Total No. of Questions : 5]

SEAT No. :

P604

[Total No. of Pages : 3

[5315] - 23

F.Y.B.Sc.

ELECTRONIC SCIENCE

EL-101: Principles of Analog Electronics

(2013 Pattern) (Paper -I)

Time : 3 Hours] *[Max. Marks : 80*

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.***
4) ***Use of calculator is allowed.***

Q1) Answer the following questions in brief: **[16]**

a) Draw the circuit symbols of BJT and UJT.

b) Sketch I-V characteristics of forward biased and reverse biased diode.

c) Draw circuit symbol of opamp snowing different terminals.

d) What is a switch? Give any two types of switches.

e) Define time constant. State its importance.

f) Draw circuit symbols of LDR, potentiometer, thermistor and resistor.

g) Define DC load line. Draw it for transistor.

h) Define rectifier. State types of rectifiers.

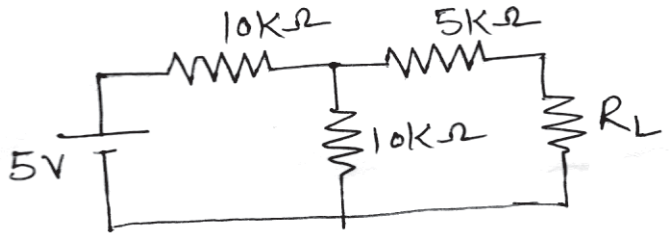
Q2) Attempt any <u>four</u> of the following: **[16]**

a) i) A resistor has colour code Brown, Black, Red and Gold. Identify the value of the resistor.

ii) What is capacitor? Draw its circuit symbol. Give its one application.

P.T.O.

b) State Thevenin's Network theorem and determine Thevenin's equivalent circuit for the following network.



c) Explain the working of RC integrator.

d) Explain working principle of LED and state its two applications.

e) Obtain the expression for gain of opamp in non-inverting configuration.

f) Explain construction and working of n-channel JFET.

Q3) Attempt any <u>four</u> of the following: **[16]**

a) i) Define the terms

Input offset voltage and Input bias current of opamp.

ii) Draw the circuit symbol DPST switch and fuse.

b) Explain the working of regulator using zener diode.

c) Draw the circuit diagram of voltage amplifier using transistor. Explain its working.

d) State different stages in block diagram of power supply and explain function of each block.

e) State and prove maximum power transfer theorm.

f) Obtain the expression for resonant frequency of series LCR circuit.

Q4) Attempt any <u>four</u> of the following: **[16]**

a) i) Explain the terms: Turns ratio and efficiency of transformer.

ii) Give any two important specifications of relay.

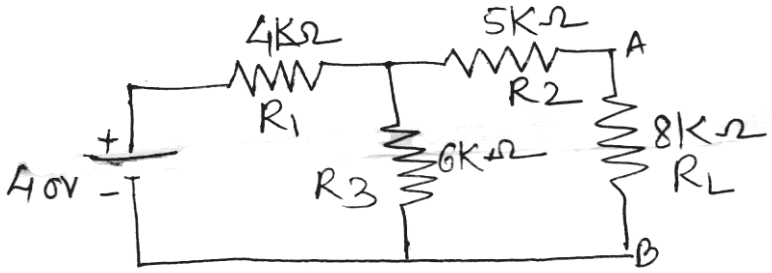
b) What is biasing a transistor? Explain the voltage divider bias.

c) Draw the circuit diagram for subtractor using opamp. Derive its output voltage expression.

d) Explain the working of enhancement type MOSFET.

e) What is photodiode? How it works? Draw its I-V characteristics.

f) Using Morton theorem, find the current through 8KΩ resistance in the following network.



Q5) Attempt any <u>four</u> of the following: **[16]**

a) i) What is cable? Give its applications.

ii) What is the difference between primary and secondary battery.

b) State and explain super position theorem.

c) Give the classification of amplifiers based on the operating point.

d) What is clipper and clamper? State any two differences between them.

e) Explain how transistor can be used as switch.

f) Explain the use of opamp as schmitt trigger.

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Total No. of Questions : 5]

SEAT No. :

P605

[Total No. of Pages : 2

[5315] - 24

F.Y. B.Sc.

ELECTRONIC SCIENCE

EL-102 : Principles of Digital Electronics

(2013 Pattern) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) What is an ASCII code?

b) List advantages of k map.

c) Define full adder. Draw its logic symbol.

d) What is an encoder? Give different types of encoders available.

e) What is sequential circuit?

f) Write the function of PRESET and CLEAR inputs of flip flop.

g) State the advantages of MOS family over bipolar family.

h) List any 4 laws of boolean algebra.

Q2) Attempt any FOUR: **[16]**

a) Draw the 2 input AND gate using transistor, and explain it. Write its truth table.

b) State and verify De Morgan theorem $\overline{A+B} = \overline{A} + \overline{B}$

c) Explain priority encoder with proper circuit.

d) Explain the circuit of 4 to 1 multiplexer with truth table.

e) Draw and explain 4 bit PISO shift register.

f) Write short note on logic families.

P.T.O.

Q3) Attempt any FOUR. **[16]**

a) Explain Gray to Binary code conversion with suitable examples.

b) Simplify logic expression using k map- $Y = ABC + \overline{A}B\overline{C} + B$.

c) What is logic comparator ? Explain two bit comparator.

d) With proper circuit diagram explain BCD to 7-segment decoder.

e) Draw basic logic circuit of JK flip flop. Write its truth table.

f) Explain CMOS NOR gate with help of proper circuit.

Q4) Attempt any FOUR. **[16]**

a) Explain parity checker system using EXOR gates.

b) Convert in standard SOP form- $\overline{AB} + \overline{A}C + B\overline{C}$

c) Explain keyboard encoder with neat diagram.

d) Perform subtraction using 1's complement (i) 60-44, (ii) 99-32.

e) What is modulus of a counter? Explain MOD 6 counter.

f) i) Explain tristate buffer with proper symbol.

ii) Explain common anode seven segment display.

Q5) Attempt any FOUR. **[16]**

a) i) Convert binary to hexadecimal : 1011010, 11000011.

ii) convert Hexadecimal to Decimal: $(8A)_{16}$, $(92)_{16}$

b) i) Convert Binary code to Gray code: 1011, 1100.

ii) Design AND gate using only NAND gate.

c) Explain half subtractor with suitable logic circuit.

d) How to construct 8:1 MUX using two 4:1 MUX.

e) What is ring counter? Explain it with shift register.

f) i) What is volatile memory? Give its example.

ii) Compare synchronous counter with asynchronous counter.

Total No. of Questions : 4]

SEAT No. :

P606

[Total No. of Pages : 2

[5315] - 25

F.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS. No.1 - EVOLUTION OF STRATEGIC THOUGHTS

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words each. [Any Ten] **[20]**

a) What do you mean by "Industrial Revolution"?

b) Which well-known literature it was wrote by kautilya?

c) Define "Modern war".

d) State the meaning of "sea power".

e) Who was sun-tzu?

f) By whom well known book "on war" it was wrote?

g) Define "Tactics".

h) What do you mean by civil-war?

i) State the meaning of "Guerrilla".

j) Define "Air Power".

k) State any two "causes of war".

l) Define "strategy".

m) What do you know about Mao-Tse-Tung?

Q2) Answer in 50 words. [Any Two] **[10]**

a) Explain the necessity of "Professional Army".

b) Write a few lines of J.F.C. Fuller.

c) Explain the concept of "Heart land".

d) Discuss in brief the concept of "Total war".

P.T.O.

Q3) Answer in 150 words. [Any Two] **[20]**

a) High light on "thoughts of Karl von Clausewitz".

b) Discuss the impact of American civil war.

c) Evaluate the geopolitical thoughts of Haushofer.

d) Explain the prof Mackinder's theory of Heart land.

Q4) Answer in 300 words. [Any Two] **[30]**

a) Explain the elements of sea power as per A.T. Mahan.

b) Highlight on strategic thoughts of kautilya.

c) Explain the views of che-Guevara on "Guerrilla warefare".

d) Discuss in detail the "Causes of war".

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Total No. of Questions : 4]

SEAT No. :

P607

[Total No. of Pages : 2

[5315] - 26

F.Y.B.Sc.

DEFENCE AND STRATEGIC STUDIES

DS.No. II - India's National Security

(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words. [Any Ten] **[20]**

a) What do you mean by National Security?

b) State the meaning of defence.

c) Write the long form of I.T.B.P.

d) State the meaning of "para military forces".

e) Write any two names of India's Nuclear reactor.

f) What do you know about U.L.F.A.?

g) State the location of Diego Garcia Islands.

h) When & Where first nuclear test conducted by India?

i) Where the MacMohan Line situated?

j) What do you know about India's chicken neck?

k) State the names of India's immediate neighbours.

l) What do you mean by defence preparedness?

m) Write the long form of N.D.F.B.

Q2) Answer in 50 words. [Any Two] **[10]**

a) Distinguish between line of control & International Boundary .

b) Write few lines on "D.R.D.O".

c) Explain the "P.N.E. of India" during 1974.

d) Explain the concept of "Civil Defence".

P.T.O.

Q3) Answer in 150 words. [Any Two] **[20]**

a) Write a note on "Indo - Bangladesh Relations in the present context".

b) Explain the solution on "Kashmir problem".

c) Discuss in detail "MacMohan Line".

d) Write a note on Non-Military challenges to India's National security.

Q4) Answer in 300 words. [Any Two] **[30]**

a) Explain the Geostrategic importance of Siachen glacier from Indian point of view.

b) Discuss the super powers rivalry in Indian ocean & its impact on India's maritime security.

c) Explain the Indo-Pak Relations in the present context.

d) Highlight on India's Defence prepared in the present context.

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Total No. of Questions : 4]

SEAT No. :

P608

[Total No. of Pages : 2

[5315] - 27

F.Y. B.Sc.

DEFENCE AND STRATEGIC STUDIES

Ds-3 : International Security

(2013 Pattern) (Paper-III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 Words (Any Ten). **[10×2=20]**

a) Define Arms Control.

b) Define Collective Security.

c) Define Neutrality.

d) Define National power.

e) State the meaning of Nation - state core values.

f) State the meaning nationalism.

g) Define international security.

h) Define diplomacy.

i) Define equal security.

j) What are the methods of pacific settlement?

k) Write any two objectives of world organization.

l) Define international Law.

m) Define Balance of Power.

Q2) Answer in 50 Words (Any Two). **[2×5=10]**

a) Describe techniques of Balance of power.

b) Discuss advantages of collective security.

c) Explain basic features of Neutrality.

P.T.O.

Q3) Answer in 150 Words (Any Two). **[2×10=20]**

a) Explain principles of non-alignment.

b) Discuss problems of Disarmament.

c) Discuss problems and issues of human security.

Q4) Answer in 300 Words (Any Two). **[2×15=30]**

a) Discuss UN system of Pacific settlement of Disputes.

b) Explain importance of peace studies.

c) Discuss any two elements of national power.

Total No. of Questions :5] SEAT No. :

P609 [Total No. of Pages : 2

[5315]-28
F.Y.B.Sc.
ENVIRONMENTAL SCIENCE
ENV101 : Fundamentals of Environmental Chemistry & Environmental Biology
(2013 Pattern) (Paper - I)

Time : 3Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt the following in not more than 5 lines: **[16]**

a) Define Environmental Chemistry & Enlist its scope.

b) What is the route of Charles Darwins Voyage HMS Beagle.

c) State difference between Cationic & Anionic detergents.

d) Give any two examples of Xerophytes.

e) Enlist any four effects of Mercury(Hg).

f) What are the objectives of Taxonomy?

g) What do you mant by Adulteration? Give its example.

h) Enlist major forest types found in India.

