Total No. of Questions : 3] **[Total No. of Pages : 1**

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[4017] - 131

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

मराठी (MARATHI)

पाठ्यपुस्तक : विज्ञान कथा विश्व (जुना अभ्यासक्रम)

(2008 पॅटर्न) (53111)

वेळ : 2 तास] *[एकूण गुण : 40*

सूचना: – *1) सर्व प्रश्न सोडविणे आवश्यक आहेत.*
2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) खालीलपैकी एका विषयावर 400 शब्दांपर्यंत निबंध लिहा. **[10]**

अ) आधुनिक शेती काळाची गरज

ब) माझा आवडता शास्त्रज्ञ

क) गप्पा आणि गप्पिष्ट (ललित)

प्रश्न 2) 'विज्ञानाला विवेकाची जोड हवी' हे सत्य 'चंद्रावरचा खून' ही कथा अधोरेखित करते, स्पष्ट करा **[15]**

किंवा

'यंत्रांनी केलं बंड' ही कथा भविष्यकालीन जीवनाचा वेध घेते या विधानाचा परामर्श घ्या.

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

अ) चंद्रलोकची सफर मधील पात्रांचा परिचय द्या.

ब) 'वामलोचना' ----- तील विश्वनाथ पंतांचा प्रयोग.

क) 'तरंगणारा संशोधक' कथेतील: 'समीर सदावर्ते'

ड) 'यंत्रमानवाच्या हाताने' कथेतील बन्याबापू.

इ) आकाश आणि जमीन कथेतील 'पर्णा' चा परिचय करून द्या.

फ) 'गुगली' या कथेची वैशिष्टये.

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Total No. of Questions : 3] **[Total No. of Pages : 1**

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[4017] - 131

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

मराठी (MARATHI)

पाठ्यपुस्तक : विज्ञान वेध (नवा अभ्यासक्रम)

(पॅटर्न 2010) (53111)

वेळ : 2 तास] *[एकूण गुण : 40*

सूचनाः – *1) सर्व प्रश्न सोडविणे आवश्यक आहेत.*

2) उजवीकडील अंक प्रश्नांचे पूर्ण गुण दर्शवितात.

प्रश्न 1) पुढीलपैकी कोणत्याही एका विषयावर **400** शब्दांपर्यंत निबंध लिहा. **[10]**

अ) माहिती तंत्रज्ञानाचे सामाजिक परिणाम.

ब) भेसळः विज्ञानापुढील एक आव्हान.

क) लहानपण देगा देवा ----- (ललित)

प्रश्न 2) ज्ञान व काळ यांचा समन्वय 'कालदमन' या कथेतून कसा मांडला आहे, सविस्तर लिहा.**[15]**

किंवा

आयुर्वेद शास्त्राच्या अभ्यासाचा प्रारंभ कसा झाला ते, चरकाचार्य या पाठाच्या आधारे स्पष्ट करा.

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

अ) भास्कराचार्यांचा 'लीलावती' ग्रंथ

ब) टॉलेमीची विश्वकल्पना

क) आइन्स्टाईनचा सापेक्षतेचा सिद्धांत

ड) सुशिक्षितांची अंधश्रद्धा पाठामध्ये मांडलेले संतविचार

इ) 'विज्ञानाचा संदेश' मधील विविधतेतील एकता

फ) 'गिनिपिग' कथेतील 'विल्सन्स सिंड्रोम' व्यक्तिरेखा

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Total No. of Questions : 3] **[Total No. of Pages : 3**

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[4017] - 132

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

हिंदी (HINDI)

(नया पाठ्यक्रम)

(2008 Pattern) (General) (53211)

समय : 2 घंटे] *[पूर्णांक : 40*

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

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

प्रश्न 1. अ) निम्नलिखित में से <u>किन्हीं दस</u> वाक्यों को शुद्ध करके फिर से लिखिए : -[10]

i) कई स्थलों में ऐसा देखा गया है।

ii) मैं उनको दस बार समझाया हूँ।

iii) उसे आनाच पड़ेगा।

iv) उसने एक स्वेटर लाल बुना।

v) मैंने शरद के सौ रूपए देने हैं।

vi) मेरे भाई की तीन लड़कियाँ हैं।

vii) क्या आपने हिमालय पर्वत देखा है ?

viii) बेचारा असमय में मर गया।

ix) आपका पत्र धन्यवाद के साथ मिला।

x) नुपूर का घर अच्छा वाला है।

xi) योगेश जो नारायण का लड़का है, को बुलाओ।

xii) हम दोनों का घोर संबंध है।

P.T.O.

आ) निम्नलिखित अँग्रेज़ी अनुच्छेद का हिंदी में अनुवाद कीजिए: **[4]**

Oils and fats store the excess energy in the body which can be, utilised when required. The unsaturated oils and fats are more easily digested compared to the saturated fats. Hence higher percentage of poly unsaturated fats (PUFA) is recommended in food. They are natural products obtained from plant and animal source.

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

क) ''मेरा डर मत करो। मैं तो बुलेल की खड्ड के किनारे मरूँगा। भाई कीरत सिंह की गोद पर मेरा सिर होगा और मेरे हाथ के लगाये हुए आँगन में आम के पेड़ की छाया होगी।''

अथवा

''अर्जी दी थी कि मुझे सौ मरले की जगह पचास मरले दे दो – लेकिन जमीन तो दो ! मगर अर्जी दो साल से वक्त ले रही ! मैं भूखा मर रहा हूँ, और अर्जी वक्त ले रही है !''

,

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

ख) ''अट्टहास उल्लास नृत्य का होगा जब आनंद,

विश्व की इस वीणा के टूटेंगे सब तार,

बंद हो जाएँगे ये जितने कोमल छंद,

सिन्धु – राग का होगा तब आलाप।''

अथवा

''मैं नहीं चाहता चिर – सुख,

मैं नहीं चाहता चिर – दुख;

सुख दुख की खेल मिचौनी

खोले जीवन अपना मुख।''

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

च) विधवा का चरित्र–चित्रण कीजिए।

छ) लहनासिंह ने अपने वचन का पालन किस प्रकार किया ?

ज) हल्कू का चरित्रांकन कीजिए।

झ) 'परदा' कहानी की कथावस्तु अपने शब्दों में लिखिए।

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

प) 'जागो फिर एक बार' कविता में कवि ने प्राकृतिक सुषमा का वर्णन किस प्रकार किया है ?

फ) 'आवाहन' कविता द्वारा कवि कौन–सा संदेश देना चाहता है ?

ब) 'मानव' कविता का भावार्थ अपने शब्दों में लिखिए।

भ) 'ताज' कविता द्वारा कवि क्या कहना चाहता है ?

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Total No. of Questions : 4] **[Total No. of Pages : 2**

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

संस्कृत (SANSKRIT)

गीर्वाणभारती (Gīrvānabhāratī)

(53311) (2008 Pattern)

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

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

पुढील प्रश्नांची 2 - 4 ओळीत उत्तरे लिहा.

i) What did Aśuinau say to Sukanyā regarding his husband ?

अश्विनौ सुकन्येला तिच्या पतिसंबंधी काय म्हणाले ?

ii) Which 3 concepts are discussed in Upanisads? What is the aim of the Upanisads ?

उपनिषदांमध्ये कोणत्या तीन संकल्पनांचा विचार केला आहे ? आणि उपनिषदांचे उद्दिष्ट कोणते ?

iii) State the names of Prāchina Upanisads ?

प्राचीन उपनिषदांची नावे लिहा.

iv) What did Śakuntala's friend suggest about the ring ?

शकुंतलेच्या सख्यांनी अंगठीविषयी काय सुचविले ?

v) Which fragrant things imagined by Śankarācharya for Śivamānasapūjā ?

शंकराचार्यांनी शिवमानसपूजेसाठी कोणती सुगंधी साधने कल्पिलेली आहेत ?

vi) Who is the Ādikavi and which is Ādikāvya ?

आदिकवी कोण आणि आदिकाव्य कोणते ?

vii) Which are the Chatuskalā of Prakāśavān Pāda ?

प्रकाशवान् पादाच्या चतुष्कला कोणत्या ?

P.T.O.

viii) What did Jābālā say to Satya kāma regarding his gotra ?

जाबालाने सत्यकामाला आपल्या गोत्रा विषयी काय सांगितले ?

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

पुढीलपैकी कोणत्याही दोहोंवर <u>8 - 10</u> ओळीत संक्षिप्त टीपा लिहा.

i) Aśvinau **अश्विनौ** ii) Kaṇva **कण्व**

iii) Brāhmaṇagrantha **ब्राह्मणग्रंथ**

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

पुढीलपैकी कोणत्याही दोहोंवर <u>8 - 10</u> ओळीत संक्षिप्त टीपा लिहा.

i) Siṁhikā **सिंहिका** ii) Upadeśaprabandha **उपदेशप्रबन्ध**

iii) Nature of Mānasapūja **मानसपूजेचे स्वरूप**

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

पुढीलपैकी कोणत्याही एका प्रश्नाचे उत्तर <u>16 - 20</u> ओळीमध्ये लिहा.

i) Explain in Detail **'तत्र श्लोकचतुष्टयम्'** Regarding the lesson **'सेयं याति शकुन्तला पतिगृहम्'**

'सेयं याति शकुन्तला पतिगृहम्' या पाठासंदर्भात 'तत्र श्लोकचतुष्टयम्' चे सविस्तर स्पष्टीकरण करा.

ii) Critically evaluate the lesson **'छायाग्राहिसत्त्वम्'** from the point of view modern age ?

आधुनिक संदर्भात 'छायाग्राहिसत्त्वम्' या पाठाचे मूल्यमापन करा.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-138

S.Y. B.Sc. (Vocational)

PHOTOGRAPHY AND AUDIO - VISUAL PRODUCTION

Still photography, Processing and Prinfing

(58011) (Paper - III) (Sem. - I) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Draw a diagram and compare the angle of view of a normal lens and a wide angle lens.

b) Explain the significance of the depth of focus.

c) Explain why a point and shoot camera does not have a focusing ring.

d) Explain the difference between a macro lens and a normal lens.

e) What is the advantage of a matrix metering pattern over an 'average' metering pattern?

f) Mention four uses of artificial light in photography.

g) A close-up lens has focal length of 250 mm. Calculate its diopter number.

h) Explain how a ND filter is useful in photography.

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

a) Explain what you mean by the terms 'Hyper focal point and hyper focal distance'. Mention the factors that control the hyper focal distance. How is it useful in Photography?

b) State the law of transmission and absorption. How is it useful in photographic filters?

c) Explain why wide angle lenses and telephoto lenses are generally slow lenses.

P.T.O.

Q3) Attempt **ANY TWO** of the following : **[8]**

a) Compare the features of a hard light source and a soft light source. Give at least one example each.

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

c) What is a polarizing filter? Discuss its use in photography.

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

a) Classify the light sources used in photography according to their origin. Discuss their features in details. Give suitable examples of each.

b) Draw a suitable diagram and discuss the three point lighting setup. What is the function of each light in the setup?

♦♦♦♦

Total No. of Questions : 4] **[Total No. of Pages : 3**

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[4017] - 104

S.Y. B.Sc.

PHYSICS

PH - 212 : (a) Electronics

(Sem. - I) (Paper - II) (2008 Pattern) (51221)

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

Instructions to the candidates:

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

Q1) Attempt all of the following:

a) Define capacitance. Give it's SI unit. **[1]**

b) What is meant by Inductive reactance? Give it's unit. **[1]**

c) State Maximum power Transfer theorem. **[1]**

d) In a common - emitter configuration of transistor, the change in collector current is 2 MA for change in base current of 20μA. Find the base current & amplification factor β. **[1]**

e) What is meant by input offset voltage of op–Amp? **[1]**

f) Explain load regulation of power supply. **[1]**

g) State different types of rectifiers. **[1]**

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

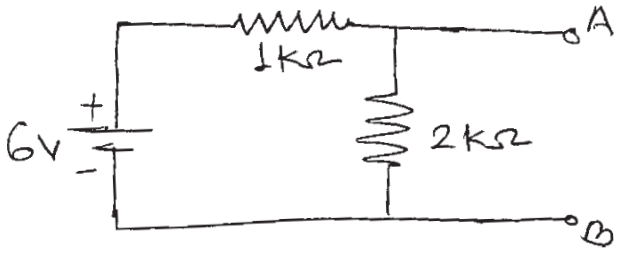
i) Convert a decimal number 53 into equivalent binary number. **[1]**

j) Draw the logic symbol of OR gate. **[1]**

P.T.O.

