessary.***

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

a) What is autotomy?
b) Define gametogenesis.
c) What is discoblastula?
d) What is electrophoresis?
e) What is embedding?
f) Write the name of instrument used for measurement of blood pressure.
g) Mention any two disadvantages of IVF.
h) Define meroblastic cleavage.
i) Mention the names of any two pathogenic protista.
j) Define eucoelomata.

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

a) Any two types of metamerism.
b) Sterilization by moist heat.
c) Ciliary movement in protista.

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

a) Principle and applications of Thin Layer chromatography.
b) Sketch and label sponging mouth parts.
c) Describe the principle of colorimeter.

Q4) Describe the alimentary canal of starfish. Add a note on physiology of digestion. **[10]**

OR

Describe in detail various types of eggs with suitable examples.

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Total No. of Questions : 4]

SEAT No. : ____

P129

[Total No. of Pages : 1

[4317]-110

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

ZOOLOGY

ZY - 212: Applied Zoology - I

(Fisheries and Agricultural Pests and their Control)

(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 labelled diagrams must be drawn wherever necessary.***

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

a) What is coastal water fishery?
b) Define pesticide.
c) Write the biological name of Mackerel.
d) Write the biological name of Red cotton bug.
e) Mention the biological name of Pearl oyster.
f) Enlist any two veterinary pests.
g) Enlist any two fishing crafts.
h) Write the full form of IPM.
i) Mention any two hazardous effects of pesticides on man.
j) Mention any two uses of fish liver oil.

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

a) Drying and canning techniques in fish preservation.
b) Crabs and snails as non-insect pests.
c) Rampani net.

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

a) Describe in brief cynogas pump as a plant protection appliance.
b) Give a brief account of chemical pest control method with suitable examples.
c) Describe harvesting method of Harpodon.

Q4) Describe marks of identification, nature of damage and control measures of Mango stem borer and Jowar stem borer. **[10]**

OR

Describe the habit, habitat and culture methods of Catla catla and Macrobranchium rosenbergi.

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Total No. of Questions : 4]

SEAT No. :

P130

[Total No. of Pages : 1

[4317]-111
S.Y. B.Sc. (Semester - I)
GEOLOGY
GL-211: Mineralogy
(2008 Pattern) (Paper - I)

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

Instructions to the candidates :

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

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

a) Define Phyllosilicate structure.
b) Give alteration products of Chlorites.
c) What is the composition of Olivine Minerals?
d) Define beauty of gemstones.
e) Give chemical composition of Wollastonite.
f) Name two yellow coloured gems.
g) What is parallel overgrowth in crystal?
h) What is Manebach twinning?
i) Define Isotropism.
j) Define Refractive Index (R.I) of minerals.

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

a) Classification of Twins.
b) Physical & optical properties of silica group of minerals.
c) Growth of crystals in cavities.

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

a) Newtons scale of Interference colours.
b) Holohedral, hemihedral and hemimorphic forms.
c) Crystalline and non-crystalline minerals.

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

OR

Give the crystallographic axes. Elements of symmetry and forms present with indices of Hexagonal system (Types - Calcite & Tourmaline).

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Total No. of Questions : 4]

SEAT No. :

P131

[Total No. of Pages : 1

[4317]-112
S.Y. B.Sc. (Semester - I)
GEOLOGY
GL-212: Structural Geology
(Paper - II) (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) What is an Outlier?
b) Define a couple.
c) Define axial plane of a fold.
d) Define shear joints.
e) Define 'Hade' of a fault.
f) Give any two methods of representation of folds.
g) Define plunge of a linear feature.
h) What is overturned fold?
i) What are dip joints?
j) Define slip along a fault.

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

a) Nature of the movement along a fault.
b) Plunging and Non-plunging folds.
c) Drag folds.

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

a) Disharmonic folding.
b) Angular unconformity.
c) Recognition of top of bed by using topographic contour.

Q4) Define fault and describe the geometrical classification of fault. **[10]**

OR

Describe the term rupturing and describe the term rupturing under tension and torsion.