Q2) Answer any four of the following. **[16]**

a) With neat labelled diagram, explain Nitrogen cycle.

b) Explain with Suitable example Green chemistry .

c) Discribe physical & chemical properties of lead.

d) Explain the concept of climatic bariers & bridges.

e) Write a note on Biogeographic zones of India.

f) Explain the concept of Species with reference to morphological & Ecological charaters.

P.T.O.

Q3) Write short notes on any four of the following. **[16]**

a) Food Additives.

b) Reasons of mass extinction.

c) Principle & working of Conductivity meter.

d) Terrestrial life forms on earth.

e) Linnaeus system of classification.

f) Carbon cycle.

Q4) Answer any two of the following. **[16]**

a) what are invertibrates Describe in detail characteristic features of orthropods & Insects.

b) Explain in detail Titrometric methods used in environmental Analysis.

c) Discribe in Brief Biological resources available on earth.

d) What are detergents, add a note on types of detergents.

Q4) Answer any one of the following. **[16]**

a) What is Virus, Explain in detail its structure & reprodution.

b) Explain in detail characteristics & chemical Reactors ocured in atmosphere.

Total No. of Questions :5] SEAT No. :

P610 [Total No. of Pages : 2

[5315]-29
F.Y.B.Sc.
ENVIRONMENTAL SCIENCE
ENV102: Fundamentals of Environmental Geosciences & Environmental Pollution
(2013 Pattern) (New course) (Paper - II)

Time : 3Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt the following in not more than 5 lines: **[16]**

a) What are Metamorphic rocks? Give two examples.

b) State the difference between Dry & Wet Adiabatic Lapse Rate.

c) What is meant by Temperature Inversion?

d) Define: Soil Profile.

e) What is Green House effect?

f) Define the term : Biomagnification.

g) Write sources of noise pollution.

h) Enumerate human activities causing soil pollution.

Q2) Answer any four of the following. **[16]**

a) Describe any four types of Soils of India.

b) Write in brief Significance of earth's atmosphere.

c) Describe Hydrological cycle With diagram.

d) Discuss air pollution effects on Animals & Non-biological systems.

e) Write about sources & control measures of solid waste pollution.

f) Explain water pollution with ref.to Arsenic poisoning. (west bengal).

P.T.O.

Q3) Write short notes on any four of the following. **[16]**

a) Explain Vertical structure of Atmosphere with diagram.

b) Define the term condensation and explain various forms of it.

c) Write about Significance of Wind energy.

d) Discuss the effects of thermal pollution on physiochemical quality of water.

e) Describe control measures for soil pollution.

f) Discuss the effects and control measures of oilspill.

Q4) Answer any two of the following. **[16]**

a) Define: precipitation and explain the factors and forms of it.

b) Discuss the causes and effects of volcano.

c) Explain the effects and control measures of noise pollution.

d) Describe the process of Eutrophication with diagram.

Q5) Answer any one of the following: **[16]**

a) Explain Plate Tectonic theory with ref. to principles, Basic concepts, six major plates, plate margins and importance of theory.

b) Discuss the effects of soil pollution on soil quality and on biological system.

Total No. of Questions : 4]

SEAT No. :

P611

[Total No. of Pages : 4

[5215] - 30
F.Y.B.Sc.
FOUNDATION COURSE
(Restructuring)
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Explain the following concepts in 50 words (any two) **[10]**

a) Gender Disparity

b) Economy

c) Society

d) Social values

Q2) Write the following short notes in 100 words (Any Four) **[20]**

a) Democracy

b) Human Right

c) Applied science

d) Liberalization

e) National Integration

f) Co-operative Movements

P.T.O.

Q3) Write the answer of the following in 200 to 250 words (Any Three) **[30]**

a) Write the characteristics of Indian culture

b) Write the classification of Science

c) Write the importantce of Research

d) Give an account of National values.

Q4) Write answer of any one of the following. **[20]**

a) Explain the various concepts in Globalization

b) Write the causes and effects of population Growth in India.

Total No. of Questions : 4]

P611

[5215] - 30
F.Y.B.Sc.
FOUNDATION COURSE
पायाभुत अभ्यासक्रम
(2013 Pattern)
(प्रथम वर्ष विज्ञान)

वेळ : *3* तास*]* ***[*एकूण गुण : *80***

सुचना :–

1) सर्व प्रश्न सोडविणे आवश्यक आहे.

2) उजवीकडील अंक पूर्ण गुण दर्शवितात.

3) संदर्भासाठी मुळ इंग्रजी प्रश्नपत्रिका पहावी.

प्र.1) पुढील संकल्पना 50 शब्दात स्पष्ट करा (फकत दोन) **[10]**

अ) स्त्री– पुरुष असमानता

ब) अर्थव्यवस्था

क) समाज

ड) सामाजिक मुल्ये

प्र.2) पुढील टिपा प्रत्येकी 100 शब्दात लिहा (फकत चार) **[20]**

अ) लोकशाही

ब) मानवी हक्क

क) उपयोजित विज्ञान

ड) उदारीकरण

इ) राष्ट्रीय एकात्मता

ई) सहकारी चळवळी

प्र.3) पुढील प्रश्नांची उत्तरे 200 ते 250 शब्दात लिहा (फकत तीन) **[30]**

अ) भारतीय संस्कृतीची वैशिष्ठये लिहा.

ब) विज्ञानाचे वर्गिकरण स्पष्ट करा.

क) संशोधनाचे महत्व स्पष्ट करा.

ड) भारतातील राष्ट्रीय मूल्यावर चर्चा करा.

प्र.4)पुढीलपैकी एका प्रश्नाचे उत्तर 500 शब्दात लिहा. **[20]**

अ) जागतिकीकरणातिल विविध संकल्पना स्पष्ट करा.

ब) भारतीय लोकसंख्या वाढीचे कारणे व परिणाम स्पष्ट करा.

Total No. of Questions :10]

SEAT No. :

P612

[Total No. of Pages :3

[5315] - 31

F.Y.B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY - I

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

SECTION - I

Q1) Answer the following: **[8]**

a) Define Emulsions.

b) Dispersion phase and dispersion medium.

c) Define chemisorption.

d) Define and explain Thixotropy.

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

a) Define and explain the phenomenon of electrophoresis.

b) Describe electrical dispersion method for preparation of sol.

c) Give assumptions of Langmuir's Adsorption theory.

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

a) Explain negative catalysis.

b) Write a short note on colloidal dispersion.

c) How catalyst increases speed of reaction? Explain.

P.T.O.

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

a) What are gels? Give types of gels and explain properties of gels.

b) Give detailed account of Adsorption theory of catalysis.

Q5) Write short note on (any two): **[8]**

a) Adsorption indicators.

b) Coagulation.

c) Aerosol.

SECTION - II

Q6) Define and explain the following terms: **[8]**

a) Phase boundaries.

b) Fundamental quantities.

c) The Gram atom.

d) Molarity.

Q7) Answer any two of the following: **[8]**

a) Describe different forms of latent heats.

b) Explain various methods to express the composition of solutions.

c) Explain distillation operation with material balance.

Q8) Write short notes on any two of the following: **[8]**

a) Applications of recycling operations.

b) Critical point of a substance.

c) Combined feed ratio.

Q9) Answer any one of the following: **[8]**

a) Describe adiabatic process and explain the factors which govern the feasibility of adiabatic reactions.

b) State and explain Hess's Law of constant heat summation.

Q10) Solve any two of the following: **[8]**

a) Flue gases leaving the stack of boiler at 250ºC having following molar composition Co_2=11.31% H_2o=13.4% O_2=2.1% N_2=73.48%. Calculate the heat lost in 1 kg mole of the gas mixture above 25ºC.

C^o_{pm} (kcal / kg mole ºK 250-25ºC)

Co_2	9.94
H_2o	8.2
O_2	7.2
N_2	7.0

b) 5 kg of O_2 contained in a closed container of volume $1m^3$ is heated without exceeding a pressure of 7 atmosphere. Calculate maximum temperature of gas attained.

c) A mixture of nitrogen and carbondioxide at 25ºC and one atmosphere pressure has an average molecular weight of 31. What is the partial pressure of nitrogen.

Total No. of Questions : 6]

SEAT No. :

P1727

[Total No. of Pages : 2

[5315]-32
F.Y. B.Sc. (Vocational) Biotechnology
101 : BIOCHEMISTRY AND MICROBIOLOGY
(2013 Pattern) (Papre - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions are compulsory.***

SECTION - I

(Biochemistry)

Q1) Answer the following in short: **[8]**

a) What is a nucleoside? Give an example.

b) Define carbohydrates. Give any two examples.

c) Name any two catabolic pathways.

d) What are enzyme inhibitors?

Q2) Attempt any four of the following: **[16]**

a) Explain the effect of pH on enzyme activity.

b) Give the functions of lipids.

c) What are polysaccharides? Give its classification with suitable examples.

d) Describe the structure of t-RNA.

e) What are amino-acids? Classify amino-acids on the basis of nutrition with examples.

Q3) Answer any two of the following: **[16]**

a) Describe TCA cycle in detail. Give its energetics and features.

b) With the help of neat and well labelled diagram describe the Watson and Crick model of DNA.

c) Describe the secondary structure of proteins.

P.T.O.

SECTION -II

(Microbiology)

Q4) Answer the following in short: **[8]**

a) Define syntrophism. Give one example.

b) What are Acidophiles?

c) What is a mordant? Give two examples

d) Give any two salient features of fungi.

Q5) Attempt any four of the following: **[16]**

a) Write a note on cultivation of viruses.

b) Describe the technique of Capsule staining

c) Write a note on contributions of Louis Pasteur to Microbiology.

d) Write in brief about the salient features of algae.

e) Write short note on prokaryotes and eukaryotes.

Q6) Answer any two of the following: **[16]**

a) Enlist the different components of medium. What are the types of media? Describe any one type of media with examples.

b) Describe MPN in detail

c) What is sterilization and disinfection? Enlist the different agents for sterilization and disinfection. Explain any two in detail.

Total No. of Questions : 5]

SEAT No. :

P613

[Total No. of Pages : 2

[5315] - 34

F.Y. B.Sc.

ELECTRONIC EQUIPMENT AND MAINTENANCE (Vocational)

Maintenance Concepts, Instruments & Appliances

(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

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 all of the following: **[16]**

a) What is reliability of component?

b) What are the advantages of meggar?

c) What are the functions of intensity control & focus control knob on front panel of CRO?

d) What is concept of autoranging?

e) Define the terms: Resolution and sensitivity.

f) Draw a pulse which has faults.

g) What is principle of magnetron?

h) What are different parts of electric geysor?

Q2) Attempt any four of the following: **[16]**

a) Write down the potential problems which may be faced by a service engineer in repairing modern electronic equipment.

b) Write a short note on DSO.

c) What are systematic errors? Explain in brief.

d) Write a note on Af signal generator. How to use it in fault diagnosis?

e) What are the precautions in handling washing machine?

P.T.O.

Q3) Attempt any four of the following: **[16]**

a) Explain the working of ac voltmeter.

b) What is DFM? How it can be used as Frequency counter?

c) What are applications of pulse generator?

d) Write a short note on: megger.

e) Explain the working of motor in mixer.

Q4) Attempt any two of the following: **[16]**

a) i) What are different front panel controls of CRO?

ii) Write a note on DC voltmeter.

b) Write a short note on dual trace CRO.

c) What is principle of emergency light? Explain it with the help of circuit diagram.

Q5) Attempt any two of the following: **[16]**

a) i) Explain the working of DVM with block diagram.

ii) Explain the working of PMMC meter.

b) Write a short note on RF signal generator.

c) Explain the working of automatic electric iron.

Total No. of Questions : 5]

SEAT No. :

P614

[Total No. of Pages : 2

[5315] - 35

F.Y. B.Sc.

INDUSTRIAL MICROBIOLOGY (Vocational)

Micro Organism and Systems for Fermentation Processes

(2013 Pattern) (Paper-I) (Theory)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer each sub-question in one or two lines; fill in the blanks: **[16]**

a) Limiting Reagent.

b) Accuracy.

c) What is process flow diagram?

d) Patent types.

e) Aspect ratio.

f) What is GILSP?

g) Baume scale uses _____ instrument to measure concentration of solute in solution.

h) What is ensured by quality assurance process?

