B.Sc (2010 Course)

31232

INDRAYANI -II (2010 COURSE): WINTER- 2016

SUBJECT: STRUCTURED PROGRAMMING AND PROGRAMIING IN C-II

Day: Friday
Date: 07-10-2016

Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40

N.B.:

1) All questions are **COMPULSORY**
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt any **TWO** of the following: **(10)**

a) Explain syntax for string declaration. Give suitable example for the same.

b) What is a structure? Explain nested structure.

c) Write a 'C' program to swap two numbers using pointer.

Q.2 Attempt any **TWO** of the following: **(10)**

a) Write a note on dynamic memory allocation.

b) Write a 'C' program to accept student information like student roll number, name, average marks and display it on the screen using structure.

c) Differentiate between text file and binary file.

Q.3 Attempt any **TWO** of the following: **(10)**

a) What are the different modes in which file can be opened?

b) What is union? How to declare union?

c) Write a 'C' program to accept ten numbers in an array and display maximum number from it.

Q.4 Attempt any **FIVE** of the following: **(10)**

a) What is the purpose of strlen ( )?

b) Differentiate between gets ( ) and puts ( ) functions.

c) What is pointer arithmetic?

d) Give the syntax of fprintf ( ) and fscanf ( ).

e) How to declare structure with typedef ?

f) What is one dimensional array?

g) What is the use of dot operator (.) in structure?

* * * *

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* * * *

31235

INDRAYANI – II (2010 COURSE): WINTER- 2016

SUBJECT: COMBINATORICS AND ALGORITHMIC GRAPH THEORY – II

Day: Friday
Date: 14-10-2016

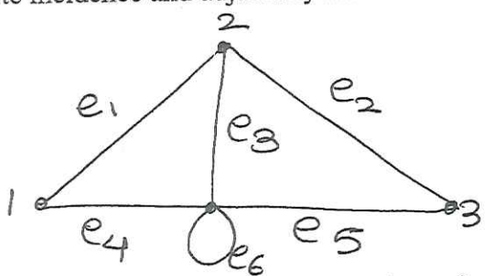
Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40

N.B.:

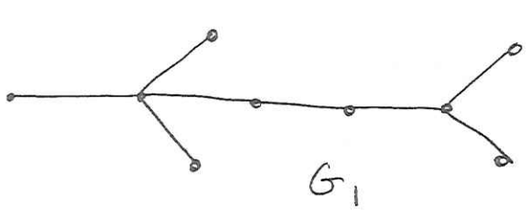
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Neat diagrams must be drawn **WHEREVER** necessary.

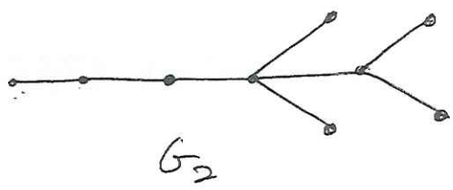
Q.1 Attempt any **TWO** of the following: **(10)**

a) Write incidence and adjacency matrix of the following graph.

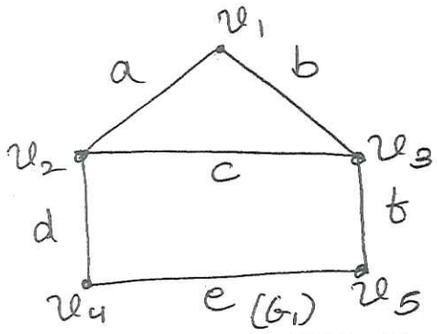


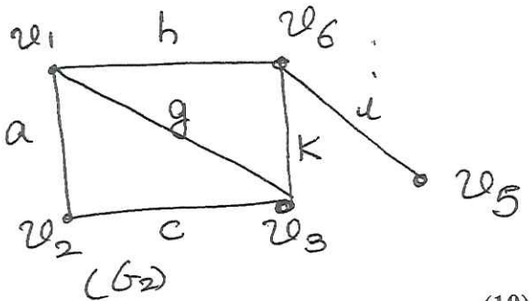
b) Determine whether following pairs of graph is isomorphic. Give the isomorphism.





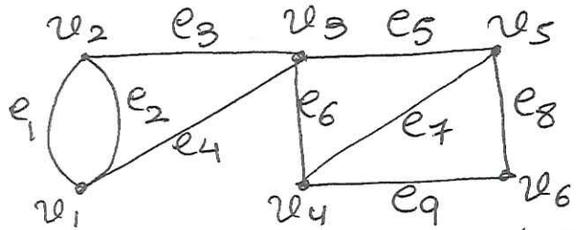
c) Find $G_1 \cap G_2$ and $G_1 \oplus G_2$ for the following graphs.