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Total No. of Questions : 4]

SEAT No. :

P132

[Total No. of Pages : 1

[4317]-115
S.Y. B.Sc. (Semester - I)
GEOGRAPHY
Gg-211: Fundamentals of Geography of Resources
(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) ***Draw neat diagrams wherever necessary.***
4) ***Use of map stencil is allowed.***

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

a) What is a resource?
b) Give any two examples of natural components of resources.
c) What do you mean by abiotic resources?
d) Give two examples of biotic nonrenewable resources.
e) State any four direct uses of forests.
f) State two causes of deforestation.
g) Write two methods of conservation of forest resources.
h) Write any two sources of water.
i) State any two methods of conservation of water.
j) State any two uses of land resources.

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

a) Components of human resources.
b) Importance of biotic renewable resources.
c) Soil conservation.

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

a) Explain how the resources are classified.
b) Give importance of study of resources.
c) Explain the environmental significance of forests.

Q4) Describe the various uses of water resources. **[10]**

OR

What is land degradation? Describe the land degradation occurring due to human activities.

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Total No. of Questions : 4]

SEAT No. :

P133

[Total No. of Pages : 1

[4317]-116
S.Y. B.Sc. (Semester - I)
GEOGRAPHY
Gg-212: Introduction to Hydrology
(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 diagrams and sketches wherever necessary.***
4) ***Use of map stencil is allowed.***

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

a) Define hydrology.
b) What is Palaeohydrology?
c) Write any two units of stream and river flow measurement.
d) What is water vapour?
e) What do you mean by frontal rainfall?
f) What is meant by infiltration?
g) Give two examples of low rainfall regions in the world.
h) What is meant by net precipitation?
i) What do you mean by point precipitation?
j) What is interception?

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

a) Applications of hydrology.
b) Depression storage.
c) Convective precipitation.

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

a) Describe the probable maximum precipitation.
b) Explain the throughfall.
c) Explain how various hydrological variables are measured.

Q4) Give a detailed account of sources of hydrologic data. **[10]**

OR

What is hydrologic budget? Give a detailed account of hydrologic budget.

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Total No. of Questions : 4]

SEAT No. :

P134

[Total No. of Pages : 2

[4317]-117
S.Y. B.Sc. (Semester - I)
MICROBIOLOGY
MB-211: Microbial Physiology
(2008 Pattern) (Theory) (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 diagram wherever necessary.***

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

a) Define Angular Velocity.

b) What is Catabolism.

c) Which one of the following is cofactor of enzyme.

i) Cu^{+} ions ii) ATP

iii) Pyruvate iv) NAD Acetate

d) State the principle of molecular exclusion chromatography.

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

f) All proteins are enzymes - True/False.

g) Write one example of any reduction reaction.

h) _____ is the range of wavelength of light in visible spectrophotometry.

i) Draw the structure of Citric acid.

j) Write the name of key enzyme involved in HMP pathway.

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

a) Describe the principle and applications of affinity chromatography.

b) Schematically represent heterolactic acid fermentation path way with it's significance.

c) Explain effect of pH on enzyme activity.

P.T.O.

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

a) Illustrate diagrammatically interconnectivity of pathways.

b) Explain pulse chase experiment.

c) Describe Emil Fisher's model for Enzyme catalysis?

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

a) Explain in detail classification of enzyme as per IUB. Describe oxidoreductases and ligases with their subclasses and one example of each.

b) Answer the following :

i) Diagrammatically represent the concept of "Amphibolism" with respect to TCA cycle.

ii) Explain the principle and applications of Spectrophotometer.