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

a) State Thevenin's theorem. Give Thevenin's equivalent of the circuit shown below. **[5]**

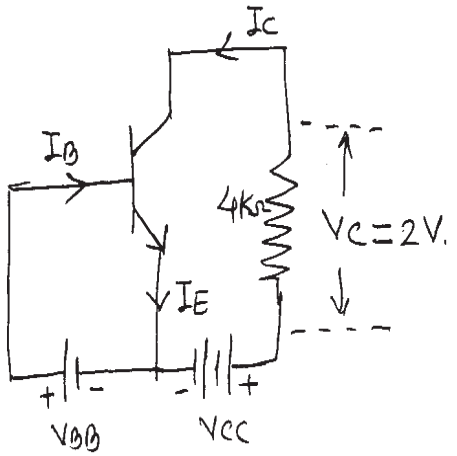


b) With circuit diagram, explain base resistor method for biasing. **[5]**

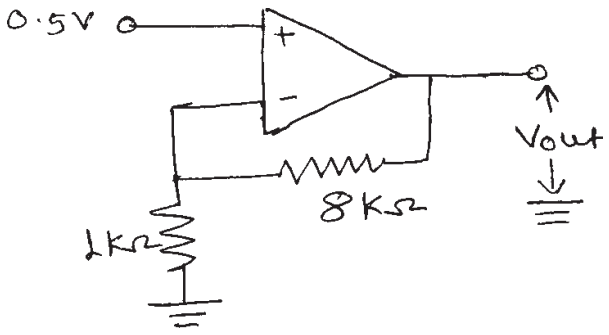
c) Explain with circuit diagram op-amp as an adder. **[5]**

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

a) For a transistor circuit shown below, find base current and emitter current if $\beta = 100$. **[5]**



b) What is the output of the following circuit? **[5]**



c) Using De-morgan's theorems. Simplify.

i) $\overline{\overline{(A+B)}+\overline{C}}$ ii) $\overline{\overline{AB}+\overline{A}+AB}$ **[5]**

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

i) 1) Explain with circuit diagram the use of transistor as a switch. **[4]**

2) Describe zener diode as a shunt regulator. **[4]**

ii) 1) State different types of feed back, circuits. Explain voltage series feed back. **[4]**

2) State and prove De-Morgan's theorems. **[4]**

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

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

ii) Explain open in a series circuit. **[2]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P243

[4017] - 104
S.Y. B.Sc.
PHYSICS
PH - 212: (b) Instrumentation
(Sem. - I) (Paper - II) (51221)

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

Instructions to the candidates:

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

Q1) Attempt all of the following:

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

b) Define the term resolution. **[1]**

c) State any one advantage of variable capacitance devices. **[1]**

d) State the principle of resistive transducer. **[1]**

e) Define the term absolute pressure. **[1]**

f) What is meant by turbulent flow? **[1]**

g) What is diamagnetism? **[1]**

h) Define the term humidity. **[1]**

i) What is MRI? **[1]**

j) Define coercivity of magnetic material. **[1]**

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

a) What do you mean by variable capacitance transducer? Explain variation in capacitance by changing common area of plates. **[5]**

b) Draw a typical ECG waveform and explain physical interpretation of the wave form. **[5]**

c) What are functional elements of a typical measurement system? Explain basic functional elements with block diagram. **[5]**

P.T.O.

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

a) Water flowing in a horizontal pipe has a speed of 20 cm/s at one end point and 15cm/s at another point. Determine the pressure drop between two points. **[5]**

b) A manufacturer calibrates a temperature gauge of 100ºC range with ± 0.5ºC. If it is used for temperature measurement of 50ºC, what will be the probable minimum and maximum value of temperature shown by gauge? **[5]**

c) An iron rod of $0.1m^2$ area of cross section is subjected to a magnetising field of 1000A/m. Calculate its magnetic permeability. Given : susceptibility of iron is 599. **[5]**

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

i) 1) Describe piezoelectric pressure transducer. **[4]**

2) Define transducer. State three characteristics of transducers. **[4]**

ii) 1) Describe use of pyranometer for measurement of solar radiation. **[4]**

2) What is cantilever beam? Explain how it is used for the measurement of force. **[4]**

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

i) The dead zone in certain thermometer is 0.125 percent of span. The calibration is 500ºC to 1300ºC. What temperature change might occur before it is detected? **[2]**

ii) What is flowmeter? State any two names of flowmeter. **[2]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P244

[4017] - 105

S.Y. B.Sc.

CHEMISTRY

CH - 211 : Physical Chemistry

(Paper - I)(Semester - I) (Theory) (2008 Pattern) (51311)

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

Instructions to the candidates:

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

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

a) State Debye third power law.

b) What is physical significance of Helmholtz free energy?

c) What is relation between K_p and K_c?

d) What is criterian of equilibrium interms of Helmholtz free energy?

e) Define the colligative property.

f) What is cryoscopic constant?

g) Draw the boiling point diagram and vapor pressure diagram for type I miscible liquid pairs?

h) What are conjugate solutions?

i) State Nernst distribution law.

j) Define the molality.

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

i) What is the use of absolute entropies?

ii) What are properties and significance of free energy change?

iii) What is van't Hoff's factor? Derive the relation between van't Hoff's factor and the degree of dissociation of an electrolyte.

P.T.O.

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

i) 48 gm of O_2 is compressed reversibly and isothermally at 27ºC from 15 atmosphere to 150 atmosphere. Calculate free energy change.

[Given : At.Wt. of oxygen = 16

$R = 8.314 \text{ J mole}^{-1}. \text{ k}^{-1}.$]

ii) A solution containing 0.5126 gm of naphthalene. (Mol.wt = 128.17) in 50.0gm of CCl_4 yields a boiling point elevation of 0.402ºC while a solution of 0.6219 gm of an unknown solute in the same weight of CCl_4 gives the boiling point elevation of 0.647ºC. Find the molecular weight of unknown solute.

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

i) Describe the construction and working of fractionating column.

ii) Derive the expression for entropy change on mixing of ideal gases.

iii) What do you mean by abnormal molecular weight? Why abnormal molecular weight is observed?

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

i) The organic liquid and water, which are immiscible with each other were boiled at 710 mm of Hg. Calculate the ratio of weight of organic liquid to water collected in the distillation.

[Given : Molecular weight of organic liquid = 130

vapor pressure of water at boiling point

= 520 mm of Hg.]

ii) The solubility of boric acid in water at 25ºC is 1.58 gm.lit^{-1}. Calculate the solubility of boric acid in amyl alcohol if distribution coefficient of boric acid in water and amyl alcohol is 3.24.

Q4) a) State Le Chatelier-Braun principle and discuss its application to ammonia formation.

OR

Define osmosis and osmotic pressure. Describe Berkelay and Hartley method of measurement of osmotic pressure. **[6]**

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

i) Discuss with the help of neat diagram, the effect of temperature on solubility of nicotine in water.

ii) Give different forms of Clapeyron equation. What are applications of Clapeyron equation?

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Total No. of Questions : 4] **[Total No. of Pages : 3**

P245

[4017] - 106

S.Y. B.Sc.

CHEMISTRY

CH - 212 : Organic Chemistry

(Semester - I) (Paper - II) (2008 Pattern) (51321)

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

Instructions to the candidates:

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

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

a) Why is e- tert. butyl cyclohexane more stable than a – tert.butyl cyclohexane.

b) Acetone gives haloform reaction. Explain.

c) 2, 2 – dimethyl butanoic acid does not undergo halogenation reaction with Br_2 and P.

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

e) Give the synthesis of pyridine from acrolein.

f) Define step-up reaction with example.

g) Give the importance of Biochemistry in population control.

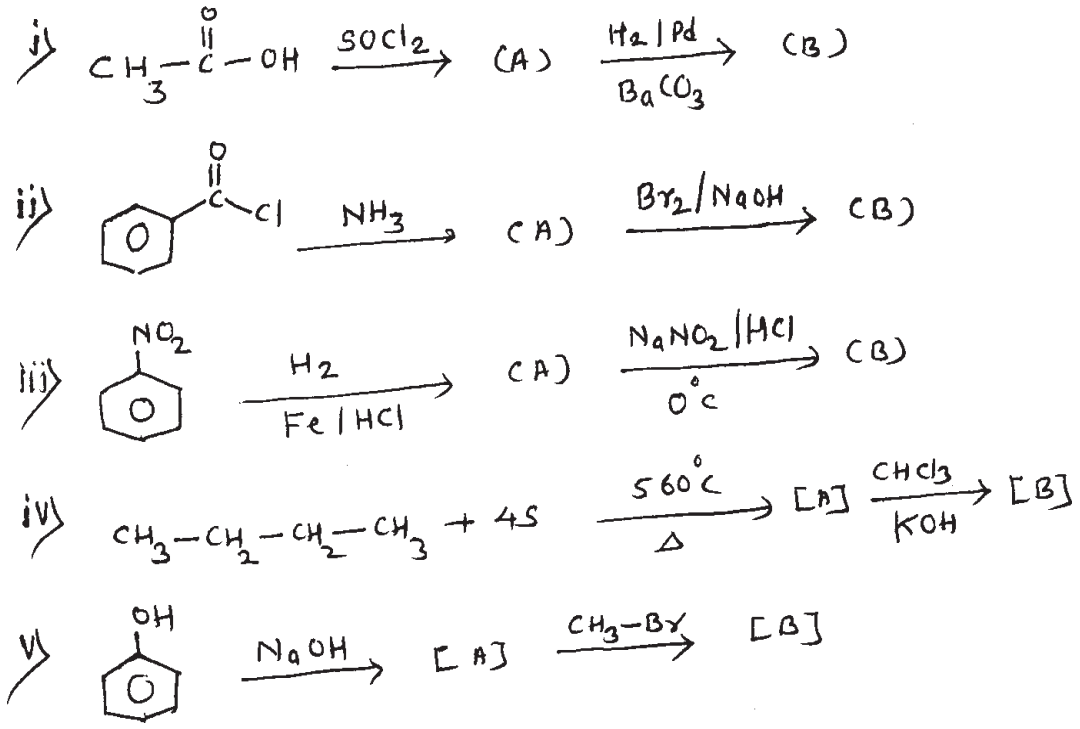
h) Draw the structure of sucrose

i) Give classification of lipids.

j) What are co-enzymes?

P.T.O.

Q2) a) Assign the structure to (A) and (B) in the following reaction. (any three): **[6]**



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

i) Acetaldehyde to 2 – propanol.

ii) Tolulene to ethyl benzoate.

iii) Aniline to p – nitroacetanilide.

iv) Methyl amine to ethyl amine

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

a) Draw all possible conformers of cyclohexane with Newman projection formula. Explain why is chair form more stable than boat?

b) What are carbohydrates? How are they classified? What is the action of following reagents on glucose.

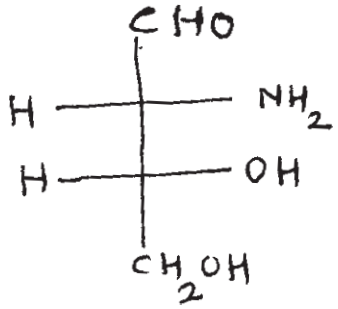
i) Br_2 water

ii) H_2 / Ni

c) What are α-amino acid? Discuss the classification of α-amino acid, giving one example of each class.

