Total No. of Questions : 4] **SEAT No. :**

P3112 **[Total No. of Pages : 1**

[4729] - 2003
M.Sc. (Semester - II)
ZOOLOGY
Z Y - 203 T : Developmental Biology
(2013 Pattern) (Credit System)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat labelled diagram must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Describe the role of Nanos and Bicoid in pattern formation of Drosophila. **[4]**

b) Explain concept of growth. **[3]**

c) Explain role of pH and divalent cation in sperm motility. **[3]**

Q2) a) Explain Hensen's node in birds as a organizer. **[5]**

b) Explain radial cleavage with example. **[3]**

c) Explain vitellogenesis phase of oogenesis. **[2]**

Q3) a) Give the importance of Drosophila as model organism. **[4]**

b) Explain apoptosis with example. **[3]**

c) Describe slow block to polyspermy. **[3]**

Q4) Attempt any one of the following : **[5]**

a) Explain regulation of cell cycle during early development.

b) Describe molecular signaling during neural induction.

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

P3113 [Total No. of Pages : 2

[4729] -2004

M.Sc. -I (Semester - II)

ZOOLOGY

ZY 204 (T) : Endocrinology (Credit System)

(2013 Pattern)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates :

1) ***Attempt any two questions from question no. 1, 2 & 3.***
2) ***Question No.4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Explain the role of X and Y organs in Crustacean metabolism, osmoregulation and moulting. **[5]**

b) How is calcium and phosphate metabolism control achieved? **[3]**

c) Enlist any four hypothalamic hypophysiotropins. **[2]**

Q2) a) Explain the action of steroid hormones. **[4]**

b) How does adrenal cortex act as endocrine organ? **[3]**

c) Write a note on insect metamorphosis with respect to hormonal regulation. **[3]**

P.T.O.

Q3) a) Explain the role of osmoregulatory hormones. **[4]**

b) How do pancreatic islets regulate metabolism invertebrates? **[3]**

c) Explain the role of pituitary hormones in regulation of control of chromatophores. **[3]**

Q4) write short notes on <u>any one</u> of the following : **[5]**

a) Hormones as chemical messengers.

b) Vitellogenesis in amphibians.

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

P3114 [Total No. of Pages : 2

[4729] -2005

M.Sc. -I (Semester - II)

ZOOLOGY

ZY : 205 (T) : COMPARATIVE ANIMAL PHYSIOLOGY

(2013 Pattern)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates :

1) ***Attempt any two questions from question No 1, 2 & 3.***
2) ***Question No.4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Describe the chemistry of vertebrate hormones. **[4]**

b) Explain the role of the action and myosin in muscle contraction. **[4]**

c) Enlist various digestive enzymes. **[2]**

Q2) a) Discuss the mechanism of thermoregulation in homiotherms. **[5]**

b) Describe the role of haemoglobin in oxygen transport. **[3]**

c) Define terms-osmoregulation and Euryhaline **[2]**

Q3) a) Differentiate between ventilation in gills and lungs. **[3]**

P.T.O.

b) Define the following terms with examples **[3]**

i) Poikilotherms

ii) Endotherms

iii) Hetero - therms

c) Define excretion? Explain the different forms of nitrogenous wastes excreted by animals. **[4]**

Q4) Define reflexes and explain the principle of neural integration. **[5]**

OR

Explain photoreception with suitable example.

Total No. of Questions : 4] **SEAT No. :**

P3115 **[Total No. of Pages :2**

[4729]-2006
M.Sc. (Part - I) (Semester - II)
(ZOOLOGY)
ZY 206 - T : Biochemical Techniques (2 Credits)
(2013 Pattern)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1, 2 & 3***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) What is Electrophoresis? How is PAGE different from SDS-PAGE, comment on their applications. **[5]**

b) State Beer-Lambert's law. Give the Difference between colorimeter and spectrophotometer. **[3]**

c) Define isoelectrofocussing. **[2]**

Q2) a) Explain the principle and working of GM counter. **[4]**

b) What is ion exchange chromatography? Comment on the ion exchangers used to separate biomolecules. **[4]**

c) What is agarose? What percentage of agarose gel is recommended to resolve genomic DNA. **[2]**

Q3) a) Explain the importance of enzymes in protein sequencing. **[4]**

b) What is centrifugal force? Differentiate between Fixed angle and Swing out rotor. **[3]**

c) What is flask constant? Explain its importance in manometry. **[3]**

Q4 a) Explain the Chain termination method of DNA sequencing. **[5]**

OR

b) Explain the construction and application of HPLC. **[5]**

P.T.O.