Total No. of Questions : 4]

SEAT No. : ____

P135

[Total No. of Pages : 2

[4317]-118
S.Y. B.Sc. (Semester - I)
MICROBIOLOGY
MB-212: Microbial Genetics
(2008 Pattern) (Theory) (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) Which form of DNA was described by Watson and Crick.
   i) B ii) Z
   iii) A iv) C

b) J. Cairn's experiment employed the following technique
   i) Chromatography ii) Autoradiography
   iii) Ultracentrifugation iv) Ultrafilteration

c) Which of the following is an initiation codon
   i) UAA ii) UUU
   iii) UAG iv) AUG

d) Define: Spontaneous mutation

e) State True or False :
   The function of DNA gyrase in E.Coli is to synthesize the DNA remove supercoils from DNA.

f) Draw the structure of Cytosine.

g) Define: Linking number of DNA.

h) State True or False :
   The Bacterial nucleoid is enclosed in a nuclear membrane.

i) In procaryotic transcription, the RNA polymerase binds to _____.
   i) Promotor ii) Terminator
   iii) Repressor iv) Suppressor

j) Plasmid DNA replicates by _____ mechanism.
   i) D-loop ii) Rolling circle
   iii) Continuous iv) θ-type

P.T.O.

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

a) Compare the A and Z forms of DNA.

b) Explain in brief the prokaryotic transcription.

c) Justify :
Replica plate technique can be used for isolation of Auxotrophic mutants.

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

a) Diagrammatically represent the semidiscontinuous and semiconservative replication of DNA.

b) Briefly describe the Avery & Macleod experiment for proving DNA as the genetic material.

c) Enlist the properties of genetic code and discuss any two in details.

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

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

i) Alkylating agent (any one)

ii) Intercalating agent (any one)

iii) Non-ionizing radiation

iv) Base analogue (any one)

b) Explain the fluctuation test proving the spontaneous nature of mutations.

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Total No. of Questions : 4]

SEAT No. :

P151

[Total No. of Pages : 1

[4317] - 136

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

INDUSTRIAL CHEMISTRY - I

VOC - 211 : Utilities, Unit Operations and Process Instrumentation (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) ***Draw neat diagrams wherever necessary.***

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

a) What is extractive distillation?
b) Convert 24g cm^{-3} into SI units.
c) Give the differences between evaporation and distillation.
d) State Peltier effect.
e) Define Hardness of water.
f) State the principle of Piezoelectric pressure devices.
g) Write the expression for Reynold number.
h) What is bound and unbound water?

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

a) Describe the applications of steam in industry.
b) Explain the principle and advantages of an inclined manometer.
c) Define crystallization and primary nucleation.

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

a) Nutriex filters.
b) Applications of evaporation process in industry.
c) Ultrasonic pressure devices.

Q4) Explain with a diagram how the electronic pressure gauge is used to measure vacuum pressure.

OR

Describe the Lancashire boiler with a diagram. **[8]**

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Total No. of Questions : 4]

SEAT No. :

P152

[Total No. of Page : 1

[4317] - 137
S.Y. B.Sc. (Vocational) (Semester - I)
BIO-TECHNOLOGY - I
VOC - Biotech - 211 : Cell and Molecular Biology
(2008 Pattern) (Paper - I)

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

Instructions to the candidates :

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

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

a) Define : Cistron.
b) Give the role of chloroplast in the cell.
c) Enlist the cell signaling methods.
d) Give the example of secondary transport.
e) What is the role of amino acid acceptor arm in tRNA?
f) Give the role of fibronectin in ECM of the cell.
g) Enlist the types of proteins present in cell membrane.
h) Name the first amino acid which will get added during protein synthesis in eukaryotes.
i) Give the types of nitrogen bases in RNA molecule?
j) What is the function of DNA polymerase enzyme?

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

a) Subcellular organelle separation.
b) Chromatin structure.
c) Desmosomes.

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

a) Explain the cloverleaf structure of tRNA.
b) Describe the process of SOS repair of DNA.
c) What is neoplasia? Explain it's mechanism.

Q4) Explain in detail the prokaryotic transcription process. **[10]**

OR

Explain in detail the structure and function of mitochondria.