Q.2 Attempt any **TWO** of the following: **(10)**

a) Consider the following graph G

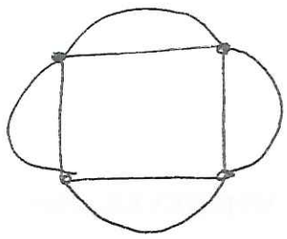


i) Find induced subgraph $G(v)$ where $V = \{V_1, V_2, V_5, V_6\}$

ii) Find G – A where A - $\{e_1, e_2, e_8, e_9\}$

P. T. O.

b) Find the edge and vertex connectivity of following graph



c) What is the diameter of Peterson's graph?

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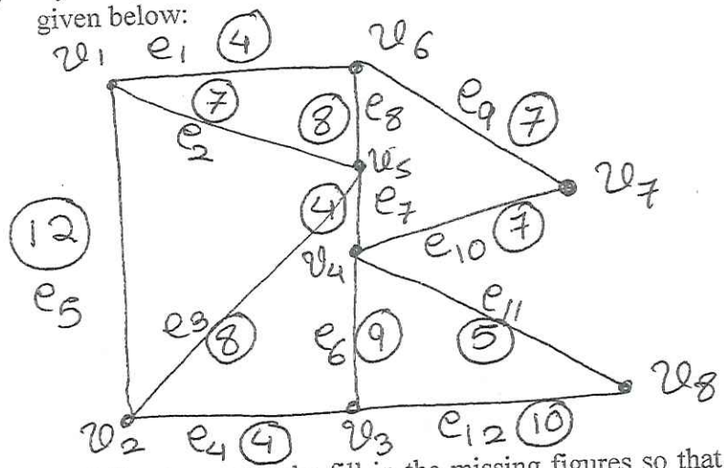
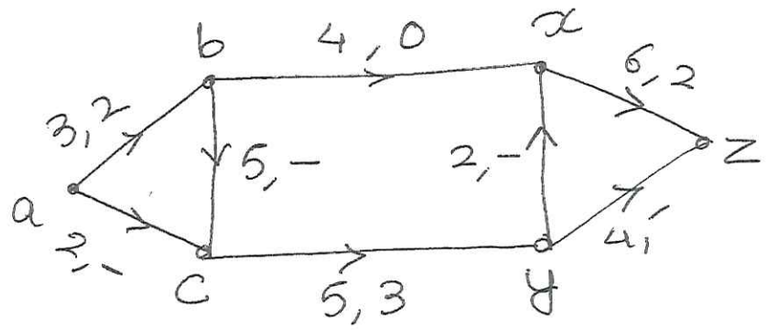
Q.3 Attempt any **TWO** of the following:

a) Explain traveling Salesman problem in brief.

b) By using Kruskal's algorithm, find the shortest spanning tree of the graph given below:



c) In following networks fill in the missing figures so that the result is a flow in the given network. Also find value of the flow.



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Q.4 Attempt any **FIVE** of the following:

a) Draw the following graphs:
   i) Wheel graph with outside 5 vertices.
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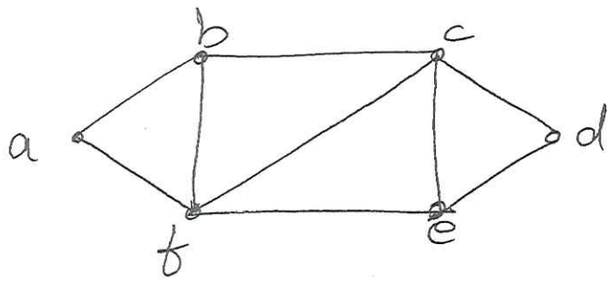
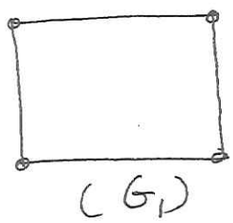
b) Verify Handshaking lemma for the following example.



c) Draw complement of following graph.

1)



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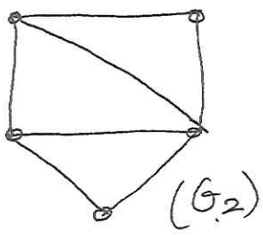
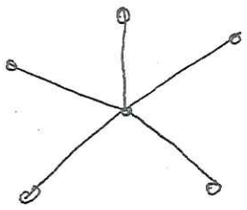


d) Find cut vertex of the following graph.