Q2) Attempt any four of the following: **[16]**

a) Discuss different meanings of word fermentation?

b) Explain the process of Isolation of Industrially important micro organism from environment.

c) Sketch the cyclic process of model construction, verification & application.

P.T.O.

d) How least square analysis applied in finding goodness of fit of data?

e) List five names of micro organisms and fermentation product produced by them.

f) Describe the firmicutes important in industrial microbiology.

Q3) Write short note on any four of the following: **[16]**

a) Components of modelling.

b) Error types.

c) Classification of physical variables.

d) Stoichiometery.

e) Up stream process.

f) Culture collections.

Q4) Attempt any two of the following: **[16]**

a) Describe the measurement of temperature and pressure quality.

b) Explain the process of development of pharmaceutical product.

c) Enlist and explain the characteristics important in microbes used in industrial microbiology.

d) Following are the 10 measurement carried out on saccharomyces cerevisae cell diameter calculate and represent mean, standard deviation & variance.

Diameter in micrometer:3.32, 3.6, 3.49, 3.25, 3.33, 3.38, 3.27, 3.1, 3.45, & 3.29.

Q5) Attempt any one of the following: **[16]**

a) Describe the linear and non-linear models of data anylysis.

b) Discuss the WHO's classification of micro- organisms on the basis of hazards and containment level followed.

Total No. of Questions : 5]

SEAT No. :

P615

[Total No. of Pages : 2

[5315] - 36

F.Y. B.Sc.

COMPUTER HARDWARE AND NETWORK ADMINISTRATION (Vocational)

Essentials of Computer

(2013 Pattern) (Paper-I) (78710)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) Define BIOS.

b) Write full forms of BCD, SIMM, CAD, MICR.

c) Write notes on web camera.

d) What is SMPS?

e) Define bluetooth.

f) Explain working of MOUSE.

g) Explain nested interrupts.

h) List different input & output devices of computer.

Q2) Attempt any four: **[16]**

a) Explain motherboard in detail.

b) Write notes on HDD.

c) Write notes on scanner.

d) What is DMA?

e) What is instruction prefetch?

f) Write notes on CD-ROM.

P.T.O.

Q3) Attempt any four: **[16]**

a) Explain working of DOT matrix printer.

b) Explain CPU with block diagram.

c) Write notes on notebook & tablets.

d) Explain working of LASER printer.

e) Write notes on device controller.

f) Explain BVS structure of computer.

Q4) Attempt any two: **[16]**

a) Explain working of online & off line UPS.

b) Explain primary & secondary memory of computer.

c) Write notes on:

i) LCD panel.

ii) Plotter.

Q5) Attempt any two: **[16]**

a) Define software. Explain different types of software in detail.

b) What is microprocessor? Explain generations of computer.

c) Write notes on:

i) Digitizer.

ii) Inkjet printer.

Total No. of Questions : 5]

SEAT No. :

P616

[Total No. of Pages : 2

[5315] - 37

F.Y. B.Sc.

SEED TECHNOLOGY (Vocational)

Morphology, Plant Breeding and Testing for Cultivar Genuineness

(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

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 in two lines (Any eight): **[8×2=16]**

a) Enlist the parts of a typical flower.

b) What is sexual reproduction in plants?

c) Give an example of pepo type of fruit (Any two).

d) What is plant breeding?

e) Write any two merits of plant introduction.

f) What is a seed?

g) Enlist types of mutation.

h) What is a phenol colour test?

i) Define embryo culture.

Q2) Attempt any four of the following: **[4×4=16]**

a) Describe Groundnut Flower in detail.

b) Explain any one method of artificial vege tative propagation.

c) Write the contrivances in self pollination.

d) Comment on evaluation activity in plant breeding.

e) Give achievements of mutation breeding.

P.T.O.

Q3) Write notes on any four of the following: **[4×4=16]**

a) T.S. of typical anther.

b) Development of microspore.

c) Development of monocot embryo.

d) Procedure for plant introduction.

e) Grow out test.

Q4) Attempt any two of the following: **[2×8=16]**

a) Describe in detail, the process of double fertilization in angiosperms. Give its definition.

b) Define hybridization. Write procedure of hybridization.

c) Describe berry and capsule type of fruits with suitable examples and diagrams.

Q5) Write the diagnostic characters, floral formula and floral diagram of families Malvaceae and Poaceae. **[16]**

OR

What is pureline selection? Write procedure, advantages disadvantages and achievements of pure line selection.

Total No. of Questions : 10]

SEAT No. :

P617

[Total No. of Pages : 2

[5315] - 38

F.Y. B.Sc.

INDUSTRIAL CHEMISTRY-II (Vocational)

(2013 Pattern) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Answer to the two sections should be written in separate books.***
6) ***Use of lagarithmic tables, slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***

SECTION-I

Q1) Answer the following: **[8]**

a) What is coal tar?

b) Give two uses of natural gas.

c) Give any two properties of a solid fuel.

d) Define and explain the flash point of a fuel.

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

a) Explain the classification of fuels.

b) What are the properties of a good fuel.

c) Describe synthesis of bio-gas.

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

a) Describe in brief the properties and uses of coke.

b) What is coal -tar? Enlist fractions obtained from it.

c) Write a short note on catalytic cracking.

P.T.O.

Q4) Answer any one of the following: **[8]**

a) Describe proximate analysis of coal.

b) What is octane number? What are the methods used for increasing octane number.

Q5) Answer any one of the following: **[8]**

a) What is reforming? Compare thermal and catalytic reforming.

b) Discuss destructive distillation of wood.

SECTION-II

Q6) Answer the following: **[8]**

a) What is Lamp-black?

b) Define electro metallurgy.

c) What is alumina? Give the different forms of alumina.

d) What is an alumina? Give two examples.

Q7) Attempt any two of the following: **[8]**

a) Describe extraction of iron by pyrometallurgy.

b) Write a short note on occurrence of metals.

c) What is concentration of ores? Describe any one process of concentration of ores.

Q8) Attempt any two of the following: **[8]**

a) Give a detailed account of roasting.

b) Write a short note on day.

c) What is reduction? Give different methods of reduction used in metallurgy.

Q9) Answer any one of the following: **[8]**

a) What are different allotropes of carbon. Discuss in detail.

b) Give a comparative account of types of silicates with appropriate diagrams.

Q10) Answer any one of the following: **[8]**

a) Discuss the principles of extraction of metals from oxide ores.

b) What is refining of metals? Give the details of different processes of refining.

Total No. of Questions : 6]

SEAT No. :

P1728

[Total No. of Pages : 3

[5315]-39

F.Y. B.Sc. (Vocational Biotechnology)

VOCATIONAL BIOTECHNOLOGY (Paper - II)

Biophysics, Instrumentation, Mathematics, Statistics and Computers for Biologists

(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***All questions are compulsory.***

SECTION - I

(Biophysics and Instrumentation)

Q1) Answer the following in short: **[8]**

a) State the Beer-Lambert's law.

b) Define centrifugation.

c) What is a buffer? Give an example.

d) What is Rf? Give its formula.

Q2) Attempt any four of the following: **[16]**

a) Explain the technique of paper chromatography.

b) Describe liquid scintillation counting method in detail.

c) Write a short note on turbidometer.

d) Describe fluorescence microscopy in detail.

e) Explain the factors affecting electrophoretic mobility.

P.T.O

Q3) Answer any two of the following: **[16]**

a) Explain the principle of thin layer chromatography. Give its procedure and applications.

b) Describe the components of a UV - visible spectrophotometer. Give the applications of UV - visible spectroscopy.

c) Enlist the types of preparative ultracentrifuge. Explain the types in detail.

SECTION - II

(Mathematics, Statistics and Computer for Biologists)

Q4) Answer the following question in short: **[8]**

a) Evaluate $\int \left[\sqrt{5-3x} + \frac{1}{\sqrt{3x-5}}\right] dx.$

b) Prove that $1 + \cot^2 x = \text{cosec}^2 x$

c) Define Mean and Median. Give formula to calculate Mean and Median.

d) Define Internet.

Q5) Answer any four of the following: **[16]**

a) Find $\frac{df}{dx}$ if $f(x) = \log (x \sin x + \cos x)$.

b) Evaluate $\int \frac{x^2 - 4x + 2}{x+1} dx$

c) Write a note on Normal distribution

d) Write a note on Correlation and Correlation Coefficient

e) Explain RAM and ROM of a computer.

Q6) Answer any two of the following: **[16]**

a) i) Evaluate $\int_2^3 \frac{x}{(x+2)(x+3)}dx$

ii) If $a_1 = \frac{2}{7}, an = \frac{n^2+1}{2n^2+5}$, $S_1 = a_1$, $S_2 = a_1 + a_2$, $S_n = a_1 + a_2 + ...a_n$. Find S_2, S_3.

b) Explain χ^2 test for goodness of fit with a suitable example.

c) What is an experiment? Explain an ideal experimental design.

d) Enlist the components of a computer. Explain any three. components in detail.

Total No. of Questions :5]

SEAT No. :

P618

[Total No. of Pages :2

[5315]-41
F. Y. B. Sc.
ELECTRONIC EQUIPMENT AND MAINTENANCE (Vocational)
Electronic Components Circuit And Equipment Assembly.
(2013 Pattern) (paper II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates :

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

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

a) Factors on which Inductance of a Inductor depends.

b) Explain the term SMD.

c) State different types of PCB.

d) Name different types of Resistances.

e) Explain importance of flux.

f) Explain the importance of sheilding cable.

g) Explain the term NEMA.

h) Name different types of transformer used in Electronic industry.

Q2) Attempt any four of the following. **[16]**

a) Explain causes and remedies of dry solder.

b) Explain the importance of different safety devices used for domestic purpose.

c) With the help of a neat diagram explain internal connections of Bread Board.

P.T.O.

d) Enlist tools required for desoldering.

e) Inductor is a wattless component comment.

Q3) Attempt any four of the following. **[16]**

a) Name advantages of ultrasonic soldering.

b) State Information do you get from circuit diagram.

c) Name different types of cables used in Electronic Industry.

d) Write a note on Applications of Resistors in Electronic circuits.

e) Explain common faults that occur in capacitors.

Q4) Attempt any two. **[16]**

a) Explain the importance of Earthing and also Explain how Earthing is done.

b) With the help of a neat diagram explain the working of a fan and Regulater.

c) With the help of a neat diagram explain the working of a MCB.

Q5) Attempt any two. **[16]**

a) With the help of a neat diagram write a note on soldering Iron.

b) With the help of a neat diagram explain the working of a tube light.

c) Enlist different tools required for soldering any Eight.

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Total No. of Questions :5]

SEAT No. :

P619

[Total No. of Pages :2

[5315]-42
F. Y. B. Sc.
INDUSTRIAL MICROBIOLOGY (Vocational)
Industrial Processes and Products
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of logarithmic tables,slide rule,mollier charts,electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) Answer any eight of following. **[16]**

a) Objective approach to isolate suitable organisms from environment.

b) Give two examples of antifoam agents.

c) How strain stability will affect the biotech company?

d) What is a precursor in raw material?

e) Biomining makes use of which micro organisms in the process?

f) What is the typical elemental formula of microbialcell?

g) Write the elemental composition of baker's yeast.

h) Examples of culture collections usefull to industry microbiologists.

i) Give examples of natural food preservatives of microbial origin.

j) Give two example of yeast classified as GRAS.

Q2) Answer any four of the following. **[16]**

a) Enlist the applications of biotechnology companies in 'Medicines sector.

b) Enlist the types of government support that can be availe by start up companies.

P.T.O.

c) Describe the process of production of 'baker's yeast'.

d) What are the applications of microbial exopolyssa - chorides?

e) Write in brief about biodeterioration of cosmetics and pharmaceuticals.

f) With suitable examples discuss the importance of strain improvement.