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Total No. of Questions : 4]

SEAT No. :

P153

[Total No. of Pages : 2

[4317] - 139

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

ELECTRONIC EQUIPMENTS MAINTENANCE - I

VOC - EEM - 211 : Audio, Video & Office Equipment - A

(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) ***Use of calculator/log table is allowed.***

Q1) Answer the following :

a) State the function of tuner in radio receiver. **[1]**

b) What is the principle of record/read head used in tape recorder? **[1]**

c) What are the different scanning methods used in TV? **[1]**

d) What do you mean by "Aspect Ratio"? **[1]**

e) What are the two processes carried out on chroma signal to fit into 0 to 1 MHz slot? **[2]**

f) State the principle of operation of DVD. **[2]**

g) What is the difference between LP record and compact disc? **[2]**

h) What are the different types of microphones used with public address system? Why? **[2]**

Q2) Answer any two :

a) Explain the important characteristics of radio receiver. **[4]**

b) Describe the mechanism of recording on audio tapes. **[4]**

c) State the advantages and applications of MP3 players. **[4]**

Q3) Answer any two :

a) Explain the composite video signal. **[4]**

b) What are the different flat screen display systems used in offices? Give the important specifications of flat screen system. **[4]**

c) Write short note on "PAL - B" standard. **[4]**

P.T.O.

Q4) Attempt the following :

a) Discuss the features and construction of commercially available radio receiver IC. **[6]**

b) Explain the principles of recording and replay of ACD. **[6]**

OR

Attempt the following :

a) Draw a neat labelled block diagram of a colour TV receiver. List various important parts therein. **[6]**

b) Explain CCTV system used in office environment. Explain its advantages. **[6]**

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Total No. of Questions : 4]

SEAT No. :

P154

[Total No. of Pages : 2

[4317] - 140

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

COMPUTER HARDWARE AND NETWORK ADMINISTRATION

Microprocessor & Interfacing Techniques - I

(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 Microprocessor?

ii) What is the size of maximum memory that 8086 can address?

iii) What is Full form of AMD?

iv) What is Interrupt?

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

i) What is function of ROM?

ii) List any two types of light sensor.

iii) State any two features of Pentium processor.

iv) How to configure 8086 microprocessor to minimum mode?

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

a) What is Bus? Explain features of any one Bus.

b) What is ADC? Define linearity and resolution of an ADC.

c) What is DMA? What is function of DMA?

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

a) Draw block diagram of 8086 Microprocessor.

b) Differentiate between hardware and software Interrupt.

c) What are advantages and disadvantages of DRAM?

P.T.O.

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

a) Draw and explain Matrix keyboard interface to Microprocessor.

b) Waht is DAC? Explain working of any one type of DAC.

c) What is Cache? What is need of cache? What is size of cache in Pentium processor.

Total No. of Questions : 4]

SEAT No. :

P155

[Total No. of Pages : 1

[4317] - 141
S.Y. B.Sc. (Vocational) (Semester - I)
SEED TECHNOLOGY - I
Hybrid Seed Production
(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) ***Draw neat and labeled diagrams wherever necessary.***

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

a) What is apomixis?
b) Define cytoplasmic male sterility.
c) Define pollen viability.
d) What are gametocides?
e) What is roughing?
f) Name the types of pollination.
g) Write the isolation distance adopted for foundation seed production in *Zea mays*?
h) Define inbreeding depression.
i) What is a variety?
j) What are pollen shedders?

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

a) Explain the genetic basis of heterosis.
b) Describe in detail the procedure for hand emasculation.
c) Comment on homomorphic self incompatibility.

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

a) Pollen storage.
b) Compact area approaches.
c) Genetic male sterility.

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

OR

Explain in detail, the procedure for hybrid seed production in Cotton.