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

f) Draw any two non- isomorphic spanning subgraphs of the following graph.

* * * *

31235

INDRAYANI – II (2010 COURSE): WINTER- 2016

SUBJECT: COMBINATORICS AND ALGORITHMIC GRAPH THEORY – II

Day: Friday
Date: 14-10-2016

Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40

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1) All questions are **COMPULSORY**.
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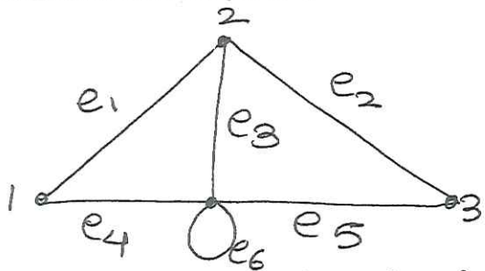
Q.1 Attempt any **TWO** of the following: **(10)**

a) Write incidence and adjacency matrix of the following graph.



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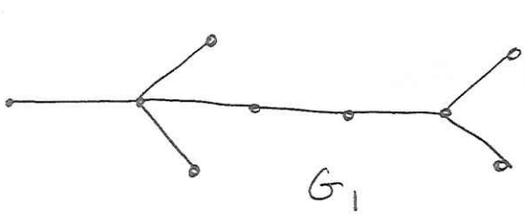

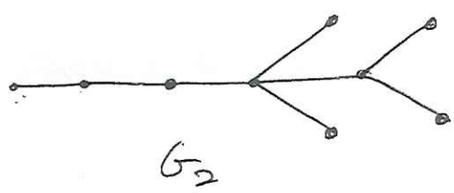

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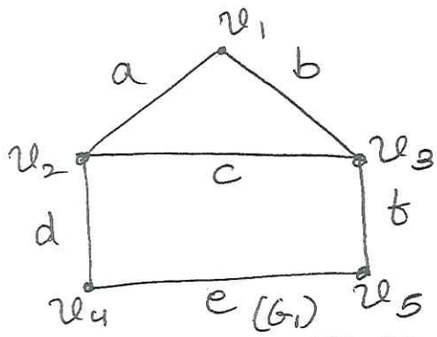

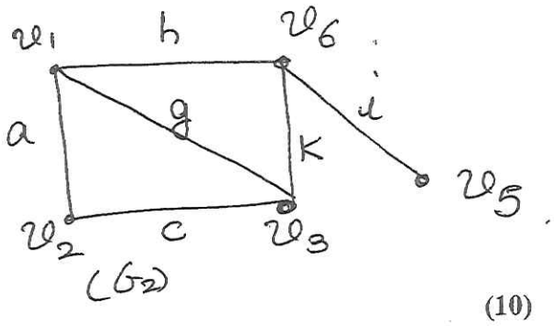

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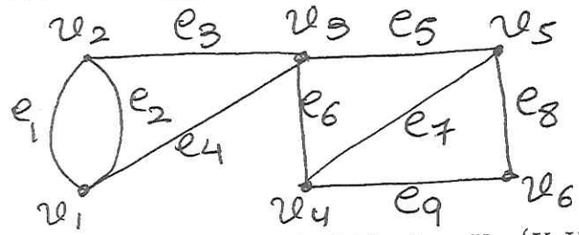

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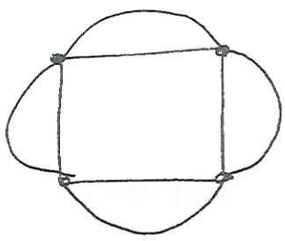

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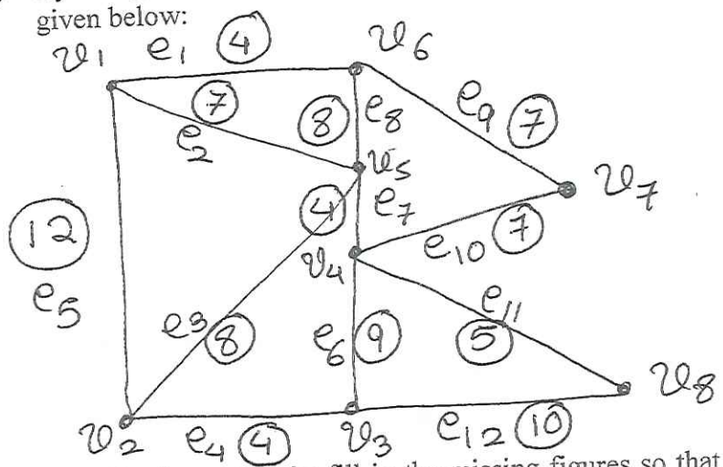