Q3) Write a short note on any four of the following. **[16]**

a) Hierarchical structure for management in biotech industry.

b) Aeration.

c) Carbon sources.

d) Shotgun approach to isolate microorganisms from environment.

e) Single cell protein production.

f) Vitamin and growth factors.

Q4) Answer any two of the following. **[16]**

a) Types of investments in biotechnology industries.

b) With the help of suitable example. Discuss the hierarchical structure for management in biotechnology industry.

c) Write in brief about inorganic and organic nitrogen sources for industrially employed microorganisms.

Q5) Answer any one of the following. **[16]**

a) Discuss in details the various heads under which the cost estimates are generated for the proposed production process.

b) With the help of suitable examples discuss the use of microbial enzymes in various industrial processes and products.

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Total No. of Questions :5]

SEAT No. :

P620

[Total No. of Pages :2

[5315]-43
F. Y. B. Sc.
COMPUTER HARDWARE AND NETWORK ADMINISTRATION (Vocational)
Computer Organisation
(2013 Pattern) (Paper - II) (78720)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates :

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

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

a) What is HDMI?

b) Explain Debugger.

c) Define Assembler.

d) What is POST?

e) Define Compiler.

f) What is Firmware.

g) Define Wi - Fi system.

h) What is USB?

Q2) Attempt any four. **[16]**

a) What is multimedia?

b) Explain any two DOS commands.

c) Write notes on Internet.

d) Explain math coprocessor.

e) Explain control panel of window operating system.

f) Explain any two logical instructions of 8086.

P.T.O.

Q3) Attempt any four. **[16]**

a) Explain difference between simulator & emulator.

b) Explain any two data transfer instructions of 8086.

c) Write notes on Network operations system.

d) Explain different Registers of 8086.

e) What is algorithm?

f) Explain application software.

Q4) Attempt any two. **[16]**

a) Explain ANDROID operating system

b) Explain architecture of 8086.

c) Write notes on.
   i) tri state buffer.
   ii) i - series microprocessor

Q5) Attempt any two. **[16]**

a) List different network topologies.Explain any one in detail.

b) Explain flow chart with example.

c) Write notes on.
   i) RS-232.
   ii) System software.

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Total No. of Questions :5]

SEAT No. :

P621

[Total No. of Pages :2

[5315]-44
F. Y. B. Sc.
SEED TECHNOLOGY (Vocational)
Seed Physiology and Seed Production
(2013 Pattern) (paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates :

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

Q1) Answer in two lines (Any eight): **[8×2=16]**

a) Define seed vigour.

b) Enlist different methods of breaking seed dormancy.

c) What is seed pelleting?

d) Enlist different methods of sowing.

e) Comment on isolation distance.

f) What are breeder's seeds?

g) Define disease.

h) What is seed longevity?

i) Enlist sources of irrigation.

Q2) Attempt any four of the following: **[4×4=16]**

a) Describe structure of seed.

b) Comment on physiology of seed development.

c) Explain different factors affecting seed vigour.

d) Comment on state seed corporation and its objectives.

e) Explain various involved in evaluation and release of new variety.

P.T.O.

Q3) Write notes on any four of the following **[4×4=16]**

a) Biochemical changes during seed germination.

b) Seed deterioration.

c) Nursery beds.

d) care during harvesting and threshing.

e) Losses due to excessive irrigation.

Q4) Attempt any two of the following: **[2×8=16]**

a) Explain seed viability concept.

b) Comment on physiology of seed storage.

c) Define sowing comment on time of sowing and seed rate.

Q5) Define seed germination? Describe types of seed germination.Add a note on seedling abnormalities and its causes. **[16]**

OR

Give an account of causal organism, symptom disease cycle and control measure for wheat rust.

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Total No. of Questions : 5]

SEAT No. :

P584

[Total No. of Pages : 3

[5315] - 1

F.Y.B.Sc.

MATHEMATICS

MT - 101 : Algebra and Geometry

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt any eight of the following: **[16]**

a) State principle of strong induction.

b) Define partition of a non-empty set. Write down any one partition of a set S={2,3,4,8}.

c) Use remainder theorem to compute the remainder when $f(x)=x^4-3x^3-7x^2-2$ is divided by $g(x)=x-3$.

d) Find eigen vector of the matrix $\begin{bmatrix} 2 & 3 \\ 0 & 4 \end{bmatrix}$ corresponding to eigen value 4.

e) Reduce the matrix $A=\begin{bmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{bmatrix}$ to echelon form. Hence find rank of A.

f) Discuss the nature of the conic $5x^2-6xy+5y^2+18x-14y+9=0$.

g) Show that the lines $\frac{x+3}{2}=\frac{y+5}{3}=\frac{z-7}{-3}$ and $\frac{x+1}{4}=\frac{y+1}{4}=\frac{z+1}{-1}$ are coplanar.

h) Find equation of the plane passing through the point (2,3,5) and perpendicular to the line whose d.r.s. are 3, –2, 6.

i) Find centre and radius of the sphere $x^2+y^2+z^2+2x+4y+6z+5=0$.

j) Define cone and generator of cone.

P.T.O.

Q2) Attempt any four of the following: **[16]**

a) Using principle of Mathematical induction prove that $1\cdot2+2\cdot3+3\cdot4+.....+n(n+1)=\frac{n(n+1)(n+2)}{3}$ for every positive integer n.

b) Let a,x,y be integers and $m>0$ be an integer. If $ax \equiv ay \pmod{m}$ and $(a,m)=1$ then prove that $x \equiv y \pmod{m}$.

c) Show that $x-\alpha$ is a factor of $f(x)$ in R[x] if and only if $f(\alpha)=0$.

d) Solve the following system by Gauss Jordan method.

$3x + y + 2z = 3$

$2x - 3y - z = -3$

$x + 2y + z = 4$

e) Find g.c.d. of 306 and 657. Also find integers x,y such that $(306,657)=306x+657y$.

f) Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$. Hence find A^{-1}.

Q3) Attempt any two of the following: **[16]**

a) Prove that for any two non-zero integers a,b have unique positive g.c.d., $d=(a,b)$ and can be expressed in the form $d=ma+nb$ for some integers m and n.

b) i) Solve the equation $x^3-9x^2+23x-15=0$; whose roots are in A.P.

ii) Let a,b be integers and $m>0$ be an integer. If $(a,m)=1$ and $m|ab$ then prove that $m|b$.

c) i) Find the values of λ for which the following system admits infinite solutions

$2x + y = 3$

$x - z = \lambda$

$y + 2z = 1$

ii) Show that the square of any integer is of the form 4K or 8K+1.

Q4) Attempt any four of the following: **[16]**

a) Shift the origin to the point $(-1,2)$ and transform the equation $x^2+y^2+2x+4y=0$.

b) Find the angle between the line $\frac{x-x_1}{l}=\frac{y-y_1}{m}=\frac{z-z_1}{n}$, where l,m,n are d.c.s. of a line and the plane $ax+by+cz+d=0$.

c) Obtain the equation of a plane in normal form.

d) Find the co-ordinates of points where the line $\frac{x+3}{4}=\frac{y+4}{3}=\frac{z-8}{-5}$ intersect the sphere $x^2+y^2+z^2+2x-10y-23=0$.

e) Find equation of the tangent plane at $P(x_1,y_1,z_1)$ to the sphere $x^2+y^2+z^2=a^2$.

f) Find equation of a cone with vertex at $(-1,1,2)$ and guiding curve $3x^2-y^2=1,\ z=0$.

Q5) Attempt any two of the following: **[16]**

a) Without shifting the origin, if due to rotation of axes, the expression $ax^2+2hxy+by^2$ is transformed to $a'x'^2+2h'x'y'+b'y'^2$ then prove that $a+b=a'+b'$ and $ab-h^2=a'b'-h'^2$.

b) i) Find the co-ordinates of the centre and radius of circle $x^2+y^2+z^2-2x-4y+2z-30=0,\ 2x-y+2z-7=0$.

ii) Find the shortest distance between the lines $\frac{x-3}{1}=\frac{y-4}{1}=\frac{z+1}{1}$ and $\frac{x+6}{2}=\frac{y+5}{4}=\frac{z-1}{-1}$.

c) i) Find equation of the plane containing the line $\frac{x+2}{2}=\frac{y+3}{3}=\frac{z-4}{-2}$ and the point $(0,6,0)$.

ii) Find the equation of a right circular cylinder where axis is the line $\frac{x-\alpha}{l}=\frac{y-\beta}{m}=\frac{z-\gamma}{n}$, where l,m,n are d.r.s. of the line and r is the radius of cylinder.

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Total No. of Questions : 5]

SEAT No. :

P585

[Total No. of Pages : 3

[5315] - 2

F.Y.B.Sc.

MATHEMATICS

MT - 102 : Calculus and Differential Equations

(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt any eight of the following: **[16]**

a) Find the supremum and infimum of the set $S=\left\{\frac{(-1)^n}{n} / n \in N\right\}$.

b) Evaluate : $\lim_{x\to 1^+}\frac{x-1}{|x-1|}$, $x \neq 1$.

c) Discuss continuity of the function f at $x=0$, where $f(x)=\begin{cases}\frac{x}{|x|}, & x\neq 0\\ 0, & x=0\end{cases}$

d) If $x=\tan(\log y)$, then prove that $(1+x^2)y_1-y=0$.

e) State Maclaurin's theorem with Lagrange's form of remainder.

f) Evaluate : $\int_0^{\frac{\pi}{2}}\cos^7 x\,dx$.

g) Define general solution and particular solution of a differential equation.

h) Find the integrating factor of the differential equation $(x^4+y^4)\,dx-xy^3dy=0$

i) Find the orthogonal trajectories of family of curves given by $y^2=mx$, where m is a parameter.

j) Solve : $Y-xp=e^p$, Where $P=\frac{dY}{dx}$.

P.T.O.

Q2) Attempt any four of the following: **[16]**

a) For real numbers x,y show that $\big||x|-|y|\big| \le |x-y|$.

b) Using the definition of limit show that $\lim_{x\to 0} \dfrac{2x^2+3}{x+5} = \dfrac{3}{5}$.

c) Discuss continuity of the function f at $x=0$,

where $f(x) = \begin{cases} \dfrac{e^{\frac{1}{x}}-1}{e^{\frac{1}{x}}+1}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

d) Determine whether the function $f(x) = x|x|$, $x \in R$, is differentiable at zero. Hence write $f^1(0)$ if it exists.

e) State and prove Lagrange's mean value theorem.

f) Separate the intervals in which the polynomial $2x^3-15x^2+36x+1$ is increasing or decreasing.

Q3) Attempt any two of the following: **[16]**

a) i) Show that if $\lim_{x\to a} f(x)$ exists then it is unique.

ii) Solve the inequality $|3x+4|<|x+2|$.

b) i) If in Cauchy's mean value theorem $f(x)=\cos x$ and $g(x)=\sin x$, on $\left[0, \dfrac{\pi}{2}\right]$ then find C.

ii) If $Y=(\sin^{-1}x)^2$, prove that $(1-x^2)Y_{n+2}-(2n+1)XY_{n+1}-n^2Y_n=0$.

c) i) Expand $\tan x$ in powers of $\left(x-\dfrac{\pi}{4}\right)$.

ii) Evaluate: $\lim_{x\to 0}\left(\dfrac{1}{x}-\dfrac{1}{e^x-1}\right)$.

Q4) Attempt any four of the following: **[16]**

a) Evaluate: $\int \frac{dx}{x(x^2+5)}$.

b) Define homogeneous differential equation and explain the method of solving it.

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

d) Solve : $(\cos y - \sec^2 x)dx - x\sin y\, dy = 0$.

e) Show that the family $\frac{x^2}{c} + \frac{y^2}{c-\lambda} = 1$, where c is a parameter, is self orthogonal.

f) Explain the method of solving differential equation $f(x,y,p)=0$ which is solvable for y where $p = \frac{dy}{dx}$.