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

i) Define the term chiral centre. Assign 'R' and 'S' configuration to each of the chiral centre in the following compound.



ii) Explain Aldol condensation with suitable example.

iii) What are nucleic acid? What are different types of nucleic acid? Discuss their chemical compositions.

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

i) Explain Haworth synthesis of Napthalene.

ii) Discuss the effect of pH on the enzyme catalysed reactions.

OR

i) Write a note on Kolbe synthesis.

ii) State the functions of lipid.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P246 **[4017] - 107**

S.Y. B.Sc.

BOTANY

BO - 211 : Fundamentals of Plant Systematics and Plant Ecology

(Sem. - I) (Paper - I) (51411) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) What is a monograph?

b) Define Biosphere.

c) What is pioneer phase in Taxonomy.

d) Enlist two anatomical features used in Taxonomy.

e) What is ICBN?

f) Give the botanical names of any two plants of Myrtaceae.

g) Enlist any two branches of ecology.

h) Give two examples of rooted hydrophytes.

i) What is xerosere?

j) Define population density.

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

a) Describe morphology as data source for plant systematics.

b) Give the general rules of coining generic names.

c) Give the merits of Bentham and Hooker's system of classification.

P.T.O.

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

a) Ecesis.

b) Internal adaptive features of Xerophytes.

c) Role of Ecology in disaster management.

Q4) Give the distinguishing characters, floral formula and floral diagram of family Annonaceae and Euphorbiaceae. **[10]**

OR

What is ecosystem? Describe in detail the pond ecosystem.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P247 **[4017] - 108**

S.Y. B.Sc.

BOTANY

BO - 212 : Fundamentals of Plant Physiology

(Sem. - I) (Paper - II) (51421) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Define plant physiology.

b) What is D.P.D.

c) Define pH.

d) What is salt absorption?

e) Define plant growth.

f) Define vernalization.

g) What is Ion antagonism?

h) Write any two examples of Short Day Plants.

i) What is Active Water Absorption?

j) What are Antitranspirants?

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

a) Give practical applications of Auxins.

b) Write in brief Ion exchange theory of salt absorption.

c) Give role and deficiency symptoms of Nitrogen.

P.T.O.

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

a) Photoperiodism.

b) Osmosis.

c) Phases of growth.

Q4) Define ascent of sap. Explain transpiration pull theory of ascent of sap. **[10]**

OR

Define transpiration. Explain K^+ pump hypothesis of opening and closing of stomata.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P248 **[4017] - 109**

S.Y. B.Sc.

ZOOLOGY

ZY - 211 : General Zoology and Biological Techniques - I

(Semester - I) (Paper - I) (2008 Pattern) (51511)

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

Instructions to the candidates:

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

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

a) Define radial cleavage.

b) Name any two protista showing ciliary locomotion.

c) What is metamerism?

d) What do you mean by discoblastula?

e) What is centrolecithal egg?

f) What is the function of water vascular system in starfish?

g) What is delamination?

h) Define incineration.

i) What is the use haemocytometer?

j) What is dealcoholization?

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

a) Biting and chewing type of mouth parts.

b) Applications of gel filtration chromatography.

c) Useful protista.

P.T.O.

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

a) Write the principle of spectrophotometer.

b) Describe holoblastic cleavage.

c) Sketch and label - Ascending paper chromatography.

Q4) Give an account of alimentary canal of starfish. Add a note on physiology of digestion. **[10]**

OR

Define fertilization. Describe in details the process of fertilization.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P249

[4017] - 110

S.Y. B.Sc.

ZOOLOGY

ZY - 212 : Applied Zoology - I

(Fisheries and Agricultural Pests and their Control)

(Semester - I) (Paper - II) (2008 Pattern) (51521)

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

Instructions to the candidates:

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

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

a) What is fishing gear?

b) Enlist any two household pests.

c) What is freshwater fishery?

d) What are insecticides?

e) Write the biological name of giant prawn.

f) What is Ising glass?

g) Mention any two uses of fish liver oil.

h) What is structural pest?

i) What is IPM?

j) Write the biological name of rice weevil.

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

a) Birds and Squirrels as non insect pests.

b) Catamaran fishing craft.

c) Chilling and freezing techniques in fish preservation.

P.T.O.

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

a) Describe in brief Rotary duster.

b) Describe harvesting method of Harpadon.

c) Give a brief account of biological control with suitable example.

Q4) Describe the habit, habitat and culture methods of Catla catla and cirrhinus mrigala. **[10]**

OR

Describe marks of identification, nature of damage and control measures of Jowar stem borer and Blister beetle.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P250

[4017] - 111

S.Y. B.Sc.

GEOLOGY

GL - 211 : Mineralogy

(Sem. - I) (2008 Pattern) (51611) (Paper - I)

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

Instructions to the candidates:

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

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

a) Define the term anisotropism.

b) What is tectosilicate structure?

c) What is hemihedral form?

d) Give the gem varieties of corundum.

e) What are non-crystalline minerals?

f) What is the chemical composition of plagioclase felspar?

g) What is foreign overgrowth?

h) Define the term dichroism.

i) What is oblique extinction?

j) Define the term twin plane.

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

a) Main attributes of gemstone.

b) Causes of twinning.

c) Phenomenon of Interference colours.

P.T.O.

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

a) Physical and optical properties of olivine minerals.

b) Elements of symmetry and forms of type calcite.

c) Phenomenon of Isotropism.

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

OR

Describe the structure, mineral composition, physical and optical properties and paragenesis of mica group of minerals.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P251

[4017] - 112

S.Y. B.Sc.

GEOLOGY

GL - 212 : Structural Geology

(Semester - I) (Paper - II) (51621) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) True and apparent dip.

b) Outlier.

c) Anticline.

d) Disconformity.

e) Normal fault.

f) Bedding joints.

g) Plunge and rake of a linear feature.

h) Dome.

i) Uses of clinometer compass.

j) Tectonic and non - tectonic structures.

Q2) Write notes on (<u>any two</u>): **[10]**

a) Define folds. Explain plunging and non - plunging folds. Add a note on doubly plunging folds.

b) Columnar and sheeting joints.

c) Genetic classification of faults.

P.T.O.

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

a) Use of ripple marks and cross bedding in determining the top of the bed.

b) Define joints. Explain the geometrical classification of joints.

c) Geometrical classification of faults based on :

i) Rake and net slip and

ii) Type of fault patterns.

Q4) Describe the parts of fold. Explain the following types of folds. **[10]**

a) Recumbent fold b) Isoclinal fold

c) Monocline d) Suprataneous fold.

OR

Describe the terms associated with faults. Explain the types of movement along faults. Enumerate the criteria of recognizing faults in the field.

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Total No. of Questions : 4] **[Total No. of Pages : 3**

P252

[4017] - 113

S. Y. B.Sc.

STATISTICS

ST-211 : Discrete Probability Distributions and Time Series

(51711)(Semester - I) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

i) If a random variable X has all the cumulants equal to 3 then fourth central moment of X is

(A) 3 (B) 9

(C) 18 (D) 30

ii) Suppose X_1 and X_2 are two independent and identically distributed random variables having geometric distribution with p.m.f. $p(x) = p\,q^x$; $x = 0, 1, 2, \ldots\ldots, 0 < p < 1, q = 1 - p$. Then variance of X_1 given $X_1 + X_2 = 6$ is

(A) 3 (B) $\frac{35}{12}$

(C) 4 (D) $\frac{50}{12}$

iii) In time series analysis the exponential smoothing method helps to

(A) smoothout the fluctiations.

(B) remove trend.

(C) estimate exponential trend.

(D) estimate logarithmic trend.

P.T.O.

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

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

ii) If X and Y are independent random variables then the conditional distribution of X given Y = y is the marginal probability distribution of X.

iii) Poisson distribution is always unimodal.

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

d) Define $(r, s)^{th}$ central moment of bivariate discrete random variable (X, Y) where r and s are non-negative integers **[1]**

e) Suppose X is poisson random variable, such that, $p(X = 2) = \frac{3}{4}$. P(X = 1). Find P(X = 0). **[1]**

f) If independent Bernoulli trials are conducted till getting the fixed number of successes then state the probability distribution of number of trials conducted. **[1]**

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

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

b) The joint probability distribution of random variable (X, Y) is

$$p(x,y) = \frac{9}{4^{x+y}} \quad ; x = 1, 2, 3, \ldots\ldots\ldots \quad y = 1, 2, 3, \ldots\ldots\ldots$$

Find i) The conditional distribution of X given Y = y and

ii) E (X | Y = y)

c) A certain plant distributes its products by trucks loaded at its only loading station. The plant has its own trucks and it also uses the trucks of transportation company. It is known that average arrival rate is 3 trucks per hour and average service rate is 4 trucks per hour. The transport company provides, 40% of the total number of trucks. Assuming poisson process, find

i) The probability that a truck has to wait.

ii) The average waiting time of a truck in the queue,

iii) Expected waiting time in queue for the trucks of transport company per day.

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

a) Define the following terms:

i) Countably infinite sample space with an illustration.

ii) Median of discrete random variable X.

iii) Mathematical expectation of a discrete random variable X; taking countably infinite values.

b) If X is negative binomial variable with parameters K and P find moment generating function of X. Hence prove the additive property of negative binomial distribution.

c) State cumulant generating function of poisson distribution with parameter m and obtain r^{th} cumulant of it. Hence obtain its first four central moments.

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

a) i) Describe the method of ratio to moving averages for computing seasonal indices. State its merits and demerits. **[6]**

ii) State and prove lack of memory property of geometric distribution with parameter p. **[4]**

b) i) A random variable X takes values 0, 1, 2, 3, ... with $P(X = x)$ proportional to $(x + 1)\left(\frac{1}{5}\right)^x$, find $P(X \leq 1)$ **[4]**

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

iii) A personnel officer interviews the candidates for 3 posts of the same rank. If probability that a candidate is found suitable is 0.6. Find the probability that the officer has to interview 10 candidates to fulfill his requirement. **[3]**

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

P253

[4017] - 114
S. Y. B.Sc.
STATISTICS
ST-212 : Continuous Probability Distributions - I
(Sem. - I) (2008 Pattern) (51721) (Paper - II)

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

Instructions to the candidates:

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

Q1) Attempt each of the following:

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

i) If X follows exponential distribution with mean $\frac{1}{\alpha}$ then its first quartile Q_1 is equal to

A) $\frac{1}{\alpha}\log_e\left(\frac{4}{3}\right)$ B) $\alpha\log_e\left(\frac{4}{3}\right)$

C) $\alpha\log_e\left(\frac{3}{4}\right)$ D) $\frac{1}{\alpha}\log_e\left(\frac{3}{4}\right)$

ii) If X and Y are independent random variables then $K_{X+Y}(t)$ is equal to:

A) $K_X(t) - K_Y(t)$ B) $K_X(t) \bullet K_Y(t)$

C) $K_X(t) / K_Y(t)$ D) $K_X(t) + K_Y(t)$

iii) If $X \rightarrow G(2, 6)$ then mode of X is

A) $\frac{5}{2}$ B) 3

C) $\frac{2}{5}$ D) $\frac{1}{3}$

P.T.O.

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

i) The probability curve of $N(\mu, \sigma^2)$ distribution has point of inflexions at $x = \mu - \sigma$ and $x = \mu + \sigma$.

ii) If (X,Y) is a bivariate continuous r.*v*. with joint p.d.f. *f(x, y)*, then E(E(X / Y)) = E(Y).

iii) If $X \rightarrow U(a, b)$, mean = median = $\frac{a+b}{2}$.

c) Define the term probability density function (p.d.f.) of a continuous *r.v.* X. **[1]**

d) Define distribution function (d. f.) of two dimentional continuous *r.v.* (X, Y). **[1]**

e) The joint probability distribution of a continuous bivariate *r.v.* (X, Y) is **[1]**

$$f(x,y)=\begin{cases} 2-x-y; & 0\le x\le 1, \quad 0\le y\le 1 \\ 0 \quad ; & \text{otherwise} \end{cases}$$

Find the marginal distribution of X.

f) If $X \rightarrow N(5, 16)$, state the probability distribution of $Y = 3X - 4$. **[1]**

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

a) Let $X \rightarrow N(\mu, \sigma^2)$. Find the m.g.f. of X. Hence, find mean and variance of X.

b) If X is a *r.v.* with distribution function

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

Find

i) $P\left(\frac{1}{2}<X<\frac{3}{4}\middle| X>\frac{1}{4}\right)$.

ii) P.d.f. of X

iii) E(X).

c) The joint p.d.f. of (X, Y) is given by

$$f(x,y)=\begin{cases} C & ; \ 5\le x\le 10, \\ & \quad 5\le y\le 10 \\ & \quad c>0 \\ 0 & ; \ \text{otherwise} \end{cases}$$

Determine the value of constant C and then find $P(X \ge Y)$.