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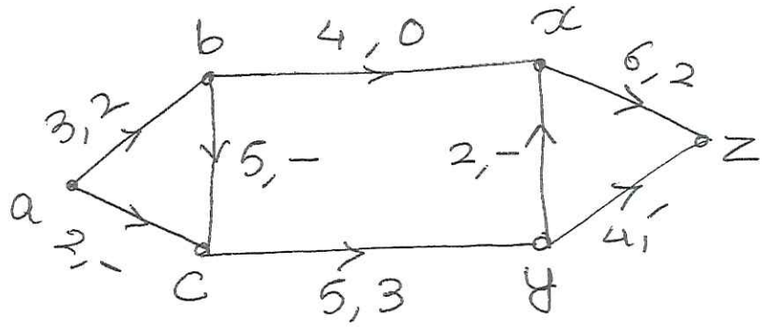

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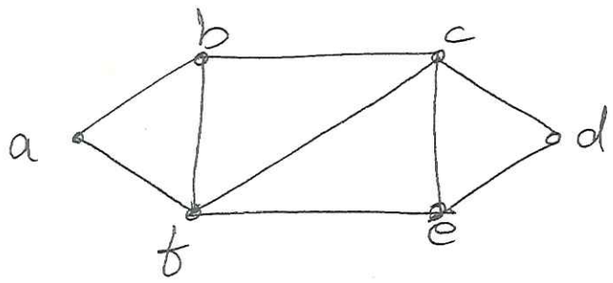

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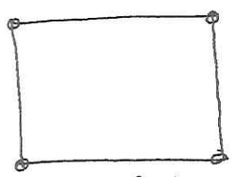

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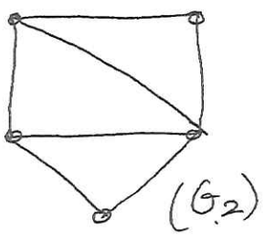

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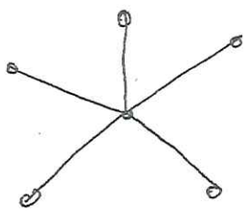

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B.Sc Com. Sc. (2010 Course)

31236

INDRAYANI-II (2010 COURSE): WINTER- 2016

SUBJECT: LINEAR ELECTROINICS-II

Day: Monday
Date: 17-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max Marks: 40

N.B:

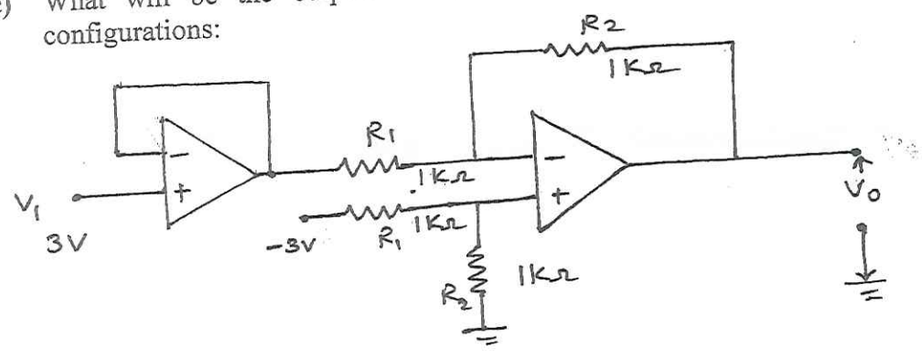
1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw diagrams **WHEREVER** necessary.
4) Use of **CALUCULATOR** is allowed.

Q.1 Answer **ANY TWO** of the following: **(10)**

a) Draw and explain the action of OP-AMP as an inverting amplifier.
b) Explain the action of off line UPS with neat diagram.
c) Draw the circuit diagram for phase shift oscillator and give the formula for its output frequency.