Q5) Attempt any two of the following: **[16]**

a) If $I_n = \int \sin^n x dx, n \geq 2$, then prove that $I_n = \frac{-\cos x \sin^{n-1} x}{n} + \frac{n-1}{n} I_{n-2}$.

Hence evaluate $\int_0^{\frac{\pi}{2}} \sin^8 x\, dx$.

b) i) Solve : $\frac{dy}{dx} + 2xy + xy^4 = 0$

ii) Solve : $Y = 2px + p^4x^2$, where $P = \frac{dy}{dx}$.

c) i) Explain the method of solving differential equation $\frac{dy}{dx} + PY = Q$, where P and Q are functions of x only.

ii) Solve : $(x-y-2)dx - (2x-2y-3)dy = 0$.

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Total No. of Questions :5] SEAT No. :

P586 [Total No. of Pages : 3

[5315]-3
F.Y.B.Sc.
PHYSICS - I
Mechanics, Heat and Thermodynamics
(2013 Pattern) (Paper-I)

Time :3Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt all of the following. **[16]**

a) State and explain Newton's third law of motion.

b) Define kinetic energy of a body. Give it's SI unit.

c) Define coefficient of viscosity. Give its SI unit.

d) Calculate the value of young's modulus. Given $\eta = 2\times10^{10}$ N/m^2 and $\sigma = 0.25$.

e) What is equation of state? Give equation of state for perfect gas.

f) What is meant by a irreversible change? Give its example

g) State the advantages of mercury thermometer.

h) Find the co-efficient of performance of cornot's refrigerator working between temperature 500ºk and 300ºk.

Q2) Attempt any four of the following. **[16]**

a) What is pseudo force? Illustrate with examples.

b) State and prove work-energy theorem.

c) Define surface tension and angle of contact and state characteristics of the angle of contact.

d) Calculate the speed of the bob of a simple pendulum at its mean position, if the bob be able to rise a maximum height of 6cm.

P.T.O.

e) Obtain the relation between volume strain and longitudinal strain.

f) Water flowing in a horizontal pipe has a speed 16 cm/s at one end point and 12cm at another point. Determine the pressure drop between two points. (Given : $\rho_{water} = 1\ gm/cm^3$)

Q3) Attempt any four of the following. **[16]**

a) Derive reduced equation of state from van der waal's equation.

b) Derive an expression for work done during an adiabatic process.

c) Explain how the entropy of a system increases during an irreversible process.

d) One litre of hydrogen at 127°C and 10^6 dynes/cm pressure expands isothermally, when pressure reduces to 5×10^5 dynes/cm. Find the volume of the gas after expansion.

e) If the compression ratio is 10 and the ratio of principal specific heats is 1.4, find the efficiency of Otto engine.

f) The resistance of platinum wire at 0°C is 5.5 ohm and at temperature t, it is 7.5 ohm. Find temperature of wire if co-efficient of temperature for platinum = 0.0039/°c

Q4) Attempt any two of the following. **[16]**

a) What is critical velocity of liquid? Obtain an expression for Reynold's number. Give its physical significance.

b) i) Define Poisson's ratio. Obtain an expression for Poisson's ratio.

ii) A ship of mass 2×10^7 kg is at rest on the surface of water. On applying a force of 25×10^5N, it is displaced through 25m. Calculate the speed of ship after this displacement.

c) i) Describe the method of measurement of rigidity by torsional oscillations. Derive the necessary formula.

ii) The tube of mercury barometer has an interval diameter of 5mm. How much error does surface tension introduce in the readings? (Angle of contact $\theta = 128°$, surface tension $T = 465\times10^{-3}$ N/m)

Q5) Attempt any two of the following. **[16]**

a) Derive the first latent heat equation in the form, $\frac{dp}{dt} = \frac{LJ}{T(V_2 - V_1)}$, where symbols have their usual meanings.

b) i) State and explain principle of air conditioning.

ii) Calculate the van der waals constant for a dry air.

(Given : T_c = 132ºk, P_c = 37.2 atm; R = 82.07 cm^3 atm/mol/ok)

c) i) Explain construction and working of gas filled thermometer.

ii) A carnot's engine whose temperature of the source is 127ºC takes 200 calories of heat at this temperature and rejects 100 calories of heat to the sink. What is the temperature of the sink? Also calculate the efficiency of the engine.

Total No. of Questions :5]

SEAT No. :

P587

[Total No. of Pages : 3

[5315]-4
F.Y.B.Sc.
PHYSICS-II
Physics Principles and Applications and Electromagnetics
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt all of the following: **[16]**

a) What is optical pumping?

b) What is ionic bond. Give example.

c) What is working principle of RADAR

d) Find linear velocity in the first orbit of hydrogen atom.
[Given : $\in_0 = 8.85 \times 10^{-12} C^2/Nm^2$, $e = 1.6 \times 10^{-19} C$ $h = 6.625 \times 10^{-34} Js$]

e) State principle of superposition in electrostatics.

f) Define electric polarization vector $\vec{P}$. Give its SI unit.

g) State Biot-Savarts law.

h) An ideal solenoid of a aluminium core, have 500turn/ meter and current 2A. Calculate magnetic field intensity.

Q2) Attempt any Four of the following: **[16]**

a) What are the drawback of Rutherford's atomic model.

b) Explain different types of co-valent bond with different examples.

c) What are the uses of X-rays.

d) Calculate the energy in eV of a photon of Red light with a frequency of 4.65×10^{14} Hz
[Given : 1 eV = 1.6×10^{-19}J]

e) A Co molecule of reduced mass 1.14×10^{-26} kg absorbs infrared radiations of frequency 6.42×10^{13}Hz. What is the force constant of the bond in Co-molecule.

f) The series limit wavelength for Balmer series of hydrogen spectrum is 3645Å. Calculate the value of Rydberg constant.

P.T.O.

Q3) Attempt any Four of the following: **[16]**

a) Distinguish between paramagnetic and ferromagnetic materials.

b) State and prove Ampere's circuital law.

c) Explain the effect of electric field on polar and non-polar dielectric material.

d) Determine the magnitude of electric field intensity due to point charge of magnitude 70 μC at a distance 20cm. [Given ; $\in_0 = 8.85 \times 10^{-12}\ C^2/Nm^2$]

e) Calculate the electric potential due to a dipole of dipole moment 3×10^{-10} C-m at a distance of 0.5meter from it.

[Given ; $\in_0 = 8.85 \times 10^{-12}\ C^2/Nm^2$] on the axis

f) A charge of 2μC moves with speed 2×10^6 m/s along positive x-axis. A magnetic field of strength $(0.1\,\hat{j} + 0.2\,\hat{k})$ T exists in space. Find the magnetic force acting on the charge.

Q4) Attempt any Two of the Following: **[16]**

a) Explain the Hertz experiment of electromagnetic waves.

b) i) Explain the terms: Spontaneous emission and stimulated emission.

ii) An electron drop from fourth energy level of hydrogen to the second energy level, the energy released is 4.08×10^{-19}J. What is the frequency and wavelength of emitted photon.

[Given : $h = 6.625 \times 10^{-34}$J.S $C = 3 \times 10^8$m/s]

c) i) What are the physical properties of covalent compounds.

ii) The force constant of vibration in O_2 molecule is 1180N/m and reduced mass 1.33×10^{-26} kg. Find the energy separation between adjacent vibrational levels of molecule in eV

[Given ; $h = 6.625 \times 10^{-34}$Js, 1 eV $= 1.6 \times 10^{-19}$J]

Q5) Attempt any Two of the following: **[16]**

a) Explain the concept of electric flux and state Gauss's law in electrostatics. Using Gauss's law obtain an expression for electric intensity at any point due to uniformly charged non-conducting sphere.

b) i) Explain the term magnetization ($\vec{M}$) and magnetic field ($\vec{B}$)

ii) A solenoid of length 1.5m is wound uniformly with 15000 turns of wire. If carries a current of 5A. Determine magnetic field on the axis of the solenoid at the centre. [Given : $\mu_0 = 4\Pi \times 10^{-7}$ T-m/A]

c) i) Obtain an expression for torque on a dipole placed in an uniform electric field.

ii) The maximum value of the permeability of some metals is 0.15T-m/A. Find the value of maximum relative permeability and suceptibility.

[Give : $\mu = 4\Pi \times 10^{-7}$ T-m/A]

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Total No. of Questions :5]

SEAT No. :

P588

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[5315] - 5

F.Y.B.Sc.

CHEMISTRY - I

Physical and Inorganic Chemistry

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Attempt the following question: **[16]**

a) Give the rule of differentiation of product of two functions.

b) First law of thermodynamic is incomplete. Explain.

c) What are active centres of a catalyst? Name them.

d) The Atomic spectrum of which element is simple. Why?

e) What is Boyle point? What is the Boyle point of nitrogen?

f) Define the terms:

i) Oxidising agent

ii) Reducing agent

g) Explain the terms: covalent bond and co-ordinate bond.

h) How many atoms are present in 80 gm of oxygen.

P.T.O.

Q2) Attempt any four of the following:- **[16]**

a) Draw the graph of linear function and find the expression for the following.

i) Linear function passing through (0,–3) and (–3, 2)

ii) Linear function when slope and intercept are given and are 2and Y intercept is –3.

b) Describe the operations of carnot cycle and derive the expression for efficiency.

c) What are critical constants Tc, Pc and Vc. Give their relationships with van der waal's constants 'a' and 'b'.

d) Give the assumptions of Langmuir adsorption theory.

e) What do you mean by quantization of energy. Explain.

f) Distinguish between emulsion and gel.

Q3) Answer any four of the following: **[16]**

a) What are liquid crystals? Discuss thermotropic liquid crystals.

b) Define viscosity of a liquid. Discuss factors affecting viscosity.

c) What is a catalyst? Explain the mechanism of catalysis of a gaseous substance in presence of a solid catalyst.

d) State and explain the assumptions of Bohr's theory.

e) Define entropy. Derive the relation for Entropy change in a chemical reaction.

f) Solve the integrals:

i) $\int (x^3 + a^x)dx$.

ii) $\int \left(x^{-2/3} + \log^x \right) dx$.

Q4) Attempt any four of the following: **[16]**

a) Calculate the oxidation number of the following:

i) P in $H_3\ PO_4$

ii) N in $NaNO_2$

iii) Si in $CaSiO_3$

iv) Mn in $KMnO_4$

b) What is SP^3 hybridisation? Explain the formation of NH_3 molecule.

c) Balance the following equation by oxidation number method.

$$Fe^{2+} + C10_3^- + H^+ \rightarrow Fe^{3+} + Cl^-$$

d) Explain the formation of N_2 molecule on the basis of atomic orbital overlap.

e) Draw the structures of:

i) BF_3

ii) IF_7

iii) $XeOF_4$

iv) XeO_3

f) Define the terms-

i) σ (sigma) bond

ii) Π (Pi) bond

iii) Normality

iv) Molarity

Q5) Solve any four of the following:- **[16]**

a) In an experiment, 400 ml of a gas at 27°C and 655 mm pressure weighs 0.568 grams. Calculate the molecular weight of the gas.

b) 36 ml 0.5 N H_2SO_4, 30ml IN HCL and 100ml 0.3N NaoH solution made up to 200ml. Is the solution acidic or alkaline? Express the acidity or alkalanity in terms of Normality.

c) The pressure and temperature of one mole of an ideal gas are changed simultaneously from 283k and 1.01325×10^{5} Nm^{-2} to 383K and 5.06625×10^{5} Nm^{-2}

Calculate the change in entropy.

(R = 8.314 J/mole/K, Cp = 5/2 R)

d) Calculate the viscosity of the solution from the following data at 20°C.

	Toulene	Water
density	860gm.dm^{-3}	992gm.dm^{-3}
time of flow	60 seconds	90 seconds.