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

a) Let $X \to G(\alpha, \lambda)$. Obtain the expression for rth raw moment of X. Hence find mean and variance of X.

b) State and prove forgetfulness property of exponential distribution and give its interpretation.

c) If X and Y are independent $N(1, 2^2)$ and $N(3, 4^2)$ variates respectively then, find

i) $P(1X - 1| < 3)$

ii) $P(2X > 3Y)$.

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

a) i) Define a uniform distribution over an interval $[a, b]$. Find its distribution function. **[4]**

ii) Let X be a continuous *r.v.* with p.d.f.

$$f(x)=\begin{cases} 3(1-x)^2 & ; \ 0\le x\le 1 \\ 0 & ; \ \text{otherwise} \end{cases}$$

Find the p.d.f. of $Y = -\log_e(1-X)$. **[3]**

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

$$f(x)=\begin{cases} 6x\ (1-x) & ; \ 0<x<1 \\ 0 & ; \ \text{otherwise} \end{cases}$$

Find median of X. **[3]**

b) i) Let X and Y be two independent gamma variates with parameters (α, λ_1) and (α, λ_2) respectively. Show that $U = X + Y$ and $V = \frac{X}{Y}$ are independent. **[6]**

ii) A fair coin is tossed 100 times. Using normal approximation find the probability of getting number of heads between 40 and 60. **[4]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P254

[4017] - 115

S.Y. B.Sc.

GEOGRAPHY

Gg - 211 : Fundamentals of Geography of Resources

(Sem. - I) (Paper - I) (2008 Pattern) (51811)

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

Instructions to the candidates:

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

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

a) Define a resource.

b) Give any two examples of renewable biotic resources.

c) Give any two examples of human resources.

d) Mention any two causes of deforestation.

e) What do you mean by aforestation?

f) What are various sources of water?

g) What do you mean by conservation of resources?

h) Define irrigation.

i) What is mining?

j) State any two methods of soil conservation.

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

a) Importance of study of resources.

b) Environmental significance of forests.

c) Need of conservation of water resources.

P.T.O.

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

a) Describe the various direct uses of forest resources.

b) Explain the importance of renewable resources.

c) Describe the various uses of water resources.

Q4) Classify the resources and describe the components of natural resources in brief. **[10]**

OR

What is land degradation? Explain the land degradation due to human activities.

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Total No. of Questions : 4] **[Total No. of Pages : 3**

P273

[4017] - 134
S.Y. B.Sc. (Sem. - I)
ARABIC
Functional Arabic
(53711) (2008 Pattern)

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

Q.I. Translate into English or Urdu or Marathi any two of the following Passages. (10)

(الف) ذٰلِكَ عَرَبِيٌّ - هٰذَا كَلْبٌ - مَنْ هٰذَا؟
ذٰلِكَ قِرْدٌ - أَنْتَ وَلَدٌ - أَنَا وَلَدٌ - هَلْ ذٰلِكَ
عَرَبِيٌّ؟ - لَا ذٰلِكَ فَارِسِيٌّ - اَلْقُرْآنُ كِتَابٌ -
اَلْإِسْلَامُ دِينٌ - اَلْجَمَلُ طَوِيلٌ - اَلشَّجَرُ كَبِيرٌ -

(ب) هَلْ أَنْتَ كَبِيرٌ - لَا أَنَا صَغِيرٌ - نَعَمْ
هٰذَا كِتَابٌ - ذٰلِكَ حِمَارٌ - اَلدَّرْسُ سَهْلٌ -
اَلْأَدَبُ وَاجِبٌ - اَللَّعِبُ ضَرُورِيٌّ - اَلْبَيْتُ
جَدِيدٌ - هَلْ ذٰلِكَ قُرْآنٌ - مَنْ أَنْتَ؟

P.T.O.

(ج) اَلْكِتَابُ عَرَبِيٌّ - اَلْعِلْمُ مُفِيدٌ - اِبْنُ الْوَلَدُ -
اَلْكُرْسِيُّ عَلَى الْأَرْضِ - اَلْقَلَمُ فِي الْجَيْبِ - اَلسَّمَكُ
فِي الْمَاءِ - هَلْ هٰذَا كِتَابٌ؟ - اَلزَّهْرُ صَغِيرٌ -
أَنَا كَبِيرٌ - ذٰلِكَ جَمَلٌ - مَا ذٰلِكَ؟ فِي الْبَيْتِ -

Q.2 Define and Illustrate any Two of the following topics:- (10)

① اِسْمُ الْإِشَارَةِ - ② الضَّمَائِرُ - ③ حُرُوفُ الْجَرِّ - ④ أَجْزَاءُ الْكَلِمَةِ ——

Q.3.= Translate into Arabic any five of the following Sentences:- (10)

① This School is good.
② There is a table in the room.
③ The student is going to the School.
④ The boy is bright.
⑤ In the fridge there is an apple.
⑥ On the window there is an curtain.
⑦ That bus is going to the university.
⑧ That car is beautiful.

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

(1) Gas. (2) Motion (3) Soft.

(4) Compounel. (5) Geology.

(6) Astrology. (7) Solution (8) Result.

(9) Mixture. (10) chemical.

(11) Laboratory. (12) Matter.

(13) Computor. (14) Microscope.

(15) Axis - (16) Atmosphere.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P274

[4017] - 135
S.Y. B.Sc. (Sem. - I)
URDU
(2008 Pattern) (53811)

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

نوٹ :- تمام سوالات لازمی ہیں۔
نشانات مساوی ہیں۔

I ؟ علامہ اقبال کی حیات و شخصیت پر روشنی ڈالئے۔ (10)

یا

علامہ اقبال کی شاعری میں جذبہ حب الوطنی کو اجاگر کیجئے

II ؟ بانگِ درا کی مقبولیت کے اسباب بتائیے (10)

یا

کلامِ اقبال میں تغزل کتنی حد مثالوں کے بیان کیجئے۔

III ؟ کسی ایک نظم کا مرکزی خیال بیان کرکے ہوئے تشریح کیجئے۔ (10)

۱- ہمالہ

۲- ایک آرزو

۳- نیا شوالہ

P.T.O.

Q4. دیئے گئے اشعار میں سے کوئی پانچ اشعار کی تشریح بحوالۂ متن کیجئے۔ (10)

۱- اَیک جلوہ تھا کلیمِ طورِ سینا کے لئے
تو تجلی ہے سراپا چشمِ بینا کے لئے

۲- اے ہمالہ! داستاں اس وقت کی کوئی سنا
مسکنِ آبائے انساں جب تھا دامن تیرا

۳- یونان و روم جو سب مٹ گئے جہاں سے
اب تک مگر ہے باقی نام و نشاں ہمارا

۴- گودی میں کھیلتی ہیں اسکی ہزاروں ندیاں
گلشن ہے جن کے دم سے رشکِ جناں ہمارا

۵- پروانہ اک پتنگا جگنو بھی اک پتنگا
وہ روشنی کا طالب یہ روشنی سراپا

۶- شکتی بھی شانتی بھی بھگتوں کے گیت میں ہے
دھرتی کے باسیوں کی مکتی پریت میں ہے

۷- گل کی کلی چٹک کر پیغام دے کسی کو
ساغر ذرا سا گویا مجھ کو جہان نما ہے۔

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P240

[4017] - 101
S.Y. B.Sc.
MATHEMATICS
MT - 211 : Calculus of Several Variables
(51111) (2008 Pattern) (Paper - I) (Sem. - I)

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

Instructions to the candidates:

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

Q1) Answer the following questions (any five) : **[10]**

a) Test whether the simultaneous limit of the function

$$f(x,y) = \frac{x^2y^2}{x^2y^2 + (x-y)^2}, \text{ if } (x, y) \neq (0, 0)$$

$$= 0 \quad , \text{ if } (x, y) = (0, 0)$$

exists at origin.

b) State Young's Theorem for the equality of mixed partial derivatives of $f(x, y)$ of second order.

c) If $u = x^2 \tan^{-1}\left(\frac{y}{x}\right)$, find $\left(\frac{\partial^2 u}{\partial x\, \partial y}\right)$ (1, 0).

d) Find the stationary points of $x^3 - y^3 - 3xy$.

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

f) Evaluate $\int_0^{\infty}\int_0^{y} \frac{e^{-y}}{y}\,dxdy$.

g) Determine whether the function $f(x, y) = xy\,(x^2 + y^2)^{5/7}$ is homogeneous, if so find its degree.

P.T.O.

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

a) Define continuity of a function $f(x, y)$ at a point (a, b). Prove that, if $f(x, y)$ is continuous function at (a, b) then $f(x, b)$ is continuous function of x at $x = a$ and $f(a, y)$ is continuous function of y at $y = b$.

b) If $f(x, y) = \dfrac{x^4 + y^4}{x^2 + y^2}$, if $(x, y) \neq (0, 0)$ and $f(0, 0) = 0$, show that f is differentiable at (0, 0).

c) By using Lagrange's method of undetermined multipliers, obtain the shortest distance of the origin from the plane $3x - 2y + z = 4$.

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

a) State Euler's theorem for homogeneous function $f(x, y)$ of degree n in x and y, hence, prove that $x^2 \dfrac{\partial^2 f}{\partial x^2} + 2xy \dfrac{\partial^2 f}{\partial x \partial y} + y^2 \dfrac{\partial^2 f}{\partial y^2} = n(n-1) f$.

b) Using differentials, obtain approximate value of $\sqrt{(1.02)^2 + (1.97)^3}$.

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

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

a) i) Evaluate $\iint_R (x^2 + y) dx dy$ where R is the region bounded by the parabolas $y = x^2$ and $x = y^2$.

ii) Evaluate $\int_0^1 \int_0^{1-x} \int_0^{x+y} e^z dx\, dy\, dz$.

b) i) If $u = f(x, y)$ and $x = r\cos\theta$, $y = r\sin\theta$ then show that

$$\left(\frac{\partial u}{\partial x}\right)^2 + \left(\frac{\partial u}{\partial y}\right)^2 = \left(\frac{\partial u}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial u}{\partial \theta}\right)^2$$

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

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P241

[4017] - 102
S.Y. B.Sc.
MATHEMATICS
MT - 212 (A) AND MT - 212 (B)
MT - 212 (A) : Differential Equations
(Paper - II (A)) (Sem. - I) (2008 Pattern) (51121)

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

Instructions to the candidates:

1) ***Candidates are advised to see the relevent question paper and solve the same.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***

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

a) State order and degree of the differential equation $\sqrt{\left(\frac{d^2y}{dx^2}\right)^3 + 2\frac{dy}{dx}} = 7y$.

b) Form the differential equation by eliminating arbitrary constants

$y = C_1e^{2x} + C_2e^{-2x}$.

c) Solve the differential equation $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$.

d) Test whether the differential equation $\frac{dy}{dx} = \frac{3x-2y+1}{2x+3y-4}$ is exact or not.

e) Find the integrating factor of the differential equation

$x^2y\,dx - (x^3 + y^3)dy = 0$

f) Solve the differential equation, $(D + 2)^2 (D + 1) (D - 1)y = 0$.

g) Find the particular integral of the differential equation

$(D^2 + 4)y = \cos 2x$

P.T.O.