Q.2 Attempt **ANY TWO** of the following: **(10)**

a) Draw well- labeled diagram of double ended input single ended output differential amplifier. Explain it in brief.
b) With neat- diagram explain the working of Hartley oscillator.
c) What will be the outputs for the following circuits? Also mention the configurations:



Q.3 Answer **ANY TWO** of the following: **(10)**

a) Explain the action of switch mode power supply with necessary block diagram.
b) Draw diagram for OP-AMP as differentiator and explain its working. Also draw input /output waveforms for square wave input.
c) State and explain types of feedback. Mention their advantages and disadvantages

Q.4 Answer **ANY FIVE** of the following: **(10)**

a) Find the frequency of oscillations for Wein bridge oscillator if $R_1=R_2 = 1$ K Ω and $C_1 = C_2 = 0.01$ μF.
b) State Barkhausen's criteria necessary for sustained oscillations.
c) Explain how OP- AMP works as comparator in brief.
d) Define the terms w. r. to power supply.
e) i) Load regulation
   ii) Line regulation
f) Define the following parameters for OP- AMP.
   i) Input bias current
   ii) Slew rate
g) What do you mean by UPS? List any two applications of it.

* * * * * *

31236

INDRAYANI-II (2010 COURSE): WINTER- 2016

SUBJECT: LINEAR ELECTROINICS-II

Day: Monday
Date: 17-10-2016

Time: 12.00 NOON. TO 02.00 PM
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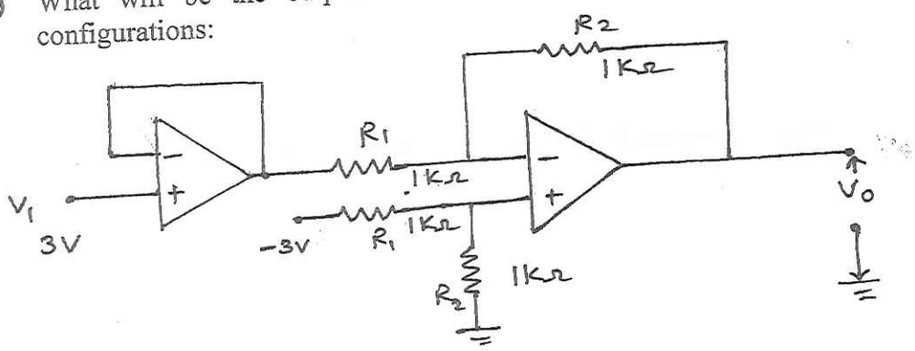

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B.Sc (2010 Course)

31234

INDRAYANI – II (2010 COURSE) : WINTER- 2016

SUBJECT : MATHEMATICAL FOUNDATION OF COMPUTER SCIENCES - II

Day : Monday
Date : 10-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N. B. :

1) All questions are **COMPULSORY**.
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Q.1 Attempt **ANY TWO** of the following: **(10)**

a) Prepare the multiplication table for the set of prime residue classes modulo 12.

b) State and prove reversal law for the inverse of a product of two elements in group.

c) Let $Q_1 = \mathbb{Q} - \{1\}$. Define the binary operation * on Q_1 defined as $a * b = a + b - ab \quad \forall a, b \in Q_1$. Prove that $(Q_1, *)$ is an abelian group.

Q.2 Attempt **ANY TWO** of the following: **(10)**

a) Prove that every subgroup of a cyclic group is cyclic.

b) Prove that every proper subgroup of order 51 is cyclic.

c) Express the permutation $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 2 & 5 & 4 & 3 & 6 & 1 & 7 & 9 & 8 \end{pmatrix}$ as product of disjoint cycles. Determine whether σ is even or odd.

Q.3 Attempt **ANY TWO** of the following: **(10)**

a) Obtain all permutations of S_3.

b) Let $(G, *)$ be an abelian group. Let $f: G \to G$ is defined by $f(x) = x^{-1}, \forall x \in G$. Show that, f is an isomorphism.

c) Let $G = \{1, -1, i, -i\}$ be the group, where $i^2 = -1$. Show that, $f: (\mathbb{Z}, +) \to (G, \cdot)$ is defined by $f(n) = i^n$ is a homomorphism. Find its kernel.

Q.4 Attempt **ANY FIVE** of the following: **(10)**

a) State Lagrange's theorem for group.

b) Find the order of $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 6 & 2 & 5 & 4 & 1 \end{pmatrix}$

c) Find f^{-1}, if $f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 2 & 1 & 4 & 5 & 3 & 7 & 6 \end{pmatrix}$

d) Define the term alternating group.

e) State true or false: $O(S_n) = (n-1)!$

f) State cancellation laws for group.