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Total No. of Questions : 4]

SEAT No. :

P156

[Total No. of Pages : 2

[4317] - 142

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

INDUSTRIAL MICROBIOLOGY - I

VOC - IND - MIC - 211 : Bioreactors - Design and Operations

(2008 Pattern) (Paper - I)

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

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***

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

a) ———— impeller should be used when fermentation broth is viscous.

b) What is the use of feed-port in fermenter.

c) Define : Containment.

d) What is immobilization?

e) State whether the following statement is true or false 'one advantage of fed batch culture is that concentration of limiting substrate may be maintained at very low level to avoid repression effect.

f) State the principle of measurement in Do-sensor.

g) Name any two types of sparger.

h) Define 'Del Factor'.

i) State whether the following statement is TRUE or FALSE 'Dielectric spectroscopy can be used on-line to monitor biomass'.

j) What is the use of check valve in fermentation?

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

a) What is solid state fermentation? Describe any two fermenter design of SSF.

b) Explain the working of a chemostat model used in continuous fermentation process.

c) What is cooling tower? Explain their types in short.

P.T.O.

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

a) Describe air-lift fermenter.

b) Describe cross-linking as method of immobilization.

c) Explain the computer applications in fermentation technology.

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

a) Describe the making of fermenter with respect to design calculation, fabrication, assembly and testing.

b) Explain the methods used to maintain aseptic conditions in fermentation process.

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Total No. of Questions : 4]

SEAT No. :

P157

[Total No. of Pages : 1

[4317] - 143

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

INDUSTRIAL CHEMISTRY - II

VOC - 212 : Inorganic Process Industries

(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 diagrams wherever necessary.***

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

a) Define cullet.
b) What is fibre glass?
c) Name two methods to prevent corrosion.
d) Give the composition of two types of aluminium alloys.
e) What is stray current corrosion?
f) Define : Super alloys.
g) Define : Glazing.
h) Give uses of bronze alloys.

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

a) What are white wares? Give their uses.
b) Describe the properties of the quartz glass.
c) Write a note on vehicle of paints.

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

a) Discuss curing of cement.
b) Write a note on high alumina cement.
c) Explain the properties of refractory materials.

Q4) Classify and describe composite materials. **[8]**

OR

Describe the manufacture of glass by tank furnace method.

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Total No. of Questions : 4]

SEAT No. :

P158

[Total No. of Pages : 2

[4317] - 144

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

BIO-TECHNOLOGY - II

VOC - Biotech - 212 : Recombinant DNA Technology and Bioinformatics

(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) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*

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

a) What are cosmids?

b) What are cloning vectors?

c) Define site directed mutagenesis.

d) What is Northern hybridization?

e) Give name of the enzyme used in PCR.

f) What is transformation?

g) What is rDNA technology?

h) Give example of a shuttle vector.

i) What is YAC?

j) Give two examples of restriction endonucleases.

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

a) Applications of PCR.

b) Genomics.

c) Cloning vectors.

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

a) Describe desirable properties of plasmids to be used as cloning vectors.

b) Describe in brief Sanger's method of DNA sequencing.

c) Explain with suitable example the concept of shuttle vectors.

P.T.O.

Q4) What is rDNA? Describe the role of various DNA modifying enzymes used in rDNA technology. **[10]**

OR

What is Southern hybridization? Describe the procedure of Southern hybridization and add a note on its applications.

Total No. of Questions : 4]

SEAT No. :

P159

[Total No. of Pages : 2

[4317] - 146

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

ELECTRONIC EQUIPMENT MAINTENANCE (EEM) - II

VOC - EEM - 212 : Maintenance Concepts and Repair II - A

(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 are advised, wherever necessary.***
4) ***Use of log table and/or non programmable calculator is allowed.***

Q1) Answer the following :

a) State one difference between active and passive redundancy. **[1]**

b) How can a log book be used for determining failure rate? **[1]**

c) State difference between a test and a measuring instrument. **[1]**

d) What is the difference between MTBF and MTTF? **[1]**

e) What is the type of battery used in a present day cell phone? State its typical voltage. **[2]**

f) CVCC power supply has a built in protection against short circuiting of its output terminal. Comment. **[2]**

g) CRO is a voltmeter. Comment. **[2]**

h) What tools are used for the following functions? **[2]**

i) To work as a heat sink while soldering.
ii) To clean lead wire before soldering.