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

a) Explain the method of solving the homogeneous differential equation

$$\frac{dy}{dx} = \frac{f(x, y)}{g(x, y)}$$

where $f(x, y)$ and $g(x, y)$ are homogeneous functions of x and y.

b) Solve the differential equation

$(5x^4 + 3x^2y^2 - 2xy^3)dx + (2x^3y - 3x^2y^2 - 5y^4)dy = 0$

c) Solve the differential equation

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

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

a) With usual notations prove that $\frac{1}{f(D)}e^{ax} = \frac{1}{f(a)}e^{ax}$, provided $f(a) \neq 0$.

b) Find the orthogonal trajectories of the family of parabolas $x^2 = 4ay$ where a is parameter.

c) The population of a town increases at a rate proportional to the population present at that time. If the population increases from 60,000 to 80,000 in 40 years. What will be the population in another 40 years?

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

a) i) Explain the method of variation of parameter for solving linear non-homogeneous differential equation $\frac{d^2y}{dx^2} + P_1(x)\frac{dy}{dx} + P_2(x)y = q(x)$.

ii) Solve the differential equation $\frac{d^3y}{dx^3} + g\frac{dy}{dx} = \cos 3x$.

b) i) Explain the method of solving linear differential equation

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

ii) Solve the differential equation $(D^2 + 3D + 2)y = 12x^2$ by using the method of undetermined coefficients.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P241

[4017] - 102
S.Y. B.Sc.
MATHEMATICS
MT - 212 (B) : Numerical Analysis
(Paper - II B) (Sem. - I) (2008 Pattern) (51121)

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

Instructions to the candidates:

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

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

a) An approximate value of e is 2.7195518 and it's true value is 2.71821828. Find the absolute and relative errors.

b) Show that the equation $5x^4 + 8x^2 + 3x - 2 = 0$ has at least two imaginary roots.

c) Prove that $\Delta\nabla \equiv \Delta - \nabla$, where ∇ is forward difference operator where as ∇ is backward.

d) Evaluate $\Delta^4(1 - x)\ (1 - 2x)\ (1 - 3x)\ (1 - 4x)$.

e) Given that $\frac{dy}{dx} = -y$ with $y(0) = 1$. Find $y(0.01)$ by Euler's method. [Perform one iteration and take $h = 0.01$].

f) State Strum's Theorem.

g) If $f(x) = \frac{1}{x^2}$. Find the divided difference $f(2, 5)$.

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

a) Use Newton-Raphson method to find a real root of the equation $x^3 - 2x - 5 = 0$. (Take $x_0 = 2$ and perform 2 iterations).

b) Solve the system of equations

$$10x + 2y + z = 9$$
$$2x + 20y - 2z = -44$$
$$-2x + 3y + 10z = 22$$

by Gauss-Seidel method (Perform 2 iterations).

c) Find a real root of the equation $x^3 - 4x - 1 = 0$ by Regula-Falsi method. (Take 2 iterations).

P.T.O.

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

a) Derive Newton-Gregory forward interpolation formula for equally spaced arguments.

b) Determine the constants a and b so that $y = a + bx$ is the best fit to the data

x	0	1	2	3
y	1	6	17	34

c) Find a polynomial $f(x)$ from the following data using Lagrange's inter polation formula.

x	-1	1	2	3
$f(x)$	-21	15	12	3

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

a) i) State general Quadrature formula and hence derive trapezoidal rule for numerical integration.

ii) Evaluate $\int_0^{12} y\,dx$ by simpson's $\frac{1^{rd}}{3}$ rule from the following table :

x	0	2	4	6	8	10	12
y	0	22	30	27	18	7	100

b) i) Determine the value of y when $x = 0.1$ by Euler's modified method.

Given that $\frac{dy}{dx} = y - \frac{2x}{y}$, $y(0) = 1$ (Take $h = 0.1$).

ii) Given $\frac{dy}{dx} = y - x$, $y(0) = 2$. Find $y(0.1)$ using Runge-Kutta method to four decimal places.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P242

[4017] - 103
S.Y. B.Sc.
PHYSICS
PH - 211 : Mathematical Methods in Physics
(51211) (Paper - I) (Sem. - I) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) If $z = 1 + \sqrt{3}\, i$ determine $|\, z \,|$.

b) Show that $\overline{A} = 4\hat{i} - 3\hat{j} + 2\hat{k}$ and $\overline{B} = 3\hat{i} + 2\hat{j} - 3\hat{k}$ are perpendicular to each other.

c) What do you mean by an implicit function?

d) If $\phi = 3x^2yz$ find $\overline{\nabla}\,\phi$

e) State the condition for exactness of the differential equation.

f) State the order and degree of the given differential equation

$$\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right) + x^2 y = 0 .$$

g) State De-Moivre's theorem.

h) Define conservative field.

i) Define divergence of a vector field.

j) State Gauss-Divergence theorem.

Q2) Attempt any two of the following :

a) Find the quadratic equation whose roots are $z_1 = 1 + i$ and $z_2 = 1 - i$. **[5]**

b) Determine the directional derivative of $\phi = 4xz - 3xy^2 + xy^2z$ at (1, –1, 2) in the direction of $\hat{i} - 2\hat{j} + \hat{k}$. **[5]**

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

P.T.O.

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

a) Using $\sin\theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$ and $\cos\theta = \frac{e^{i\theta} + e^{-i\theta}}{2}$ **[5]**

Prove that i) $\sin 2\theta = 2\sin\theta \cos\theta$

ii) $\cos 2\theta = \cos^2\theta - \sin^2\theta$.

b) Show that the divergence of $\overline{V}$ represents the net amount of flux of the vector field leaving per unit volume. **[5]**

c) Show that the point $x = 0$ is an irregular singular point of the differential equation $x^2(x-2)^2 \frac{d^2y}{dx^2} + 2(x-2)\frac{dy}{dx} + (x+3)y = 0$. **[5]**

Q4) a) Attempt 'i' or 'ii' :

i) 1) Find a unit normal to the surface $\phi = x^2 + 3y^2 + 2z^2$ at (2, 0, 1). **[4]**

2) Show that the equation $df = (y^2 - y + 2xy)\,dx + (x^2 - x + 2xy)dy$ is an exact differential. Hence, find function f. **[4]**

ii) 1) If $\overline{A}$ and $\overline{B}$ are irrotational, show that $(\overline{A} \times \overline{B})$ is solenoidal. **[4]**

2) If $f(x, y) = \ln\left(\frac{xy}{x^2 + y^2}\right)$, find fx and fy. **[4]**

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

i) Find the slope of the tangent to the curve $x^3 + 3xy^2 - y^3 = 0$ at $x = 2, y = -3$. **[2]**

ii) Determine the value of $\ln Z$ where $Z = 1 - i$. **[2]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P255

[4017] - 116
S.Y. B.Sc.
GEOGRAPHY
Gg - 212 : Introduction to Hydrology
(Paper - II) (2008 Pattern) (Sem. - I) (51821)

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

Instructions to the candidates:

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

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

a) What do you mean by palaeohydrology?

b) Define hydrology.

c) Write any two units of stream and river flow measurement.

d) What do you mean by evaporation?

e) What do you mean by vapour pressure?

f) What is meant by cyclonic precipitation?

g) Write any two hydrologic measurements.

h) What do you mean by through fall?

i) What is meant by point precipitation?

j) What do you mean by interception?

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

a) Application of hydrology.

b) Depression storage.

c) Areal precipitation.

P.T.O.

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

a) Describe the sources of hydrological data.

b) Give a detailed account of global water storage.

c) Describe the process of orographic precipitation in detail.

Q4) Describe hydrological cycle with suitable diagram. **[10]**

OR

Give a detailed account of global distribution of precipitation.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P256

[4017] - 117
S.Y. B.Sc.
MICROBIOLOGY
MB - 211 : Microbial Physiology
(Paper - I) (2008 Pattern) (Theory) (Sem. - I) (51911)

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

Instructions to the candidates:

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

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

a) Define prosthetic group.

b) When one molecule of glucose is completely oxidised to CO_2 & H_2O; what is net gain of ATP molecules.

c) Define Respiration.

d) All proteins are enzymes. True / False.

e) β-galactosidase belongs to_____.

i) Oxido-reductases ii) Lyases

iii) Ligases iv) Hydrolases

f) Write the principle of mol. exclusion chromatography.

g) Define Angular velocity.

h) What is Relationship between RCF and RPM.

i) Write the biochemical reaction catalysed by pyruvate decarboxylase.

j) The wavelength of light used in U.V. spectrophotometry is 400-700 nm True / False.

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

a) What is ultracentrifugation. Explain in brief density gradient centrifugation.

b) Explain induced fit model for enzyme catalysis.

c) Describe phosphoketolone path way with structures & enzymes involved.

P.T.O.

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

a) Describe in brief Autoradiography.

b) Explain effect of temperature on enzyme activity.

c) Illustrate diagrammatically "Concept of central and peripheral energy yielding path way".

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

a) Describe Tricarboxylic acid cycle with structures and energetics.

b) Answer the following :

i) What is active site of an enzyme enlist it's properties.

ii) What is pulse chase experiment add a note on it's significance.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P257

[4017]-118
S.Y. B.Sc.
MICROBIOLOGY
MB - 212 : Microbial Genetics
(2008 Pattern) (Paper - II) (Sem. - I) (Theory) (51921)

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

Instructions to the candidates:

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

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

a) Draw the structure of cytosine.

b) Define periodic selection.

c) Write two examples of intercalating agents.

d) Enlist any two enzymes which take part in DNA replication.

e) Name any two nonsense codons.

f) What is wobble hypothesis?

g) Change in base sequence of alteration in amino acid sequence of protein synthesized is called as ———— mutations.

h) Z form of DNA has right handed helical sense. True/False.

i) What is the role of single strand binding proteins in DNA replication?

j) ———— base pairs are present in each turn of a form of DNA.

i) 10
ii) 12
iii) 11
iv) 10.5

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

a) Explain frame shift mutations.

b) Describe D-loop model for DNA replication.

c) Comment on concept of gene and its expression.

P.T.O.

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

a) Diagramatically illustrate B-form of DNA.

b) What are spontaneous mutations? How do they occur?

c) Describe fluctuation test.

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

a) Explain messelson and stahl experiment. Describe different modes of DNA replication.

OR

b) Explain in detail the process of bacterial transcription and translation.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P258

[4017]-119
S.Y. B.Sc.
PSYCHOLOGY
EP - 211 : Psychology of Adjustment
(2008 Pattern) (Paper - I) (Sem. - I) (52011)

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

Instructions to the candidates:

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

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

a) What is Paranoia?

b) State unemployment.

c) Define divorce.

d) What is happiness?

e) Define Narcissistic.

f) Define adjustment.

g) Define abnormal behaviour.

h) What is psychoanalysis?

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

a) Explain the personal characteristics for choosing a career.

b) What is marriage? Explain process of marriage?

c) Describe roots of happiness.

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

a) Behaviorist approach of adjustment.

b) Coping with occupational hazards.

c) Job characteristics.

P.T.O.

Q4) Explain marrital adjustment across the family life cycle. **[8]**

OR

Describe various types of anxicty disorders.

Total No. of Questions : 4] **[Total No. of Pages : 1**

P259

[4017] - 120
S.Y. B.Sc.
PSYCHOLOGY
EP - 212 Experimental Psychology
(Sem. - I) (Paper - II) (52021) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Define visual acuity.
b) What is monocular cue?
c) Define classical conditioning.
d) State insight learning.
e) What is Space Perception?
f) What is extinction?
g) Define images.
h) What is problem solving?

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

a) Differentiate classical & instrumental conditioning.
b) Explain general determinants of perception.
c) Describe functions of Rods & Cones.

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

a) Colour mixing in visual perception.
b) Reinforcement schedule.
c) Parameters of conditioning.

Q4) Describe trial & error in problem solving. **[8]**

OR

Explain the process in perception of the spatial world.