(Given : Viscosity of water = 0.010 poise)

e) Calculate the wavelength and momentum of an α - particle moving with the speed of 10^{5} $cm.s^{-1}$.

(Given: Mass of an α - particle = 4 amu, 1 amu = $1\times1.66\times10^{-27}$kg)

f) Calculate the threshold frequencyvo for sodium if work function for sodium metal is 1.82 eV. [1 eV = 1.602×10^{-19}J]

Total No. of Questions :5]

SEAT No. :

P589

[Total No. of Pages :4

[5315] - 6

F.Y.B.Sc.

CHEMISTRY - II

Organic and Inorganic Chemistry

(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

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

a) Explain the following terms.

i) Assymmetric centre

ii) Laevo rotatory.

b) Define:

i) Bond energy

ii) Enantiomers

c) Draw zig-zag structures for the following compounds:

i) Isopropyl alcohol

ii) n-hexane.

d) Methylamine is stronger base than Ammonia. Explain.

e) Benzaldehyde does not undergo Aldol condensation reaction. Explain.

P.T.O.

f) Alkaline earth metals show +2 oxidation states. Explain

g) Give the statements of Hund's rule and pauli's Exclusion principle.

h) Define Interhalogen compounds with suitable examples.

Q2) Attempt Any Four of the following. **[16]**

a) Discuss conformational isomerism in n-butane with energy profile diagram.

b) What is steric effect? N, N-dimethy1 aniline is a weaker base than 2,6-dimethyl N, N - dimethyl aniline. Explain.

c) What are alcohols? How will you prepare ethyl alcohol from,

i) Formaldehyde

ii) Ethylene.

d) What are carboxylic acids? How will you prepare Acetic acid from,

i) Acetonitrile

ii) Solid CO_2

e) What are alkenes? How will you prepare cis-2-butene and trans-2-butene from 2-butyne.

f) What is friedel craft alkylation reaction? Discuss its limitations.

Q3) Attempt any four of the following. **[16]**

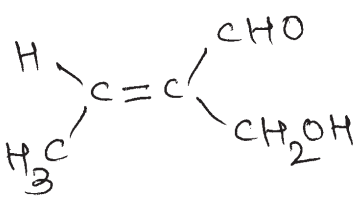
a) What are amines? How are they classified? How will you prepare ethylamine from methyl cyanide.

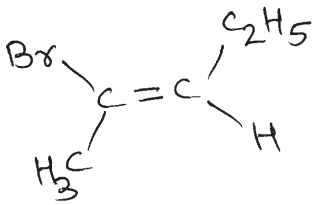
b) What are alkyl halides? Discuss any two methods of preparation of alkyl halides.

c) What are phenols? How will you prepare salicylaldehyde from phenol.

d) What is hybridisation? Discuss formation of methane molecule using the concept of hybridisation.

e) Assign 'E' or 'Z' configuration of the following compounds.

i) 

ii) 

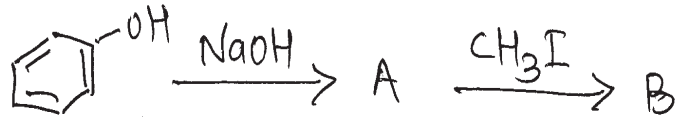
f) Write short notes on,

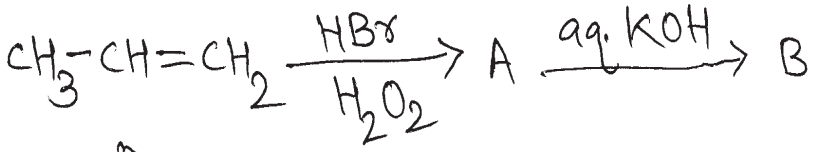
i) Cannizzaro reaction.

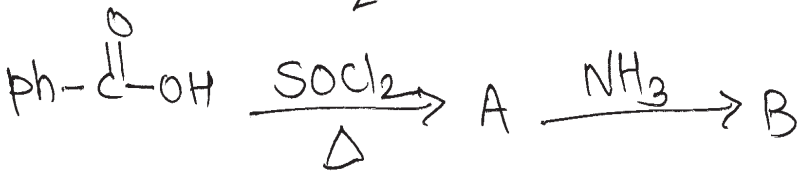
ii) Clemmensen reduction.

Q4) Attempt any four of the following. **[16]**

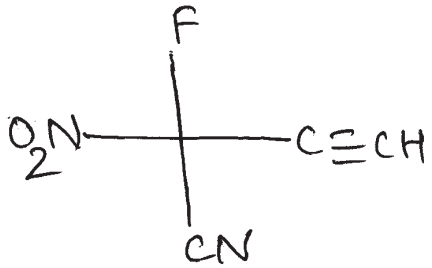
a) Identify the products A and B and rewrite the reactions (any two)

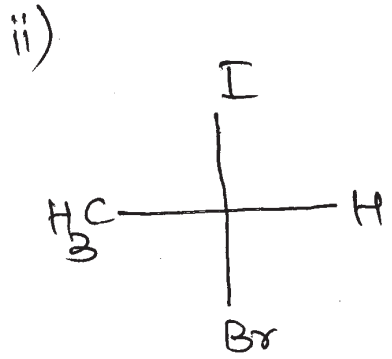
i) 

ii) 

iii) 

b) Assign 'R' or 'S' configuration of the following compounds.

i) 

ii) 

c) What are alkynes? How is acetylene obtained from

i) Calcium carbide.

ii) Methane.

d) What is Inductive effect? Explain +I and –I effects with suitable examples why Acetic acid is weaker than formic acid.

e) Lithium shows anomalous behaviour in the family of alkali metals. Explain.

f) Write note on 'Silicates'

Q5) Attempt any four of the following. **[16]**

a) Give the names, symbol, atomic number and electronic configuration of Group II A elements.

b) What are the similarities of hydrogen with halogen elements?

c) Explain bonding & shape of IF5 molecule.

d) Oxygen shows anomalous behaviour in Group IV A elements. Explain.

e) Give different applications of alkali metals and their compounds.

f) Draw the structures of

i) Al_2Br_6

ii) BrF_5

iii) ClF_3

iv) H_2SO_4

Total No. of Questions : 5]

SEAT No. :

P590

[Total No. of Pages : 2

[5315] - 7

F.Y.B.Sc.

BOTANY

BO-111 : Fundamentals of Botany:

Plant Diversity, Morphology and Anatomy

(2013 Pattern) (Theory Paper - I) (71410)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) What are phanerogams?

b) Name any two classes of Algae according to G.M.Smith.

c) Define Fungi.

d) Name any two forms of lichens based on thallus morphology.

e) Mention any two importance of anatomy.

f) Define Flower.

g) What is function of xylem.

h) Name any two agents of seed dispersal.

Q2) Attempt Any Four of the following: **[16]**

a) Write any four characters of Fungi.

b) Write an economic importance of Lichens.

c) Describe the sporophyte of Nephrolepis.

d) Describe any two modifications in root.

e) Describe any two types of cymose inflorescence.

f) Define meristem and give any three characteristics of meristem.

P.T.O.

Q3) Write short notes on any four of the following: **[16]**

a) Mode of nutrition in Albugo (Cystopus).

b) Dehiscence mechanism of sporangium in Nephrolepis.

c) Causes of evolutionary success of Angiosperms.

d) Phyllotaxy.

e) Rhizome.

f) Aggregate fruit.

Q4) Attempt any two of the following: **[16]**

a) Describe scalariform conjugation in Spirogyra.

b) Describe the process of fertilization in Riccia.

c) Describe the capitulum and verticillaster inflorescence.

d) What are mechanical tissues? Comment on different mechanical tissues.

Q5) Describe the life cycle of Cycas. **[16]**

OR

Describe the internal structure of Dicotyledonous leaf and monocotyledonous stem.

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Total No. of Questions : 5]

SEAT No. :

P591

[Total No. of Pages : 2

[5315] - 8

F.Y.B.Sc.

BOTANY - II

BO-112 : Industrial Botany

(2013 Pattern) (Theory Paper - II) (71420)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) Give any two plant resources of Tannin.

b) Give any two limitations of greenhouse technology.

c) What is grafting.

d) Enlist the types of explant.

e) Define biofuel.

f) Give the names of any two fungi used in the production of antibiotics.

g) Enlist the types of biofertilizers.

h) What is Aristha.

Q2) Attempt Any Four of the following: **[16]**

a) Describe the value added products of mushrooms.

b) Explain the harvesting and marketing of Rose.

c) Give the limitations of organic fertilizers.

d) Describe biofuel production from castor.

e) Discuss the need of fruit processing.

f) Give the products and applications of Yeast.

P.T.O.

Q3) Write short notes any four of the following: **[16]**

a) Fiber Industry.

b) Methods of sterilization in plant tissue culture.

c) Spawn production.

d) Products of Penicillium.

e) Squash.

f) Integrated Pest Management (IPM).

Q4) Attempt any two of the following: **[16]**

a) Describe the cultivation practices of Tuberose.

b) Describe advantages and types of Organic fertilizers.

c) Describe Azolla and phosphate solubilizing biofertilizers.

d) Give the commercial significance of biopesticides.

Q5) Describe artificial vegetative propagation by Air layering and Approach Grafting. **[16]**

OR

Describe the commercial significance of Amla and Aloe.

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Total No. of Questions : 5]

SEAT No. :

P592

[Total No. of Pages : 2

[5315] - 9

F.Y.B.Sc.

ZOOLOGY

ZY-101 : ANIMAL SYSTEMATICS AND DIVERSITY - I & II

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Define / Explain: **[16]**

a) Genus.

b) Spicules.

c) Cytopyge.

d) Vocal sacs.

e) Leucocytes.

f) Catadromous migration.

g) Hemichordata.

h) Closed circulatory system.

Q2) Write short notes on (Any Four): **[16]**

a) General characters of Kingdom Animalia.

b) Salient features of Phylum Coelenterata.

c) General characters of class Cestoda.

d) Hibernation in Frog.

e) Salient features of Urochordata.

f) General characters of Vertebrata.

P.T.O.

Q3) Attempt the following (Any Four): **[16]**

a) Give general characters of Phylum Annelida.

b) Explain Binary fission in Paramoecium.

c) Describe external morphology of earthworm.

d) Sketch and label dorsal view of Brain of frog.

e) Give general characters of Bony fishes with examples.

f) Explain salient features of Anura with examples.

Q4) Attempt the following (Any two): **[16]**

a) Describe contractile vacuoles in paramoecium.

b) Describe septal nephridia in earthworm.

c) Describe mechanism of working of Heart in frog.

d) Describe neoteny in Amphibia.

Q5) Give an account of digestive system of Earthworm. **[16]**

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Give an account of female reproductive system of frog. **[16]**

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Total No. of Questions : 5]

SEAT No. :

P593

[Total No. of Pages : 2

[5315] - 10

F.Y.B.Sc.

ZOOLOGY

ZY-102 : FUNDAMENTALS OF CELL BIOLOGY AND GENETICS

(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Define / Explain the following: **[16]**

a) Cytogenetics.

b) Nuclear stain.

c) Glycoprotein.

d) Lysosomes.

e) Genotype.

f) Dominant lethal genes.

g) Paramecin.

h) Inheritance.

Q2) Write short notes on (Any Four): **[16]**

a) Animal cell.

b) Metaphase of mitosis.

c) Cell cycle.

d) Law of segregation.

e) Concept of co-dominance.

f) Genetic Engineering.

P.T.O.

Q3) Attempt the following (Any Four): **[16]**

a) Write a short note on vital stain.

b) Give the significance of mitosis.

c) Explain supplementary factors (9:3:4) with suitable example.

d) Explain the inheritance of haemophilia in human.

e) Discuss the phenomenon of gynandromorphism.

f) Describe the medico legal importance of blood groups.

Q4) Attempt the following (Any two): **[16]**

a) Describe the functions of plasma membrane.

b) Describe the structure of nuclear pore complex.

c) Give an account of Down's syndrome.

d) Explain the 'Erythroblastosis foetalis'.