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31234

INDRAYANI – II (2010 COURSE) : WINTER- 2016

SUBJECT : MATHEMATICAL FOUNDATION OF COMPUTER SCIENCES - II

Day : Monday
Date : 10-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N. B. :

1) All questions are **COMPULSORY**.
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31134

NIRA-V (2010 COURSE): WINTER- 2016
SUBJECT: MICROBIOLOGY: VIROLOGY (MB-54)

Day : Monday
Date : 10-10-2016

Time : 12:00NOON TO 2:00PM.
Max.Marks : 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following : **(10)**

a) Give the general properties of viruses.

b) Describe the general characteristics of viroids.

c) Comment on: General features of T even phages.

Q.2 Attempt **ANY TWO** of the following : **(10)**

a) Explain in short on chick embryo technique used in cultivation of viruses.

b) Write in short on isolation of bacteriophages.

c) Enlist different methods used for enumeration of viruses. Explain any one in brief.

Q.3 Attempt **ANY TWO** of the following : **(10)**

a) Give the role of promoters in lytic and lysogenic cycle.

b) Justify: Viruses are non living entities.

c) Draw a neat labelled diagram of regulatory region of λ phage.

Q.4 Explain/define/write in short on **ANY FIVE** of the following : **(10)**

a) Haemagglutination
b) Complementation test
c) Adenovirus
d) TMV virus
e) LD_{50}
f) Host range mutants of phages
g) Role of C_{II} and C_{III} genes

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31134

NIRA-V (2010 COURSE): WINTER- 2016
SUBJECT: MICROBIOLOGY: VIROLOGY (MB-54)

Day : Monday
Date : 10-10-2016

Time : 12:00NOON TO 2:00PM.
Max.Marks : 40

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following : **(10)**

a) Give the general properties of viruses.

b) Describe the general characteristics of viroids.

c) Comment on: General features of T even phages.

Q.2 Attempt **ANY TWO** of the following : **(10)**

a) Explain in short on chick embryo technique used in cultivation of viruses.

b) Write in short on isolation of bacteriophages.

c) Enlist different methods used for enumeration of viruses. Explain any one in brief.

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b) Justify: Viruses are non living entities.

c) Draw a neat labelled diagram of regulatory region of λ phage.

Q.4 Explain/define/write in short on **ANY FIVE** of the following : **(10)**

a) Haemagglutination
b) Complementation test
c) Adenovirus
d) TMV virus
e) LD_{50}
f) Host range mutants of phages
g) Role of C_{II} and C_{III} genes

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31154

WINTER- 2016

NIRA – VI (2010 COURSE):

SUBJECT: MICROBIOLOGY: IMMUNOLOGY (MB- 62)

Day: Tuesday
Date: 04-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max. Marks: 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat diagrams **WHEREVER** necessary.

Q.1 Attempt Any **TWO** of the following: **(10)**

a) Define the term 'Epitope' and discuss the types of epitope.

b) Discuss the formation and functions of NK cells.

c) Explain the mechanism of Type – IV Hypersensitivity.

Q.2 Attempt Any **TWO** of the following: **(10)**

a) Explain the significance of 'HAT medium'.

b) Discuss the role of estrogen in thymocyte maturation and cytokine production.

c) What is 'Single Radial Immunodiffusion Technique'?

Q.3 Write short notes on Any **TWO** of the following: **(10)**

a) Cross Over Electrophoresis

b) Interleukin -1

c) Burnett's Clonal Selection Theory

Q.4 Attempt Any **FIVE** of the following: **(10)**

a) Write functions of TNF.

b) Enlist cells involved in type – I hypersensitivity.

c) Write principle of ELISA.

d) Enlist four factors affecting antigenicity.

e) Mention theories of formation of immunoglobulin.

f) Write classes of T- cells.

g) Enlist fluorescent dyes.

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31154

NIRA – VI (2010 COURSE): WINTER- 2016

SUBJECT: MICROBIOLOGY: IMMUNOLOGY (MB- 62)

Day: Tuesday
Date: 04-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max. Marks: 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat diagrams **WHEREVER** necessary.

Q.1 Attempt Any **TWO** of the following: **(10)**

a) Define the term 'Epitope' and discuss the types of epitope.

b) Discuss the formation and functions of NK cells.

c) Explain the mechanism of Type – IV Hypersensitivity.

Q.2 Attempt Any **TWO** of the following: **(10)**

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b) Discuss the role of estrogen in thymocyte maturation and cytokine production.