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Total No. of Questions : 4] **[Total No. of Pages : 3**

P260

[4017] - 121
S.Y. B.Sc.
STATISTICAL TECHNIQUES
STT - 211 : Statistical Techniques - I
(Paper - I) (2008 Pattern) (Sem. - I) (52111)

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

Instructions to the candidates:

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

Q1) Attempt each of the following : **[3 × 1 = 3]**

a) Choose the correct alternative in each of the following :

i) For negative binomial distribution_____.

A) mean > variance

B) mean = variance

C) mean < variance

D) mean = standard deviation

ii) Which of the following relation holds :

A) $R^2_{1.23} = r^2_{13.2}\ (1 - r^2_{12})$

B) $1 - R^2_{1.23} = (1 - r^2_{13.2})\ r^2_{12}$

C) $1 - R^2_{1.23} = (1 - r^2_{13.2})\ (1 - r^2_{12})$

D) $1 - R_{1.23} = (1 - r_{13.2})\ (1 - r_{12})$

iii) If (X_1, X_2, X_3) follows multinomial distribution with parameters (n, P_1, P_2, P_3) then the marginal distribution of X_1 is _____.

A) B (n, P_1)

B) $B\left(n, \frac{P_1}{P_2 + P_3}\right)$

C) MN $(n, P_1, P_2 + P_3)$

D) Poisson $(n_1\ P)$

P.T.O.

b) State whether the following statements are true or false **[3 × 1 = 3]**

i) Geometric distribution satisfies additive property.

ii) If $X \sim N(0, \sigma^2)$ then, X and –X are identically distributed random variables.

iii) If X follows exponential distribution then, $P(x > s + t) = P(x > s)$. $P(x > t)$, $s, t \geq 0$.

c) Define the term probability density function of a continuous random variable. **[1]**

d) Define partial correlation, in case of trivariate data. **[1]**

e) If $X \sim N(2, 9)$, state the probability distribution of $3X - 5$. **[1]**

f) Give a real life situation where geometric distribution is experienced. **[1]**

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

a) Define negative binomial distribution, state its probability mass function, state its mean and variance. Explain the relationship between negative binomial distribution and geometric distribution. **[5]**

b) If $r_{12} = r_{13} = r_{23} = \rho \neq 1$, find $R_{1.23}$ and $b_{12.3}$. **[5]**

c) If $R_{1.23} = 0$, prove or disprove that $R_{2.13} = 0$. **[5]**

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

a) Define normal distribution. State its additive property. Give two real life situations where it is experienced. State the values of mean, mode and median. **[5]**

b) If the height (in cm) of human being is N(155, 16) find **[5]**

i) probability that the individual has height more than 163 cm.

ii) the height above which tallest 10% individuals are observed.

c) If the life of battery is exponential random variable with mean 500 days, find **[5]**

i) the probability that a selected battery will work more than 750 days.

ii) the probability that a battery will work more than 750 days given that it is working already for 500 days at present.

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

a) i) If $(X_1, X_2 ....., X_k) \sim MN (n, P_1, P_{2y}.....,P_k)$, state the probability mass function, state the variance-covariance matrix. Also state the conditional distribution of X_i given X_j. **[5]**

ii) Suppose $(X_1, X_2, X_3, X_4) \sim MN (20, 0.1, 0.2, 0.3, 0.4)$ find $P(X_1 = X_2 = X_3 = X_4)$ $E(X_1)$, $Var(X_2)$, $Cov(X_1, X_2)$. **[5]**

b) i) If X denotes the number of heads in 100 tosses of a fair coin, using normal approximation find, $P(X \geq 55)$, $P(40 \leq X \leq 60)$.**[5]**

ii) Probability that a candidate will be selected at an interview is 0.20. If there are 3 posts to be filled in, find the probability that 8 candidates are required to be interviewed to get third suitable candidate. **[5]**

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Total No. of Questions : 4] **[Total No. of Pages : 3**

P261

[4017] - 122
S.Y. B.Sc.
STATISTICAL TECHNIQUES
STT - 212 : Statistical Techniques - II
(2008 Pattern) (Sem. - I) (52121) (Paper - II)

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

Instructions to the candidates:

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

Q1) Attempt each of the following :

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

i) The number of samples of size 3 that can be drawn by SRSWR from a population containing 6 observations is

A) 3^6 B) 6^3 C) 18 D) 6

ii) A simple random sample with replacement (SRSWR) of size $n = 100$ was drawn from a village in which there were N = 10,000 households. It was found among the sampled households that only 30 households possessed a television set. Then the estimate of total number of households in the village possessing television set will be

A) 3 B) 30 C) 300 D) 3000

iii) In double sampling plan {N, n_1, n_2, c_1, c_2}, number c_2 denotes

A) Number of defectives in first sample.

B) Number of defectives in second sample.

C) Acceptance number for second sample.

D) Acceptance number for the samples I and II combined.

P.T.O.

b) In each of the following cases, state whether the given statement is true or false : **[1 Each]**

i) AOQL is the maximum average outgoing quality of lot after the inspection under prescribed sampling plan.

ii) The standard deviation of the estimator of population mean under SRSWR is always smaller than that under SRSWOR.

iii) The nature of operating characteristic curve for a single sampling plan is non increasing.

c) In a stratified random sampling with 2 strata the values of Ni are as follows : **[1]**

Stratum Number	Ni
1	6000
2	4000

If total sample size is 600, compute the sample sizes under proportional allocation.

d) State one real life situation where sampling for proportions is used. **[1]**

e) For a single sampling plan {N = 1000, n = 100, c = 1} find the probability of accepting the lot of quality 0.01. **[1]**

f) State the formula of AOQ for single sampling plan with rectification. **[1]**

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

a) Define simple random sampling with replacement (SRSWR) and simple random sampling without replacement (SRSWOR) from a finite population. State the unbiased estimators of the population mean and their variances based on the above two methods. **[5]**

b) Draw an OC curve for a single sampling plan {N = 1200, n = 100, c = 0} Find the probability of accepting the lot of AQL 0.02, 0.04, 0.05, 0.1. **[5]**

c) A sample of 30 persons is to be drawn from a population consisting of 300 persons belonging to two groups A and B. The total number of persons in each group, the mean and standard deviation of characteristic X of persons in both the groups are given below : **[5]**

Stratum (Group)	Total number of persons (Ni)	Mean ($\overline{Y}_{ni}$)	S.D. (S_i)
A	100	50	10
B	200	40	25

What should be the stratum sample sizes under optimal allocation? Obtain

i) estimate of population mean.

ii) estimate of the variance of the estimator of population mean under optimal allocation.

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

a) What is stratified random sampling? Give any one real life situation where stratified random sampling is an appropriate method of sampling. State the expression of an estimator of population mean and its standard error under stratified random sampling. **[5]**

b) A random sample of 100 pineapples is selected from a consignment containing 2000 pineapples and 65 are found to be bad. Estimate the total number of bad pineapples in the consignment. Also estimate the standard error of the estimate. **[5]**

c) Explain the terms : AQL, LTPD, Producers risk, Consumers risk. **[5]**

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

a) i) Draw all possible samples of size 2 by the method of SRSWOR from the population consisting of four observations 1, 4, 6, 9. Further calculate the sample mean $\bar{x}$ for all the samples drawn and verify that the sample mean is unbiased estimator of population mean i.e.$E(\bar{x}) = \bar{X}$. **[5]**

ii) Explain the construction of OC curve in case of double sampling plan. Mention the uses of OC curve. **[5]**

b) i) Calculate ATI for a double sampling plan :
$\{N = 1000, n_1 = 80, n_2 = 40, c_1 = 1\ c_2 = 3\}$.
Given that the lot quality is 0.05. **[5]**

ii) Show that in simple random sampling without replacement the probability that a specified unit of the population being selected at any given draw is equal to the probability that it is being selected at any given draw. **[5]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P262

[4017] - 123
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 211 : Analog Circuits & Systems
(52211) (Paper - I) (Sem. - I) (2008 Pattern)

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

Instructions to the candidates:

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

Q1) Answer all of the following :

a) Define thermal runaway. **[1]**

b) What is the need of Multistages in amplifiers? **[1]**

c) What is the effect of negative feedback on the gain of an amplifier? **[1]**

d) Define Common Mode Rejection Ratio. **[1]**

e) "Power amplifier is used at the final stage of multistage amplifier system", comment. **[2]**

f) "Negative feedback is desirable in amplifier", comment. **[2]**

g) Determine the voltage gain of an inverting Op-Amp. When R_f = 5.7 KΩ and R_i = 10KΩ. **[2]**

h) Calculate the frequency of Wien Bridge Oscillator for R = 5.1 KΩ and C = 0.001μf. **[2]**

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

a) Compare different types of coupling used in amplifiers with their advantages and disadvantages. **[4]**

b) What is cross-over distortion? How it can be minimized? **[4]**

c) Draw circuit of class-A amplifier for resistive load. Show that its efficiency is 25%. **[4]**

P.T.O.

Q3) Answer any two of the following :

a) Explain the method to draw d.c. load line with the help of d.c. equivalent circuit of a transistor amplifier. **[4]**

b) Explain the working of differential amplifier using constant current bias, in adequate details. **[4]**

c) Explain the circuit diagram of an Op-Amp. integrator with proper waveforms. **[4]**

Q4) Answer all of the following :

a) State and explain different types of feedback. Derive the expression for gain in positive feedback in amplifier . **[6]**

b) Discuss the frequency response of RC-coupled, transformer coupled and Direct coupled amplifier with neat diagrams. **[6]**

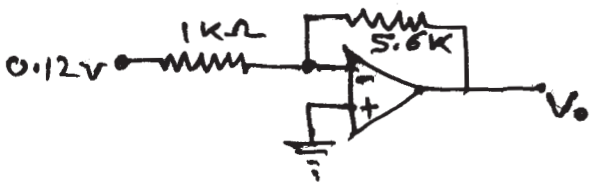
OR

a) Design phase shift oscillator for frequency 1kHz. Where C = 0.01μf. **[4]**

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

c) For the following circuit find out **[4]**

i) Gain and. ii) Output voltage.



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Total No. of Questions : 4] **[Total No. of Pages : 2**

P263

[4017] - 124
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 212 : Electronic Instrumentation - II
(52221) (Paper - II) (Sem. - I) (Old Course)

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

Instructions to the candidates:

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

Q1) Answer all of the following :

a) Define sensitivity of measuring instrument. **[1]**

b) State application of signal generator in electronics. **[1]**

c) What are the frequency related test for electronic circuits? **[1]**

d) List any two specifications of DC-Voltmeter. **[1]**

e) "Speedometer is rpm meter", comment. **[2]**

f) Determine static error if digital voltmeter reads 3.57 volts and true value of the voltage is 3.5 volt. **[2]**

g) "Digital Thermometer is precise than mercury Thermometer", comment. **[2]**

h) A moving coil voltmeter has linear scale with 100 division the full scale reading is 100 volt and 1/10 of scale division can be read out. Determine the resolution of it in volt. **[2]**

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

a) Compare alternate mode and chop-mode. **[4]**

b) Explain with block diagram digital thermometer. List electrical temperature sensor. **[4]**

c) Explain the terms line regulation and load regulation. **[4]**

P.T.O.