Q5) a) Give detailed account of duplication and translocation in chromosomes. **[8]**

b) Describe "ZZ-ZW" method of sex determination. **[8]**

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Explain the structure and functions of mitochondria. **[16]**

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Total No. of Questions : 5]

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P594

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F.Y.B.Sc.

GEOLOGY

MINERALOGY AND PETROLOGY

(2013 Course) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

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

a) Define petrogenesis.

b) Define strike of a bed.

c) Explain streak.

d) What is granite?

e) What is optical mineralogy?

f) Define centre of symmetry of a crystal.

g) Define lustre. Give the lustre of diamond.

h) Define a crystal.

Q2) Answer the following questions. [Any Four] **[16]**

a) Explain the forms present in minerals, as a physical property.

b) Explain co-valent bonding in minerals with suitable examples.

c) Describe Nesosilicate structure with suitable examples.

d) Give an account of minerals used in cement industry.

e) Explain the various branches of Mineralogy.

f) Explain the supergene enrichment and placer deposits in mineral formation.

P.T.O.

Q3) Answer the following questions. [Any four] **[16]**

a) Give the diagnostic characters of Metamorphic Rocks.

b) Give the classification of Igneous Rocks based on depth of formation.

c) Describe the Rudaceous Deposits.

d) Explain Cataclastic Metamorphism with suitable egs.

e) Explain Pillow structure.

f) What is magma? Give the compostion of magma.

Q4) Answer the following. [Any Two] **[16]**

a) Give the tabular classification of sedimentary Rocks.

b) State the various optical properties of minerals seen in Plane Polarised Light (PPL). Explain "cleavage" in detail.

c) Explain the following structures of sedimentary Rocks.

i) Graded Bedding.

ii) Current Bedding.

d) Give the various forms with indices present in Monoclinic system, Type-Gypsum.

Q5) Define a fold. Describe the different parts of the fold with neat diagram. Describe Anticline and Syncline. **[16]**

OR

Draw the crystallographic axes, Elements of symmetry, definitions of various forms with indices present in Orthorhombic system, Type-Baryte.

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Total No. of Questions : 5]

SEAT No. :

P595

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F.Y.B.Sc.

GEOLOGY

PHYSICAL GEOLOGY AND PALAEONTOLOGY

(2013 Course) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

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

a) Mention the major tectonic plates of the Earth.

b) Give any two uses of fossils.

c) Give the periods of the Palaeozoic Era.

d) Draw diagram of a typical Nautilus shell.

e) Define Isostacy.

f) What are Belemnites?

g) Draw diagram of K/Ar method of age determination.

h) Give the systematic position of Corals.

Q2) Answer the following questions. [Any Four] **[16]**

a) Define Geology. Describe any three fundamental branches of Geology.

b) What is Sampling? Explain Spot Sampling.

c) Define Palaeontology. Describe its branches.

d) Explain the internal structure of the earth.

e) Explain Imprints and Carbonisation modes of preservation of fossils.

f) Explain the geological evidences of Continental drift.

P.T.O.

Q3) Answer the following questions. [Any four] **[16]**

a) Define an Earthquake. Describe the Seismic waves.

b) Describe life of the Cenozoic Era.

c) Explain the conditions necessary for fossilization.

d) Describe the Hydrosphere of the Earth.

e) Explain the coiling in Gastropod shells.

f) Define a disaster. Explain the different types of disasters.

Q4) Answer the following questions. [Any Two] **[16]**

a) Define a volcano. Describe the structure of a typical volcano.

b) Describe the hard part morphology of a typical lamellibranch shell.

c) Explain the Big Bang theory for the origin of the Universe. Add a note on temperature and pressure within the Earth.

d) Describe the hard part morphology of a Trilobite.

Q5) Describe any four depositional landforms formed by the river action. **[16]**

OR

a) Describe the hard part morphology of a Brachiopod shell. **[8]**

b) Describe the hard part morphology of a Regular Echinoid. **[8]**

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Total No. of Questions :5]

SEAT No. :

P596

[Total No. of Pages :3

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F.Y.B.Sc.

STATISTICS/ STATISTICAL TECHNIQUES

Descriptive Statistics

(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

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

Q1) Attempt each of the following.

a) i) Define the term population. **[1]**

ii) State any two demerits of arithmetic mean. **[1]**

iii) Define the term less than cumulative frequency of a class. **[1]**

iv) Define order of an attribute. **[1]**

b) Choose the correct alternative for each of the following:

i) Which of the following is least affected by extreme values. **[1]**

A) Arithmetic mean B) Geometric mean

C) Median D) Harmonic mean

ii) If the largest value in a set of observations is 89 and its range is 85, the smallest value of the set is; **[1]**

A) 7 B) 4

C) 86 D) –4

iii) The value of coefficient of skewness based on moments ($\sqrt{1}$) for a symmetric distribution is equal to **[1]**

A) 0 B) Positive

C) Negative D) 3

P.T.O.

iv) If the equation of line of regression of X on Y is $2X + 3Y = 9$, the regression coefficient of X on Y (bXY) is. **[1]**

A) $\frac{2}{3}$ B) $\frac{-3}{2}$

C) $\frac{3}{2}$ D) $\frac{1}{3}$

c) i) Explain the term random sample. **[2]**

ii) State the formula of median for a grouped frequency distribution. **[2]**

iii) Define Spearman's rank correlation coefficient and state its formula. **[2]**

iv) The first two raw moments of a frequency distribution are 1 and 10 respectively. Find the variance of the distribution. **[2]**

Q2) Attempt <u>any</u> <u>Four</u> of the following. **[4×4=16]**

a) Explain stratified random Sampling with illustration.

b) For the following information, find line of regression of X on Y;

$n = 20,\ \sum X^2 = 380,\ \sum Y^2 = 420,\ \bar{X} = 4,\ \bar{Y} = 3\ ,\ \sum XY = 180.$

c) State any two merits and demerits of standard Deviation. (S.D.).

d) State the requirements of a good measure of central tendency.

e) For a frequency distribution Bowley's coefficient of skewness is 0.6. The sum of upper and lower quartiles is 100, and the median is 38. Find the two quartiles.

f) Calculate Fisher's price index number for the following data;

Commodities	2012		2014	
	Price(₹)	Quantity(kg.)	Price(₹)	Quantity(kg.)
A	40	8	60	6
B	60	10	80	12
C	20	15	40	15

Q3) Attempt any four of the following. **[4×4=16]**

a) Define correlation coefficient. Show that it always lies between –1 and +1.

b) Define quartiles. Explain how to obtain quartiles in case of frequency distributions.

c) Discuss any one problem involved in the construction of index number.

d) Show that the central moments are invariant to the change of origin.

e) If X and Y are uncorrelated and var (X) = K, Vae (Y) = 2, find K such that Var (3X – Y) = 25.

f) A report regarding examination is given below: Total number of candidates appeared in examination is 1000 of which 550 were boys. Among these candidates 700 were successful. Number of successful boys is 300. Find the number of successful girls, number of unsuccessful girls and number of unsuccessful boys.

Q4) Attempt any Two of the following. **[2×8=16]**

a) i) Describe Scatter diagram and explain how it is used to measure correlation.

ii) The first 4 moments about the value 4 are 1.5, 17, –30 and 308 respectively. Find the 4th central moment.

b) i) Define an Index-Number. State any two uses of it.

ii) Given that, N = 1000, (A) = 470, (B) = 620, $(\alpha\beta)$ = 230. Verify whether A and B are associated?

c) i) Define Bowley's coefficient of skewness. Show that it always lies between –1 to +1.

ii) Show that sum of squares of deviations taken from arithmetic mean is minimum.

d) Explain the terms:

i) dichotomy.

ii) order of a class.

iii) positive class frequency.

iv) ultimate class frequency.

Q5) Attempt any <u>one</u> of the following.

a) i) Derive an expression for line of regression of Y on X, for a set of n observations on a bivariate random variable (X, Y). **[8]**

ii) Define α% trimmed mean.

Calculate 10% trimmed mean for the following data: **[4]**

34, 35, 59, 40, 42, 34, 36, 47, 41, 32.

iii) Splice the two series together so as to give a continuous series with base year 2000. **[4]**

Year	2000	2001	2002	2003	2004	2005	2006
Series A	100	125	140	160	–	–	–
Series B	–	–	–	100	130	150	170

b) i) With usual notations show that $\beta_2 \geq \beta_1 + 1$. **[8]**

ii) Explain the term kurtosis using suitable diagrams. State a measure of kurtosis. **[4]**

iii) Explain the procedure of fitting the curve $Y = ab^x$ for a bivariate data. **[4]**

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Total No. of Questions :5]

SEAT No. :

P597

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[5315]-14
F.Y.B.Sc.
STATISTICS/STATISTICAL TECHNIQUES
Discrete Probability and Probability Distributions
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Attempt each of the following:

a) i) Define a discrete sample space. **[1]**

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

iii) State mode of a Poisson distribution with parameter m=3. **[1]**

iv) If A and B are independent events with P(A)=0.4, P(B)=0.5, find $P(A' \cap B)$ **[1]**

b) Choose the correct alternative for each of the following: **[1 each]**

i) Relative complement of A with respect to B is given by:

A) $A \cap B'$ B) $A' \cup B$

C) $A' \cap B$ D) $A' \cap B'$

ii) In the simulteneous tossing of two fair coins, the probability of having at least one head is:

A) 0.75 B) 0.25

C) 1 D) 0.5

iii) If X is a degenerate random variable then:

A) $E(X^2) < [E(X)]^2$ B) $E(X^2) > [E(X)]^2$

C) $E(X^2) = [E(X)]^2$ D) None of these

iv) Let X_1 and X_2 are two independent Poisson variates then the probability distribution of (X_1+X_2) is :

A) Binomial B) Poisson

C) Geometric D) Bernoulli

P.T.O.

c) i) State the multiplication theorem for two events A and B defined on a sample space Ω. **[2]**

ii) The probability distribution of a discrete random variable X is as follows:

x	0	2	4
P(X= x)	0.25	0.40	0.35

Find E(x) **[2]**

iii) Define binomial distribution. **[2]**

iv) Determine K such that the following function is a probability mass function (p.m.f)

P(X= x) = k x ; x =1, 2, 3, 4.

=0 ; otherwise **[2]**

Q2) Attempt any four of the following: **[4 each]**

a) An integer between 1 and 100 (both inclusive) is selected at random. Find the probability of selecting a perfect square. Also find the probability of selecting a perfect cube, if all integers are equally likely.

b) Let X $\rightarrow$ B (n=6, p=$\frac{1}{4}$)

Find i) P(X=3)

ii) P(X<3)

c) X and Y are random variables with joint probability mass function partly shown in the following table. Find the missing probabilities.

X \ Y	0	1	Total
0	$\frac{1}{6}$	-	-
1	-	-	$\frac{2}{3}$
Total	-	$\frac{1}{2}$	1

d) Let X be a descrete random variable with probability mass function,

P(X= x)= $\frac{x}{15}$, for x =1, 2, 3, 4, 5.

= 0 , otherwise

Find E(X) and Var (2X-3)

e) Given A and B are two independent events defined on Ω, prove that A' and B' are independent.

f) Explain the following terms with one illustration each:
   i) mutually exclusive events
   ii) exhaustive events.

Q3) Attempt any Four of the following: **[4 each]**

a) Obtain moment generating function (m.g.f) of Poisson distribution with parameter 'm'.

b) Give the classical definition of probability. State its limitations.

c) A bag contains 4 white and 2 black balls. Another bag contains 3 white and 3 black balls. One ball is drawn from each bag at random. Find the probability that they are of different colours.

d) The probability mass function (p.m.f) of a random variable X is given by,

$$P(X=x)=\frac{k2^x}{x!}, \quad x=0,1,2,3,\ldots\ldots, k>0$$

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

Find the value of K and $P(X \geq 1)$.

e) Let X~B(n,p). Find mean of X.

f) For a bivariate discrete r.v.(X,Y):

$\sigma_X^2=9,\ \sigma_Y^2=4,$ Cov(X,Y)=4.