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b) Enlist cells involved in type – I hypersensitivity.

c) Write principle of ELISA.

d) Enlist four factors affecting antigenicity.

e) Mention theories of formation of immunoglobulin.

f) Write classes of T- cells.

g) Enlist fluorescent dyes.

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31166

NIRA- VI: (2010 COURSE): WINTER- 2016

SUBJECT: CHEMISTRY: ANALYTICAL CHEMISTRY (C-64)

Day: Saturday
Date: 08-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max Marks: 40

N.B:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Both the sections should be written in **SAME** answer book.

SECTION-I

Q.1 Attempt any **TWO** of the following: **(10)**

a) What is chromatography? Classify different types of chromatography by considering the stationary and mobile phases used.
b) Describe the principle of conductometry and derive a relation between specific conductance and equivalent conductance.
c) Explain multiple extractions are better than single extraction.

Q.2 Attempt any **TWO** of the following: **(10)**

a) Define and explain terms:
i) Distribution coefficient
ii) Distribution ratio
and state any two advantages of solvent extraction.
b) Explain the measurement of specific rotation by using polarimeter.
c) What is column chromatography? Describe it with a neat diagram.

SECTION-II

Q.3 Attempt any **TWO** of the following: **(10)**

a) Discuss the various applications of FES.
b) Describe the Wheatstone bridge for determination of specific conductance of a given electrolyte.
c) Write a short note on: "Demineralization of water."

Q.4 Attempt any **TWO** of the following: **(10)**

a) In chromatography separation of mixture consists of benzene, xylene, naphthalene components. Solvent front is 15.2 cm while distance traveled by benzene is 9.3 cm, for xylene 6.4 cm and for naphthalene 8.5cm The unknown compound D has R_f value 0.65. Find out distance traveled by unknown compound.

b) 3gm of solute is dissolved in 50ml of aqueous solution. Calculate amount of solute remain unextracted in aqueous phase.
After i) a single extraction of 40 ml ether
ii) 5 successive extractions with 25ml ether (Given D=10).

c) The specific rotation of fructose containing 6 gm per lit is to be determined when angle of rotations $+2.5^0$ and tube length is 25cm. Calculate specific rotation and also molar rotation of glucose.

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31166

NIRA- VI: (2010 COURSE): WINTER- 2016

SUBJECT: CHEMISTRY: ANALYTICAL CHEMISTRY (C-64)

Day: Saturday Time: 12.00 NOON. TO 02.00 PM

Date: 08-10-2016 Max Marks: 40

N.B:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Both the sections should be written in **SAME** answer book.

SECTION-I

Q.1 Attempt any **TWO** of the following: **(10)**

a) What is chromatography? Classify different types of chromatography by considering the stationary and mobile phases used.

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a) Define and explain terms:
i) Distribution coefficient
ii) Distribution ratio
and state any two advantages of solvent extraction.

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b) 3gm of solute is dissolved in 50ml of aqueous solution. Calculate amount of solute remain unextracted in aqueous phase.
After i) a single extraction of 40 ml ether
ii) 5 successive extractions with 25ml ether (Given D=10).

c) The specific rotation of fructose containing 6 gm per lit is to be determined when angle of rotations $+2.5^0$ and tube length is 25cm. Calculate specific rotation and also molar rotation of glucose.

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31164

NIRA – VI (2010 COURSE): WINTER- 2016

SUBJECT: MICROBIOLOGY: AGRICULTURAL & ENVIRONMENAL MICROBIOLOGY (MB -64)

Day: Saturday
Date: 08-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max. Marks: 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt any **TWO** of the following: **(10)**

a) Describe in detail the biodegradation of Lignin in soil.

b) Explain *In-Situ* process in bioleaching.

c) Write a note on thermal pollutants.

Q.2 Attempt any **TWO** of the following: **(10)**

a) Discuss various methods of composting.

b) Describe KVIC model of biogas plant for domestic waste management.

c) Describe plant disease- Citrus Canker.

Q.3 Attempt any **TWO** of the following: **(10)**

a) Explain microbial approach in the remediation of oil contaminated marine sites.

b) Describe viral biopesticides.

c) Explain biomonitoring its advantages and disadvantages.

Q.4 Attempt any **FIVE** of the following: **(10)**

a) Sustained fertility.

b) Soil sickness.

c) Soil texture.

d) Bioremediation.

e) Fungal biopesticides.

f) Organic pollutants.

g) Sources of marine pollution.