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

a) What is availability? Explain. Also explain its relationship with MTBF and MTR. **[4]**

b) Explain the idea of Artificial Earth and explain the pipe type of earthing. **[4]**

c) What are the typical specifications of a bipolar junction transistor provided in a databook? Explain. **[4]**

P.T.O.

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

a) Write a note on service manual and explain its importance. **[4]**

b) What are the stages involved in installation of a TV receiver using terrestrial antenna? Explain in brief. **[4]**

c) List commonly used test and measuring instruments and state function of each. **[4]**

Q4) a) Write a note on reliability of series and parallel systems. **[6]**

b) Write a note on alkaline cells. **[6]**

OR

a) What is preventive maintenance? Explain with an example. **[6]**

b) Write a note on 'Safety Measures'. **[6]**

Total No. of Questions : 4]

SEAT No. :

P160

[Total No. of Pages : 2

[4317] - 147

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

COMPUTER HARDWARE & NETWORK & NETWORK ADMINISTRATION

Computer System Management - 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.***

Q1) a) Attempt the following : **[4 × 1 = 4]**

i) What is Corrosion?

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

iii) What does ROM Stand for?

iv) Give one example of Logical Access Control.

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

i) What is an Incident?

ii) List any two Antivirus Softwares.

iii) Give any two environmental contributors to PC Failures.

iv) Give one example of a RUN Problem.

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

a) Give various reasons for Display Failures.

b) What precautions should we take to avoid Disasters?

c) Explain the need for preventive maintenance of a printer.

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

a) How hardware fault isolation technique is implemented?

b) Explain the importance of data Backup.

c) Comment on Specific troubleshooting and Repairs.

P.T.O.

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

a) What are the things that should be covered under Disaster Recovery Plan?

b) What are common troubles in a Modern PC?

c) How will you Maintain :

i) Harddisk.

ii) Monitor.

iii) Keyboard.

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Total No. of Questions : 4]

SEAT No. :

P161

[Total No. of Page : 1

[4317] - 148
S.Y. B.Sc. (Vocational) (Semester - I)
SEED TECHNOLOGY - II
Seed Testing
(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 labeled diagrams wherever necessary.***

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

a) What is seed testing?
b) Give the importance of Central Seed Testing Laboratory.
c) Name the equipment used for testing the moisture content of seed?
d) Write any two principles of seed sampling.
e) Define heterogeneity test.
f) What is reporting of results?
g) Write the methods used for testing seed moisture content?
h) Name the methods employed in testing of seed germination.
i) What is seed vigour?
j) How guard samples are stored?

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

a) Explain the role of International Seed Testing Association.
b) Describe staffing in relation to Seed Testing Laboratory.
c) Give in detail any one kind of seed sampling.

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

a) Physical purity analysis.
b) Seed vigour testing.
c) Air oven method.

Q4) What is seed germination? Describe in detail any two methods used for seed germination testing. **[10]**

OR

Describe in detail mixing and dividing samples. **[10]**

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Total No. of Questions : 4]

SEAT No. :

P162

[Total No. of Pages : 2

[4317] - 149

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

INDUSTRIAL MICROBIOLOGY - II

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

(2008 Pattern) (Paper - II)

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

Instructions to candidates :

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *All questions carry equal marks.*
4) *Draw neat, labelled diagram wherever necessary.*

Q1) Answer each subquestions in one or two lines, fill in the blanks, state whether the statement is true or false : **[10]**

a) Define 'secondary metabolite'.

b) Define 'Decimal Reduction Time'.

c) State whether following statement is true or false.

i) 'Glutamic acid is generally produced during stationary phase of growth of microorganisms?

ii) Peptone serves a dual role in fermentation media'.

d) Fill in the blank.

———— is analogue of arginine.

e) Name any two antifoam agents used in fermentation media.

f) With the help of an example explain role of inducer.

g) What does the term 'by-product' mean in fermentation?

h) Explain why buffers can not replace neutralising agents/pH regulators for a fermentation process.

i) Name any one sensor based on galvanometric measurements.