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

a) What is D.C. to D.C. converter? State its advantages. **[4]**

b) Explain with block diagram digital techometer. **[4]**

c) How D' Arsonvol movement is converted into multirange ammeter. **[4]**

Q4) Answer all of the following :

a) Give block diagram of single trace CRO, explain various sections. **[6]**

b) Explain the working of DFM with neat block diagram. **[6]**

OR

Answer all of the following :

a) Design 0-20V range voltmeter with D' Arsonvol movement. Full scale deflection is 50μA and internal resistance coil is 100Ω. Find the value of series resistance and draw the diagram. **[4]**

b) Design 0-100 mA range D.C. milliammeter with internal resistance of 100Ω, full scale deflection current 1mA. **[4]**

c) For a signal generator 40 volt output voltage value and 4-volt is in range value. Find the attenuation in dB. **[4]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P263

[4017] - 124
S.Y. B.Sc.
ELECTRONIC SCIENCE
EL - 2A1 : Digital System Design
(52221) (Paper - II) (Sem. - I) (New Course) (2008 Pattern)

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

Instructions to the candidates:

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

Q1) Answer all of the following :

a) What do you mean by combinational logic circuit? **[1]**

b) How many flip-flops are required to construct mod-7 counter? **[1]**

c) Draw a symbol of n-channel MOSFET. **[1]**

d) What is the resolution of 4-bit DAC? **[1]**

e) What is UART? **[2]**

f) Draw logic diagram of 4-bit parity checker. **[2]**

g) Draw the symbol and truth table of Half-Adder. **[2]**

h) Convert gray to binary. **[2]**

i) 11001 & ii) 10011

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

a) Design full adder circuit by using K-map. **[4]**

b) Draw 3-bit Asynchronous counter circuit, explain its working with timing diagram and truth table. **[4]**

c) Draw a circuit diagram of 4-bit R-2R ladder D/A converter. Obtain an expression for analog output voltage for n-bit binary input. **[4]**

P.T.O.

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

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

b) Explain the working of flash type ADC with the help of neat diagram. **[4]**

c) With suitable circuit diagram explain the interfacing of non cascaded multi-stage system. **[4]**

Q4) Answer all of the following :

a) With the help of logic diagram explain the working of decade counter. Give its state diagram, truth table and timing diagram. **[6]**

b) What is CMOS? Explain the working of CMOS NAND gate and CMOS NOR gate with the help of logic diagram. **[6]**

OR

Answer all of the following :

a) Calculate the conversion time for successive approximation ADC. Given F clock = 1MHz, Vref = 10 volt, and resolution = 16 bits. **[4]**

b) If A = 1100, B = 0011 compare A with B using digital comparator. **[4]**

c) Calculate the output voltage for 4-bit resistive divider network for

i) 11101 and ii) 011010

if the applied voltage V = 10 volt. **[4]**

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P264

[4017] - 125
S.Y. B.Sc.
DEFENCE & STRATEGIC STUDIES
DS - 101 : International Relations and Foreign Policy
(Sem. - I) (2008 Pattern) (52311) (Paper - I)

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

Instructions to the candidates:

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

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

a) Write the nature of International Relations.
b) Write the scope of International Relations.
c) Write the concept of foreign policy.
d) Name the kinds of power.
e) What do you mean by 'Defence in Depth'?
f) Define the term 'Military Operation'.
g) Define 'War'.
h) Define 'National Interest'.

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

a) Explain idealist theory.
b) Explain Realist theory.
c) Explain the component of military capability.

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

a) Concept of International Relations.
b) Concept of National Power.
c) Nature of National Interest.

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

a) Explain the basic tenets of India's foreign policy.
b) Discuss the type of National Interest.

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Total No. of Questions : 4] **[Total No. of Pages : 1**

P265

[4017] - 126
S.Y. B.Sc.
DEFENCE & STRATEGIC STUDIES
DS - 102 : Elements of National Security
(52321) (Sem. - I) (2008 Pattern) (Paper - II)

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

Instructions to the candidates:

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

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

a) Define Nation.
b) State the meaning of National Security.
c) What do you mean by Sustainable development?
d) Define diplomacy.
e) Explain the meaning of military power.
f) Define Terrorism.
g) What do you mean by Non-State Actors?
h) State the meaning of research & development.

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

a) Explain objectives of National security.
b) Discuss Non-Strategic threat to Indian security.
c) Explain defence planning in India.

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

a) Economic sustainability.
b) Role of Diplomacy in International Relations.
c) Nuclear Elements.

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

a) Write a note on determinants of defence policy.
b) Explain New-Challanges to India's National Security.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P266

[4017]-127

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

DEFENCE AND STRATEGIC STUDIES

DS - 103 : Geopolitics

(52331) (2008 Pattern) (Paper - III)

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

Instructions to the candidates:

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

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

a) Define 'Country'.

b) Define 'Nation'.

c) Define 'State'.

d) What is meant by Population?

e) What is economic resources?

f) Introduce 'Antarctica'.

g) What is Ferrous Metal?

h) Write the application of Aluminium.

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

a) How do you conceptualise maritime boundaries?

b) Write the concept of line of actual control.

c) Explain the meaning and concept of Geopolitics.

P.T.O.

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

a) Lakshdweep.

b) Afganistan.

c) Diego Garcia.

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

a) Explain the pre-requisite factors of a state.

b) Explain the problems of land locked/Buffer states.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P267

[4017]-128

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE - I

ENV 201 : ECOLOGY & ECOSYSTEM

(52411) (Sem. - I) (Paper - I) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Define : Ecological succession.

b) What is meant by Population density.

c) Enlist any four characteristics of community.

d) Define carrying capacity.

e) State the difference between ecotone & edge effect.

f) Define synecology & give a suitable example.

g) What is productivity of an ecosystem?

h) Who is attributed to have introduced the term ecology? When?

i) What are the basic ecological age groups in which a population can be divided into?

j) What were the composits of the early original atmosphere of earth?

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

a) Levels of organisation in ecology.

b) Sulphur cycle with diagram.

c) Forest ecosystems of the world.

P.T.O.

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

a) Explain the concept of Food chain & food web with examples.

b) Define Population distribution. Describe any four population distribution patterns with examples.

c) What are survivorship curves? Discuss them with illustrations.

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

a) Explain any five interspecies relationship with examples of each.

b) Describe in detail the various stages in the evolution of earth's atmosphere.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P268

[4017]-129

S.Y. B.Sc.

ENVIRONMENTAL SCIENCE - II

ENV 202 : Hydrology

(2008 Pattern) (Sem. - I) (Paper - II) (52421)

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

Instructions to the candidates:

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

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

a) Define hydrology.

b) Enumerate the 4 most abundant salt ions present in sea water.

c) State the difference between renewable & non renewable resources with example.

d) Define watershed.

e) What is meant by surface run-off interception?

f) What are unconfined aquifers?

g) What is rainwater harvesting?

h) Define evapotranspiration.

i) Enumerate any 2 effects of water pollution on soil.

j) Differentiate between primary & secondary aquifers.

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

a) Origin of water on Earth.

b) Fluoride & Arsenic poisoning in India.

c) Sources of surface & ground water pollution.

P.T.O.

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

a) Define infiltration. Discuss the factors that regulate infiltration.

b) Describe any 5 factors affecting the rate of evaporation.

c) Explain any 2 artificial recharge methods.

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

a) Give a detailed comparison between the chemical composition of ground water & that of river water. Specify reasons for these differences.

b) How does mining activity affect ground water quality? Explain with a suitable case study.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P269

[4017]-130

S.Y. B.Sc.

OPTIONAL ENGLISH

Enriching Oral and Written Communication in English

(2008 Pattern) (Sem. - I) (53011)

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

Instructions to the candidates:

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

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

a) What are the factors which disrupt upward and horizontal communication?

b) Explain the role of voice and appearance in effective communication.

c) Write down a few guidelines to be followed for effective communication, when you are the sender of a message.

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

a) Give suitable collocations.

i) _____ a crime. ii) _____ (verb) difficulties.

b) Change the following words into their opposites by adding prefixes.

i) legal. ii) Social.

c) Give synonyms of the following words.

i) repair. ii) connect.

iii) delight. iv) luck.

d) Write down two words having more than two meanings.

e) Differentiate between the following confused words and bring out their meanings in sentences (any one)

i) practical, practicable. ii) birth, berth.

f) Make two words each with following suffixes (any two)

– less, – ee, – ful.

P.T.O.

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

a) Write four words belonging to the following lexical webs:

i) laboratory. ii) town.

b) Write down the correct spellings of the following words.

i) vacum, vacuum, vaccum.

ii) independent, independant, indipendent.

c) Give meanings of the following phrases and use them in sentences.

i) to give up. ii) to give off.

d) Make four words each using the letters in the following words.

i) language. ii) communication.

e) Write words starting with letter 'g' which are opposite or almost opposite in meaning to the following words.

i) lose. ii) stingy.

f) Rearrange the jumbled letters to form meaningful words.

i) bactrinser. ii) muntestrin.

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

a) Write the phonetic transcription for the following words.

i) queen. ii) vague.

iii) zinc. iv) bridge.

b) State whether the following sentences will be said with the falling, rising or falling rising tone.

i) It is Six o'clock. ii) The man has left, hasn't he?

c) Write a short dialogue for the following situation.

Asking a businessman to donate money to charity.

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-136

S.Y. B.Sc. (Vocational)

INDUSTRIAL CHEMISTRY - I

VOC - 211 : Utilities & Unit Operations of Process Instrumentation

(55611) (2008 Pattern) (Sem. - I) (Paper - I)

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

Instructions to the candidates:

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

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

a) Sketch schematically the relationship among absolute, gauge, barometric and vacuum pressures.

b) List the basic requirement for separation of components by distillation.

c) Convert 5000 kg m^{-3} into CGS units.

d) Convert 137ºC into rankine temperature.

e) Explain what is fundamental interval in temperature scales.

f) Give industrial uses of steam.

g) Define permanent hardness.

h) What are the requirements for the classification of centrifuges?

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

a) Distinguish between filter media and filter aids.

b) Explain with a diagram the principle and working of a magnetic flow meter.

c) Discuss how evaporation is useful in industry.

P.T.O.

Q3) Attempt the following: **[8]**

a) Sketch & explain the principle and working of a thermionic ionization gauge.

b) Explain the use of thermocouples in temperature measurement.

Q4) Sketch & explain the various types of electronic pressure devices. **[8]**

OR

Discuss the principle of fractional distillation with a diagram.

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-137

S.Y. B.Sc. (Vocational)

BIOTECHNOLOGY - I

VOC-Biotech-211 : Cell and Molecular Biology

(55711) (Sem. - I) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

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

a) Give function of sigma factor.

b) Define antiport.

c) Enlist various types of cell junctions.

d) What are split genes?

e) What are peripheral proteins?

f) Define passive transport.

g) What is the function of peroxisomes?

h) Define cytoplasmic inclusion.

i) Give function of chloroplast.

j) What is translation?

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

a) Prokaryotic promoter.

b) Cell death.

c) Neoplasia.

P.T.O.

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

a) Describe techniques of cell fractionation.

b) Give an account of rough endoplasmic reticulum.

c) Explain the process of initiation of transcription in prokaryotes.

Q4) Describe various post-translational modifications of proteins. **[10]**

OR

What is cell signalling? Describe various types of cell signalling mechanisms.

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-139

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE - I

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

(2008 Pattern)(Paper - I) (Sem. - I) (58111)

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

Instructions to the candidates:

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

Q1) Answer the following:

a) Give the frequency range of typical AM receiver. **[1]**

b) What is done to keep the speed of tape transport steady? **[1]**

c) What is done to increase relative speed of tape in VCR? **[1]**

d) Give the important features of flat screen TV. **[1]**

e) State the advantages of FM receiver. **[2]**

f) Name the popular microphone and loudspeaker used in PA system. **[2]**

g) Write the applications of CCTV. **[2]**

h) Scanning is needed in audio as well as video systems. Comment. **[2]**

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

a) Draw a composite video signal for one line of scanning. Label all sections. **[4]**

b) Describe the construction of a video monitor with the help of block diagram. **[4]**

c) Write a short note on - DVD. **[4]**

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

a) Explain principle of operation of FM radio receiver with the help of neat diagram. **[4]**

b) Give a typical PA system installation plan of an auditorium and state its requirements. **[4]**

c) Write short note on - MP3 compression. **[4]**

P.T.O.