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31164

NIRA – VI (2010 COURSE): : WINTER- 2016

SUBJECT: MICROBIOLOGY: AGRICULTURAL & ENVIRONMENAL MICROBIOLOGY (MB -64)

Day: Saturday
Date: 08-10-2016

Time: 12.00 NOON. TO 02.00 PM
Max. Marks: 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt any **TWO** of the following: **(10)**

a) Describe in detail the biodegradation of Lignin in soil.

b) Explain *In-Situ* process in bioleaching.

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a) Sustained fertility.

b) Soil sickness.

c) Soil texture.

d) Bioremediation.

e) Fungal biopesticides.

f) Organic pollutants.

g) Sources of marine pollution.

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31171

NIRA – VI (2010 COURSE): WINTER- 2016
SUBJECT : INDUSTRIAL CHEMISTRY (C – 65) (Chemistry)

Day : Thursday
Date : 13-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following: **[10]**

a) Give the synthesis and uses of paracetamol and Phenobarbital.

b) Give the synthesis and uses of methyl red.

c) Write a note on 'Phenol-formaldehyde resin.

Q.2 Attempt **ANY TWO** of the following: **[10]**

a) Discuss the synthesis, properties and uses of 'Polyvinyl chloride'.

b) Distinguish between thermosetting and thermosoftening plastic.

c) Write a note on 'Mixed Fertilizer'.

Q.3 Attempt **ANY TWO** of the following: **[10]**

a) Give the synthesis and uses of Aspirin and diazepam.

b) Explain the terms: **i)** Saponification value **ii)** Acid value.

c) Write a note on 'Manufacture of Urea'.

Q.4 Attempt **ANY TWO** of the following: **[10]**

a) What are dyes? Give their classification.

b) Explain the dry process for the hydrogenation of oil.

c) Discuss the manufacture of soap by continuous process.

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3117

NIRA – VI (2010 COURSE): WINTER- 2016
SUBJECT : INDUSTRIAL CHEMISTRY (C – 65) (Chemistry)

Day : Thursday
Date : 13-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Attempt **ANY TWO** of the following: **[10]**

a) Give the synthesis and uses of paracetamol and Phenobarbital.

b) Give the synthesis and uses of methyl red.

c) Write a note on 'Phenol-formaldehyde resin.

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a) Discuss the synthesis, properties and uses of 'Polyvinyl chloride'.

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a) What are dyes? Give their classification.

b) Explain the dry process for the hydrogenation of oil.

c) Discuss the manufacture of soap by continuous process.

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31176

NIRA-VI (2010 COURSE) : **WINTER- 2016**

SUBJECT : CHEMISTRY: ENVIRONMENTAL CHEMISTRY (C-66)

Day : Saturday
Date : 15-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40.

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate full marks.
3) Both the sections should be written in **SEPARATE** answer books.
4) Draw neat labeled diagrams **WHEREVER** necessary.

SECTION-I

Q.1 Attempt any **TWO** of the following: **(10)**

a) Explain the terms Reclaimation, Recycling and Reuse with respect to glass and ceramic industry.
b) "Wood is a major renewable resource". Explain.
c) Discuss the role of air and water in soil.

Q.2 Attempt any **TWO** of the following: **(10)**

a) Describe the potential of Nuclear fusion and fission energy.
b) Explain Nitrogen pathways and NPK in soil.
c) Comment on "Entropy ethics and solid waste".

SECTION-II

Q.3 Attempt any **TWO** of the following: **(10)**

a) Discuss the calorie requirement by human body with reference to the nature of job of the person. Also comment on the present scenario of the carbohydrates for developing and developed countries.
b) Explain the mode of action of pesticide with reference to (i) Nervous system (ii) Enormous growth of stems.
c) Explain the energy requirements in the field of agriculture with reference to (i) Transport (ii) Cold storages (iii) Food processing (iv) Tractor industry (v) Fertilizer industry.

Q.4 Attempt any **TWO** of the following: **(10)**

a) Explain in detail the process of "Bioamplification" with respect to Minamata disease.
b) Describe the functioning of chlor-Alkali production. How does it lead to mercury pollution?
c) Enlist different industries creating water pollution. Discuss briefly the nature of pollution created by them.

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31176

NIRA-VI (2010 COURSE) : **WINTER- 2016**

SUBJECT : CHEMISTRY: ENVIRONMENTAL CHEMISTRY (C-66)

Day : Saturday
Date : 15-10-2016

Time : 12.00 NOON TO 02.00 PM
Max. Marks : 40.

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate full marks.
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SECTION-I

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