P.T.O.

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

a) Define 'screening'. Explain the objectives of secondary screening.

b) Describe the process and use of Lyophilisation process.

c) Describe the process of inoculum build-up.

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

a) Enlist different methods of medium sterilisation and describe any one in detail.

b) Explain the role of buffering agents in fermentation media.

c) What is 'microbial diversity'? Write different indices of diversity.

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

a) Define the term 'primary metabolite'. Describe any three methods of modifying organism for the overproduction of primary metabolites.

b) State the salient features of Plackett - Burman design of media optimisation. Give the protocol of media optimisation using this design.

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Total No. of Questions : 4]

SEAT No. :

P313

[Total No. of Pages : 3

[4317] - 113
S.Y. B.Sc. (Semester - I)
STATISTICS
ST - 211 : Discrete Probability Distributions and Time Series
(2008 Pattern) (Paper - I)

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

Instructions to candidates :

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

Q1) Attempt each of the following :

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

i) Relation between central moment of order 4 and cumulants is

A) $\mu_4 = k_4 + 3k_2^2$

B) $\mu_4 = k_4 - 3k_2^2$

C) $\mu_4 = k_4$

D) $\mu_4 = k_4 + k_2^2$

ii) If $X \sim p(m)$ then

A) $E(X) < V(X)$

B) $E(X) > V(X)$

C) $E(X) = V(X)$

D) $E(X^2) = V(X)$

iii) Linear trend means

A) No change

B) Constant change

C) Changes are in geometric progression

D) None of the above

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

i) If X is geometric random variable taking values 0, 1, 2, 3, ... then its variance is greater than its mean.

P.T.O.

ii) Suppose X and Y are independent random variables such that $X \rightarrow NB(k_1, p_1)$ and $Y \rightarrow NB(k_2, p_2)$ then $X + Y \rightarrow NB(k_1 + k_2, p_1 + p_2)$.

iii) Moving averages can give estimate of trend for future.

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

d) State Poisson approximation to negative binomial distribution. **[1]**

e) For the following p.m.f. find the value of k **[1]**

$$p(x) = k\left(\frac{1}{3}\right)^x \quad ; x = 1, 2, 3, ...$$
$$= 0 \quad ; \text{otherwise}$$

f) Define time series. **[1]**

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

a) State and prove lack of memory property of geometric distribution. In what sense is it called as lack of memory property?

b) The joint p.m.f. of two discrete random variable (x, y) is

$$p(x,y) = \frac{m^y e^{-2m}}{x!(y-x)!} \quad ; x = 0, 1, 2, ..., y$$
$$y = 0, 1, 2, ...$$
$$m > 0$$
$$= 0 \quad ; \text{otherwise}$$

Find :

i) Marginal distribution of y.

ii) E $(x/y = y)$.

c) Let X denote the number of failures preceding K^{th} success in a sequence of Bernoulli trials with a constant probability of success p in a single trial. Obtain

i) The probability distribution of X and

ii) E (X).

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

a) Define the following terms :

i) A discrete random variable X defined on countably infinite sample space.

ii) Probability distribution of a discrete r.v.x.

iii) Mathematical expectation of a discrete r.v.x.

b) Define cumulant generating function (cgf) of a discrete r.v.x. Discuss the effect of change of origin and scale on cumulants.

c) Obtain the probability distribution of $z = x + y$ where X and Y are independent $B\left(2, \frac{1}{3}\right)$ and $B\left(2, \frac{2}{3}\right)$ variates respectively.

Q4) Attempt any one of the following :

a) i) What is time series? Discuss the seasonal and cyclical variations. **[6]**

ii) A random variable has all the cumulants equal to k. Find Pearson's coefficients of skewness and Kurtosis. **[4]**

b) i) If X and Y are independent Poisson variates such that $p(x = 1) = p(x = 2)$ and $p(y = 2) = p(y = 3)$ then find var $(x/x + y = 4)$. **[7]**

ii) Write a note on 'Secular trend'. **[3]**

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