Q4) Answer the following:

a) Explain the tape transport mechanism with the help of neat sketch. What role is played by capstan, press roller, flywheel and guides? **[6]**

b) What are the problems in video recording and how these have been solved? **[6]**

OR

Answer the following:

a) With the help of neat diagram, explain how sound is reproduced from a CD. **[6]**

b) What are the problems in TV transmission and receptions? How these have been solved? **[6]**

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Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-142

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY - I

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

(58211) (Semester - I) (2008 Pattern) (Paper - I)

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

Instructions to the candidates:

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

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

a) State whether the following statement is TRUE or FALSE.

'Fibrous filters are used for sterilizing air used for aeration of a fermentation broth'.

b) State whether the following statement is TRUE or FALSE

'Hollow Fibre Reactor is a type of immobilized cell reactor'.

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

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

e) State why foam control is necessary during a fermentation.

f) Define 'Del factor'.

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

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

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

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

P.T.O.

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

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

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

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

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

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

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

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

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

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

b) Explain any three important aspect of manufacturing fermenter.

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-143

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

INDUSTRIAL CHEMISTRY - II

VOC-212 : Inorganic Process Industries (Paper - II)

(55621) (2008 Pattern) (Vocational)

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

Instructions to the candidates:

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

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

a) Define ceramics.

b) Give two uses of aluminium alloys.

c) Give the uses of ball mills and tube mills.

d) Define : Soil Corrosion.

e) What is fibre glass?

f) Define super alloys.

g) Give the constituents of cements.

h) Give the composition of glass.

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

a) Discuss the constituents of white pigment.

b) Write a note on stray current corrosion.

c) Write a note on the uses of cement.

P.T.O.

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

a) Explain Annealing of glass.

b) Discuss types of bronzes & their compositions.

c) Discuss the properties of refractory materials.

Q4) What is the purpose alloying? Give the application of steel alloys. **[8]**

OR

Describe the manufacture of glass by pot furnace method.

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-144

S.Y. B.Sc.

BIOTECHNOLOGY - II

VOC-Biotech-212 : Recombinant DNA Technology & Bioinformatics

(Vocational) (Sem. - I) (Paper - II) (2008 Pattern) (55721)

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

Instructions to the candidates:

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

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

a) Define : Genomics.

b) What is western blotting.

c) Enlist any two DNA dependent DNA polymerase.

d) Give the different properties of plasmid vector molecule.

e) What is streptavidine? How it is useful in hybridisation process?

f) What is the capacity of cosmid vector to carry foreign DNA molecule.

g) Why mineral oil overlay is essential on PCR reaction.

h) What is Ori site?

i) Give two examples of plant viruses used in gene cloning.

j) What are sticky ends?

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

a) Applications of PCR.

b) Blue - White screening.

c) Dideoxy chain termination method.

P.T.O.

Q 3)

Attempt any two of the following in 8-10 lines each. 8

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-146

S.Y. B.Sc. (Vocational)

ELECTRONIC EQUIPMENT MAINTENANCE - II

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

(2008 Pattern) (Semester - I) (Paper - II) (58121)

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

Instructions to the candidates:

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

Q1) Answer the following:

a) What is 'Maintainability'? **[1]**

b) Determine the Reliability if $\lambda = 0$. **[1]**

c) On what factors does MTBF depend? **[1]**

d) Define failure rate. **[1]**

e) Differentiate between 'Preventive' and 'Corrective' maintenance. **[2]**

f) What are the typical reasons of failure of any instrument? **[2]**

g) Give name of any four Soft tools. **[2]**

h) Define the term 'Availability'. **[2]**

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

a) Describe the preventive maintenance schedule of CRO. **[4]**

b) Discuss the installation procedure of TV receiver. **[4]**

c) Explain the term passive redundancy with necessary block diagram. **[4]**

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

a) Write a short note on preventive maintenance. **[4]**

b) What do you understand by the term Maintenance policy? Describe the maintenance policy at the time of purchase and installation. **[4]**

c) Explain with neat diagram any one method of artificial earth. **[4]**

P.T.O.

Q4) Answer the following:

a) Explain typical contents of Service manual. Discuss its importance during Servicing of equipment. **[6]**

b) Write a short note on 'Electric hazards and Safety measures'. **[6]**

OR

Answer the following:

a) List ten instruments and servicing tools used in servicing of electronic equipments. Give in brief the function of each. **[6]**

b) Discuss the installation procedure of computer. Explain the preventive maintenance schedule of it. **[6]**

Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-149

S.Y. B.Sc. (Vocational)

INDUSTRIAL MICROBIOLOGY - II (Theory Paper II)

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

(2008 Pattern) (Semester - I) (58221)

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

Instructions to the candidates:

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

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

a) Fill in the blank and rewrite the following statement.
'_____ is used almost universally for sterilization of fermentation media'.

b) Fill in the blank and rewrite the following statement.
'_____ is incorporated in a medium used for screening for organic acid producers to identify the producer'.

c) What are on-line sensors?

d) State the role of Del Factor in designing a sterilization cycle.

e) Give the role of Corn steep liquor in penicillin fermentation.

f) Define 'Protoplast'.

g) Define Simpson's Index.

h) State whether the following statement is TRUE or FALSE.
'Media used for animal cell culture are sterilized using filtration'.

i) State whether the following statement is TRUE or FALSE.
Lard oil serves a dual role in fermentation media.

j) List any two gases present in exhaust gas during a fermentation.

P.T.O.

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

a) Give the importance of Plackett-Burman design in media optimization.

b) Describe the method of culture preservation for sporulating organisms.

c) With is the difference between primary and targeted screening.

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

a) Describe any one approach for cultivation of conventionally unculturable bacteria.

b) Draw flow diagram of a typical continuous injector flash cooler sterilizer.

c) Describe how pH is measured and controlled during a fermentation process.

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

a) What are auxotrophic mutants? What is the use of auxotrophic mutants in secondary metabolic production?

b) What are the objectives of scale up fermentation?

Total No. of Questions : 4] **[Total No. of Pages : 2**

P351

[4017] - 141
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY - I
Hybrid Seed Production
(58911) (Sem. - I) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Enlist the types of apomixis.

b) What is genetic male sterility?

c) Define self incompatibility.

d) What do you mean by roguing?

e) What is isolation?

f) Define variety.

g) What is emasculation?

h) Give the isolation distance adopted for certified seed production of jowar.

i) Define stigma receptivity.

j) Define allogamy.

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

a) Give an account of heteromorphic self incompatibility.

b) Describe the genetic basis of heterosis.

c) Explain in detail cytoplasmic genetic male sterility.

P.T.O.

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

a) Pollen viability.

b) Gametocides.

c) Selection of site for seed production.

Q4) Explain the detail procedure for hybrid seed production of sunflower with respect to land requirement, isolation, planting, cultural practices, plant protection, roguing, harvesting and drying. **[1 × 10 = 10]**

OR

Describe in detail stepwise procedure for hybrid seed production of cotton.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P352

[4017] - 148
S.Y. B.Sc. (Vocational)
SEED TECHNOLOGY - II
Seed Testing
(Paper - IV) (Sem. - I) (58921) (2008 Pattern)

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

Instructions to the candidates:

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

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

a) Define seed testing.

b) What is the role of Association of official seed analysts?

c) Enlist any two equipments used in seed testing laboratory.

d) What is seed sampling?

e) Enlist kinds of seed samples.

f) Give different purity components in physical purity.

g) Define moisture testing.

h) What is normal seedling?

i) Define seed vigour.

j) Enlist seed sampling equipments.

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

a) Comment on physical purity analysis.

b) Give the diagrammatic layout of Seed Testing Laboratory.

c) Write the general principles of seed sampling.

P.T.O.

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

a) State Seed Testing Laboratory.

b) Moisture meter.

c) Principles of Seed vigour testing.

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

OR

Write the procedure of registration and explain in detail types of seed samples.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

P399

[4017]-145
S.Y. B.Sc. (Vocational)
PHOTOGRAPHY AND AUDIO-VISUAL PRODUCTION
Principles of Acoustics and Sound for Media
(Paper - IV) (Sem. - I) (2008 Pattern) (58021)

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

Instructions to the candidates:

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

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

a) Calculate the sound pressure level for the sound pressure of 0.1 Pa.

b) Give the graph that represents a 2-way crossover network.

c) Define :
   i) Reverberation time.
   ii) Sound intensity level.

d) Give any two requirements for the construction of an acoustically good auditorium.

e) Explain a stereophonic system.

f) Give the block diagram of a crystal microphone.

g) Calculate the sound absorption coefficient for a hall of 50m × 30m × 5m volume and reverberation time of 1.57s.

h) Give any two characteristic features of a microphone.

Q2) Answer <u>any two</u> of the following questions : **[8]**

a) With the help of a block diagram explain the construction and working of a ribbon microphone.

b) A hall of 40m × 30m × 5m has the following surfaces :

Surfaces	Dimensions	No. of surfaces	Absorption coefficients
Open windows	3m × 2m	10	1
Woolen Galeecha	20m × 20m	1	0.25
Curtains	3.5m × 2.5m	10	0.15
Audience		550	0.45

Determine the Reverberation Time of the Hall.

c) Explain the working of a 3-way cross-over network.

P.T.O.

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

a) With the help of a block diagram explain the construction and working of a PA system.

b) With the help of a block diagram explain the construction and working of an audio CD sound reproduction.

c) Explain with the help of block diagram the working principle of a condenser microphone and give few of its characteristics and applications.

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

a) With the help of a block diagram explain the construction and working of a magnetic sound recording and reproduction.

b) Explain :

i) Hi-Fi system.

ii) Synthetic reverberation.

c) With the help of a block diagram explain the construction and working of a Horn type of loudspeaker.

Total No. of Questions : 4] **[Total No. of Pages : 2**

P513

[4017]-140
S.Y. B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
Microprocessor and Interfacing Techniques
(Paper - I) (2008 Pattern) (58711) (Sem. - I)

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

Instructions to the candidates:

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

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

i) What is Full Form of PCI?
ii) What is the temperature range of LM-35 sensor?
iii) What is function of ADC?
iv) List different types of Key switches.

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

i) What is working principle of Thermocouple?
ii) What is DMA?
iii) What is USB? List any two devices that support USB.
iv) Write a note on Computer Based Design and Development tools.

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

a) Explain DOS INT 21H with its functions.
b) Draw functional diagram of a simple Parallel Comparator ADC? State its advantages and disadvantages.
c) How to configure 8086 Microprocessor to Minimum mode and Maximum mode?

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

a) Differentiate between Hardware and Software Interrupt.
b) Explain the operation of simple 4-bit DAC.
c) What is a cache memory? Explain its need.

P.T.O.

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

a) List Intel and Non-Intel processors. Explain any two Intel Processors.

b) What are sensors? List different types of sensors. Explain light controller relay circuit using a photocell?

c) State types of RAM used in PC. Write a note on DRAM briefing its advantages and disadvantages.

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Total No. of Questions : 4] **[Total No. of Pages : 2**

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[4017]-147
S.Y. B.Sc. (Vocational)
COMPUTER HARDWARE AND NETWORK ADMINISTRATION
(Computer Maintenance)
Computer System Management - I
(Paper - II) (2008 Pattern) (Sem. - I) (58721)

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

Instructions to the candidates:

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

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

i) List one Electrical Line Problem that affects a PC?
ii) How many Parallel Ports are there in a PC?
iii) What does DRP Stand for?
iv) Give name of any one utility Software.

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

i) What is the use of ROM in a PC?
ii) List any two Environmental factors affecting a PC.
iii) Give any two repair generated problems in a PC.
iv) What is the function of a Stabilizer?

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

a) What General Precautions should one take during PC Trouble Shooting?
b) Discuss problems related to :

i) Parallel Port.
ii) USB Port.

c) Explain various reasons that may lead to a Disaster.

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

a) Give different causes for 'No Display' for a PC?
b) Explain the importance of Business Continuity and Disaster Recovery.
c) What are different types of Storage Memories?

P.T.O.

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

a) Explain Need of Preventive Maintenance Schedules.

b) Explain the importance of Restore Policies.

c) How will you do Preventive Maintenance of :

i) UPS.

ii) Operating System.

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