Total No. of Questions : 4]

P3115

[4729]-2006
M.Sc. (Part - I) (Semester - II)
ZOOLOGY
ZY 206 - T : Ichthyology
(2013 Pattern)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1, to Q. 3***
2) ***Question No. 4 is compulsory.***
3) ***Draw neat labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe structure of gill in fishes **[4]**

b) Describe any one order from class osteichthyes with two examples. **[3]**

c) Enlist types of scales in fishes **[3]**

Q2) a) Describe neuro-harmonal control of colour change in fishes. **[5]**

b) Explain morphometric measurement in fishes. **[3]**

c) Discuss the type of food in fishes. **[2]**

Q3) a) Describe various anatomical modifications in digestive system of fishes. **[4]**

b) Explain in brief seasonal changes in gonads in fishes. **[3]**

c) Give the diagnostic characters of cyclostomata with suitable examples. **[3]**

Q4 Describe in detail carpuscles of stannius. **[5]**

OR

Discuss the role of pitutary gland in fishes.

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Total No. of Questions : 12] SEAT No. :

P3096 [Total No. of Pages : 2

[4729] - 203
M.Sc. - II (Semester - II)
ZOOLOGY
ZY - 203 : A) Biochemical Technique
OR
Ichthyology
B) Endocrinology
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any two sections.***
2) ***Answer any two questions from each section.***
3) ***Answer to the two sections should be written in separate answer books.***
4) ***All questions carry equal marks.***
5) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

ZY - 203 : A) Biochemical Technique

Q1) Give the principle, working and application of HPLC. **[20]**

Q2) a) Explain any two methods of protein sequencing. **[10]**

b) Explain principle and applications of ultracentrifuge. **[10]**

Q3) a) Give detail account of electrophoresis techniques to resolve proteins. **[10]**

b) Explain principle and working of UV-VIS spectrophotometer. **[10]**

Q4) Write short note on : **[20]**

a) Thin layer chromatography.

b) Radioactive compounds in biological research.

c) RQ and its determination technique.

d) Ion-Exchangers.

P.T.O.

OR

A) Ichthyology

Q5) Describe food and feeding habits of fishes. Add a note on anatomical modifications of the alimentary canal of fishes.

Q6) Describe various types of endocrine organs in fishes and their functions.

Q7) Write an account of water and salt balance in stenohaline and Euryhaline fishes.

Q8) Write short notes on :

a) Dipnoi.

b) Osteichthyes.

c) Buoyancy mechanism.

d) Scales in fishes.

SECTION - II

ZY - 203 : B) Endocrinology

Q9) Explain endocrine regulation of metabolism and moulting in crustaceans. **[20]**

Q10) a) Explain the role of hormones in phosphate metabolism. **[10]**

b) Give the role of gastrointestinal hormones in digestion. **[10]**

Q11) Describe hypothalamic-hypophysiotropins. **[20]**

Q12) Write notes on : **[20]**

a) ACTH.

b) Signal transduction.

c) Hormones as chemical messengers.

d) Renin angiotensin complex.

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

P3127 [Total No. of Pages : 3

[4729] - 4003

M. Sc. (Semester - IV)

ZOOLOGY

Z Y 403 (T) : Mammalian Reproductive Physiology (2 Credits)

(2013 Pattern)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Questions No. 4 is compulsory.***
3) ***Figures to right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) Explain the accessory reproductive organs in male. **[5]**

b) Explain the neuroendocrine control of parturition. **[3]**

c) Define implantation. **[2]**

Q2) a) Explain the methods of increasing reproductive potential. **[4]**

b) Explain the structure and functions of hemo-chorial placenta. **[3]**

c) Explain the factors affecting breeding. **[3]**

Q3) a) Explain the Suckling reflex. **[4]**

b) What is reproductive dysfunction? Explain it with suitable example. **[4]**

c) Explain the significance of sertoli cells. **[2]**

Q4) Attempt any one of the following :

a) Explain the surgical methods of contraception. **[5]**

b) Explain the ovarian cycle. **[5]**

P.T.O.