Find i) Var (2X-3Y)
   ii) Cov (2X, 3Y)

Q4) Attempt any Two of the following:

a) i) State and prove Baye's theorem **[6]**
   ii) Define r^{th} order factorial moment of a discrete r.v. **[2]**

b) The joint probability distribution of X and Y is,

X \ Y	1	2	3
0	0.1	0.05	0.15
1	0.05	0.1	0.15
2	0.15	0.15	0.1

Find i) E (Y/X=1) **[4]**
   ii) V (Y/X=1) **[4]**

c) State and prove binomial approximation to hypergeometric distribution. **[8]**

d) The probability distribution of r.v.X is given by, **[8]**

X	0	1	2	3
P(x)	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{6}$

Calculate coefficient of skewness γ_1 and comment on the nature of the distribution.

Q5) Attempt any One of the following:

a) i) A r.v. X has discrete uniform distribution with p.m.f, **[6]**

$$P(x)=\frac{1}{n+1} \; ; \qquad x=0,1,.....n.$$

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

Find mean and variance of X.

ii) Define Bernoulli distribution with parameter p. **[2]**

iii) The joint p.m.f of (X,Y) is as given below: **[8]**

X \ Y	0	1	2
1	0.1	0.2	0.2
2	0.1	0.3	0.1

Find correlation coefficient between X and Y

b) i) Let X be a discrete r.v. with p.m.f

$P(x)= pq^x$, x=0, 1, 2....., 0 < p <1, q=1-p

= 0 , otherwise

Find E(X) and Var (X), also show that E (X) < Var (X) **[8]**

ii) Given that $P(A_1)=P(A_2)=P(A_3)=\frac{1}{3}$ and $P(B/A_1)=\frac{2}{7}$ $P(B/A_2)=\frac{4}{9}$,

$P(B/A_3)=\frac{1}{5}$, find $P(A_2/B)$. **[4]**

iii) A box of 20 mangoes contain 4 rotten mangoes. Two mangoes are drawn at random without replacement from this box. Obtain the probability distribution of the number of rotten mangoes in the sample. **[4]**

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Total No. of Questions : 5]

SEAT No. :

P598

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F.Y. B.Sc.

GEOGRAPHY

Gg-110 : Geomorphology

(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following in twenty words (any Eight): **[16]**

a) State the branches of physical Geography.

b) What are primary Earthquake waves?

c) What is Isostasy?

d) Define faults.

e) What are crustal movement?

f) Define Rocks.

g) State the formation of Marble.

h) What is Beach?

i) What is Lagoon?

j) Define moraines.

Q2) Explain the following in 150 words (Any four): **[16]**

a) Criticism on wegner's continental Drift theory.

b) Differenciate between Rocks and Minerals.

P.T.O.

c) Major Earthquake regions of the world.

d) Types of Volcanoes.

e) Formation of sea cliff.

f) Characteristics of the Igneous Rocks.

Q3) Answer the following in 150 words (Any four): **[16]**

a) Explain the major plates of the Earth.

b) Explain in detail normal faults.

c) Discuss the causes of the earthquake.

d) Explain the formation of Metamorphic Rocks.

e) Explain the Mass Movement.

f) Explain with neat diagrams of the cirques.

Q4) Answer the following in 300 words (Any Two): **[16]**

a) Explain the interior of the Earth.

b) Explain types of Folds.

c) Explain depositional work of river.

d) Explain any four landforms associated with erosional work of wind.

Q5) Answer the following in 500 words (Any One): **[16]**

Explain the nature and scope of Geomorphology.

OR

What is weathering? Explain the types of weathering in detail.

Total No. of Questions :5] SEAT No. :

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[5315]-16
F.Y.B.Sc.
GEOGRAPHY
Gg-120: Climatology and Oceanography
(2013 Pattern) (Paper-II)

Time :3Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All question carry equal marks.***
3) ***Draw Neat diagrams wherever necessary.***
4) ***Use of map stencils is allowed.***

Q1) Answer the following in twenty words (Any Eight). **[16]**

a) Define Climate.

b) Define Lapse rate.

c) Define moisture.

d) What do you mean by wind ward and lee ward slope of mountain.

e) Give the name of high and low clouds.

f) Define coast.

g) Define salinity.

h) What is Trough?

i) Define wavelength.

j) Any two effects of gulf stream.

Q2) Explain the following in 150 words.(Any four) **[16]**

a) Scope of climatology

b) Global warming.

c) Snow.

d) ocean salinity.

e) ocean deeps.

f) High tides & low tides.

P.T.O.

Q3) Answer the following in 150 words.(Any Four). **[16]**

a) Nature of climatology.

b) Heat budget of the earth.

c) Mechanism of monsoon.

d) Importance of oceanography.

e) Describe density of ocean water.

f) Causes of ocean current.

Q4) Answer the following in 300 words.(Any Two) **[16]**

a) Describe cowes of Global warming.

b) Explain concept of pressure gradient.

c) Nature of oceanography.

d) Explain vertical distribution of ocean water temperature.

Q5) What is precipitation? Explain any three forms of precipitation. **[16]**

OR

What is coast ? Explain Longitudinal and transeverse coast.

Total No. of Questions : 5]

SEAT No. :

P600

[Total No. of Pages : 2

[5315] - 17

F.Y. B.Sc.

MICROBIOLOGY

Introduction to Microbiology

(2013 Pattern) (Paper-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) What are Rickettsia?

b) _____ bond is present between water molecules.

i) Covalent ii) Hydrogen

iii) Ionic iv) None of above

c) Name any two proteins.

d) Define pH.

e) Match the following:

i)	Single flagellum on one pole	a)	Peritrichous
ii)	Flagella all over cell	b)	Monotrichous
iii)	Flagella on both poles	c)	Lophotrichous
iv)	Many flagella on one pole	d)	Amphitrichous

f) Name the enzyme present in carboxysome.

g) _____ and _____ proposed the double helix model of DNA.

h) Name the chemicals unique to bacterial endospore.

Q2) Attempt any four of the following: **[16]**

a) Give the principles of classification of viruses by ICTV.

b) Explain in brief the theory of spontaneous generation.

P.T.O.

c) Give the morphological characteristics of bacteria.

d) Describe hallmark developments in Industrial Microbiology.

e) Explain the formation of ionic bond with suitable example.

f) Enlist distinguishing characters of algae.

Q3) Write short notes on any four: **[16]**

a) Bacterial capsule.

b) Probiotic microorganisms.

c) Redox potential.

d) Developments in vaccination.

e) Bioinoculants.

f) Functions of lipids.

Q4) Attempt any two of the following: **[16]**

a) Give distinguishing characters of protozoa and their economic importance.

b) With neat labelled diagram explain three jar experiment.

c) State Koch's and River's postulates.

d) With neat labelled diagram explain. Structure and function of endospore.

Q5) Attempt any one of the following: **[16]**

a) Describe in detail the structure and composition of bacterial flagella. Add a note on its function.

b) What are carbohydrates? Explain the carbohydrates that occur in prokaryotes.

Total No. of Questions : 5]

SEAT No. :

P601

[Total No. of Pages : 2

[5315] - 18

F.Y. B.Sc.

MICROBIOLOGY

Basic Techniques in Microbiology

(2013 Pattern) (Paper-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

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

a) 1g = _____ mg.

1mg = _____ µg.

b) Define - specific growth rate.

c) Give two examples of fixatives in staining.

d) Give two common ingredients of media.

e) Define - Diauxic growth.

f) Define - Moist heat sterilization.

g) State True or false.

i) Congo red is a basic stain.

ii) Methylene blue is a basic stain.

h) Match the following:

i) Exponential growth	a) Log phase
ii) Enumeration of bacteria	b) petroff Hausser chamber
	c) congo red

Q2) Attempt any four of the following: **[16]**

a) Explain filtration as physical mean of sterilization.

b) What are chemolithotrophs? Explain a method to cultivate chemolithotrophs.

P.T.O.

c) Explain role of accentuators in staining.

d) How is Direct Microscopic count used to enumerate bacteria.

e) What is the significance of oil immersion objective in compound microscope.

f) What are selective media? Ellaborate with suitable example.

Q3) Attempt any four of the following: **[16]**

a) What is disinfectant? Explain use of gases as disinfectant.

b) Write the principle and significance of Relief staining.

c) With the help of growth curve, explain phases of bacterial growth.

d) Explain functions and working of culture collection centre.

e) Describe - Astigmatism.

f) Describe nephlometry as a method to enumerate bacteria.

Q4) Attempt any two of the following: **[16]**

a) Explain role of biological and chemical indicators to check efficiency of sterilization.

b) Explain various methods for preservation of fungal cultures.

c) What are acidic and basic dyes? Explain with examples.

d) Explain heat as an agent of physical sterilization.

Q5) Attempt any one of the following: **[16]**

a) Explain principle, construction, working and applications of Bright Field Microscope.

OR

b) Enlist methods of enumeration of bacteria. Explain in detail chemical methods to enumerate bacteria.

Total No. of Questions : 5]

SEAT No. :

P602

[Total No. of Pages : 2

[5315] - 19
F.Y.B.Sc.
PSYCHOLOGY
General Psychology
(2013 Pattern) (Paper - I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words. **[16]**

a) Define attention.

b) What is motivation?

c) Define psychoanalysis.

d) What is creative thinking?

e) What is perception?

f) Define frustration.

g) What is Big-five model?

h) What is the formula of IQ?

Q2) Answer in 50 words. [4 out of 6] **[16]**

a) Explain structuralism approach.

b) State the determinants of attention.

c) What is humanistic approach of motivation?

d) Explain the physiology of anger emotion.

e) State the Allport's trait approach.

f) Describe mentally challenged personality types.

P.T.O.

Q3) Answer in 150 words. [4 out of 6] **[16]**

a) What is Bio-psycho-socio-cultural approach?

b) Explain types of conflicts.

c) Describe drive reduction theory of motivation.

d) Explain positive emotions.

e) What are the causes of mental retardness?

f) Explain the process of decision making.

Q4) Answer in 300 words. [2 out of 4] **[16]**

a) Describe fields of psychology.

b) Explain perceptual illusions.

c) State the theories of emotions.

d) Explain Cattell's 16 PF model of personality.

Q5) Answer in 500 words. [any one] **[16]**

a) Describe glandular system.

b) What is learning? Explain Thorndikes law's with experiment.

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Total No. of Questions : 5]

SEAT No. :

P603

[Total No. of Pages : 2

[5315] - 20
F.Y.B.Sc.
PSYCHOLOGY
Experimental Psychology
(2013 Pattern) (Paper - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

Q1) Answer in 20 words. **[16]**

a) What is PSE?

b) Define constant error.

c) State definition of thinking.

d) What is problem solving?

e) Define psychological test.

f) What is intelligence test?

g) State longform of WAIS.

h) What is TAT?

Q2) Answer in 50 words. [4 out of 6] **[16]**

a) Explain goals of experimental psychology.

b) What is Weber's law?

c) Explain concept formation.

d) Describe types of learning.

e) Enumerate characteristics of psychological test.

f) Explain the nature of personality test.

P.T.O.

Q3) Answer in 150 words. [4 out of 6] **[16]**

a) Explain the application of experimental psychology.

b) Differentiate classical and operant conditioning.

c) Describe problem solving approaches.

d) State the importance of language in thinking.

e) Explain the nature of interest inventory.

f) State the pros & cons of SPM.

Q4) Answer in 300 words. [2 out of 4] **[16]**

a) Describe history of experimental psychology.

b) Explain methods of psychophysics.

c) Explain influencing factors of learning.

d) Describe social and ethical implications in psychological testing.

Q5) Answer in 500 words. [any one] **[16]**

a) Define variable. Explain types of variables.

b) What is reaction time? Explain determinants of reaction time.

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