Total No. of Questions : 4]

P3127

[4729] - 4003
M. Sc. (Semester - IV)
ZOOLOGY
Z Y 403 T : Biodiveristy Assessment (2 Credits)
(2013 Pattern)

Time : 1½ Hour] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to right indicate full marks.***

Q1) a) What is the biological significance of wild life conservation in India. **[5]**

b) Write a note on biogeographical classification of India. **[3]**

c) Define threatened species. **[2]**

Q2) a) Explain the role of morphology in taxonomy. **[4]**

b) Define consumptive biodiversity. **[3]**

c) Write a short note on aesthetic value of biodiversity. **[3]**

Q3) a) What is biodiversity? Explain the agro biodiversity. **[4]**

b) What are the objectives of conservation. **[3]**

c) Write any three in-situ and ex-situ conservations. **[3]**

Q4) Write a detail note on Bishoni's movement of conservation in India.

OR

Write the characterstic features of phylum Mollusca.

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

P3128 [Total No. of Pages : 2

[4729] -4004

M.Sc. -II (Semester - IV)

ZOOLOGY

ZY - 404 : (T) Histology and Histochemistry (2 Credits)

(2013 Pattern)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates :

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Question No.4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) Explain the double staining (HE) method and its significance in histology. **[5]**

b) What is cryostat? Explain its significance. **[3]**

c) What is Meyer's albumin? **[2]**

Q2) a) Explain the procedure of PAS staining. **[4]**

b) Explain the process of embedding and give its significance. **[3]**

c) Explain nuclear stains with suitable examples. **[3]**

Q3) a) Explain the principle and practice of histochemical detection of protein. **[4]**

b) Explain formaldehyde as a fixative. **[4]**

c) Define adipocyte. **[2]**

P.T.O.

Q4) Attempt any one of the following :

a) What precautions should be taken for histochemical detection of enzymes? **[5]**

b) Explain the structure and function of striated muscular tissue. **[5]**

Total No. of Questions : 4] **SEAT No. :**

P3129 **[Total No. of Pages : 2**

[4729] -4005

M.Sc. (Semester - IV)

ZOOLOGY

ZY 405 (T) : POLLUTION BIOLOGY

(2013 Pattern) (2 Credits)

Time : 1½ Hour] ***[Max. Marks : 25***

Instructions to the candidates :

1) ***Attempt any two questions from Q.No. 1 to Q.No. 3.***
2) ***Question No.4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) What is pollution? Describe sources of air pollution. **[4]**

b) Explain Handling and Management of Biomedical Waste. **[4]**

c) Write a note on hydrosphere. **[2]**

Q2) a) Describe strategies for water pollution monitoring . **[4]**

b) Describe causes and consequences of Bioaccumulation. **[3]**

c) Describe effects of radioactive pollution. **[3]**

P.T.O.

Q3) a) What is bioassay? Explain pollutant bioassay using fish. **[4]**

b) Describe characteristics of sound. **[3]**

c) Write a note on Lithosphere. **[3]**

Q4) Describe Histological methods to study impact of pollutants on animals. **[5]**

OR

Describe sources and effects of sound pollution.

Total No. of Questions : 4]

SEAT No. : ____

P3130

[Total No. of Pages :1

[4729]-4006
M.Sc. (Semester - IV)
ZOOLOGY
ZY - 406 T Apiculture
(2013 Pattern) (2 Credits)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to 3.***
2) ***Question No. 4 is compulsory.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Describe two story Langstroth ten frame hive **[5]**

b) What are limitations of the beekeeping. **[3]**

c) What is Apiculture? **[2]**

Q2) a) Describe polymorphism in Honey bee. **[4]**

b) Discuss foraging behaviour of bees. **[3]**

c) What is migratory beekeeping? **[3]**

Q3) a) Discuss bee flora of India. **[4]**

b) Describe protozoan diseases of bees. **[4]**

c) What is bee bread? **[2]**

Q4 Write short notes on <u>any one</u> of the following: **[5]**

a) Insect enemies of bees.

b) Seasonal management of bee colonies

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P.T.O.

Total No. of Questions : 4] **SEAT No. :**

P3131 **[Total No. of Pages :1**

[4729]-4007
M.Sc. (Semester - IV)
ZOOLOGY
ZY - 407 T : Pest Control
(2013 Pattern) (2 Credit)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from question No. one to three.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***

Q1) a) Describe stored grain pests. **[5]**

b) Describe changes caused by pest. **[3]**

c) What are physical control measures **[2]**

Q2) a) Describe various cultural control methods employed in pest control. **[4]**

b) Describe liquid insecticide formulations. **[4]**

c) What are chemosterilents? **[2]**

Q3) a) Explain the harmonal control of insects. **[4]**

b) Give control measures for crabs & snails. **[3]**

c) Discuss insects of veterinary importance. **[3]**

Q4) Write short notes on (any one): **[5]**

a) Dusters

b) IPM.

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Total No. of Questions : 4] **SEAT No. :**

P3132 **[Total No. of Pages :1**

[4729]-4008
M.Sc. (Semester - IV)
ZOOLOGY
ZY - 408 T : Toxicology - II (2 Credits)
(2013 Pattern)

Time : 1½ Hour] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from question No. 1 to 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain Bio-medical waste disposal . **[4]**

b) Give objectives of Biotransformation. **[3]**

c) What are the principal goals of toxicogenomics? **[3]**

Q2) a) Describe regulatory agencies in toxicity testing of xenobiotics . **[4]**

b) How microarray can be used as a useful technique in Toxicogenomics. **[4]**

c) Name principal organs of elimination (excretion) of toxic agents. **[2]**

Q3) a) Describe any two storage depots (store house) of toxic agents in the body . **[5]**

b) Describe the absorption of toxic agents through lungs and skin. **[3]**

c) Describe the role of IAEC in animal research. **[2]**

Q4) a) Describe the elimination (excretion) of toxic agents through kidney. **[5]**

OR

b) Describe any one of the following mechanisms of Biotransformation:

i) Phase I

ii) Phase II

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Total No. of Questions : 16] SEAT No. :

P3102 [Total No. of Pages : 3

[4729] - 403
M.Sc. - II (Semester - IV)
ZOOLOGY
(ZY - 431 - 435)
ZY-431 : Physiology of Mammalian Reproduction
ZY-432 : Comparative Invertebrate Histology and Histochemistry
ZY-433 : Biodiversity Assessment
ZY-435 : Apiculture
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any two sections.***
2) ***Answer any two questions from each section.***
3) ***Answer to the two sections should be written in separate answer books.***
4) ***All questions carry equal marks.***
5) ***Neat labeled diagrams must be drawn wherever necessary.***

SECTION - I
ZY-431 : Physiology of Mammalian Reproduction

Q1) Explain structure, function and hormonal regulation of mammary gland during lactation. **[20]**

Q2) a) Explain oestrous cycle in mammals.
b) Give the various events in the process of conception and blastocyst formation.

[20]

Q3) a) Give the various events hormones involved in maintenance of pregnancy.
b) Explain testicular hormones.

[20]

Q4) Write note on (any two) : **[20]**

a) Puberty.
b) Ageing and reproduction.
c) Breeding patterns in animals.
d) Artificial insemination.

P.T.O.

SECTION - II

ZY-432 : Comparative Invertebrate Histology and Histochemistry

Q5) Explain the principle and procedure of histochemical detection of Enzymes. **[20]**

Q6) What is fixation? Explain any two fixatives in detail. **[20]**

Q7) Explain the connective tissue with respect to type, function, and location. **[20]**

Q8) Write notes on : **[20]**

a) Sudan Black B.

b) Histochemical detection of proteins.

SECTION - III

ZY-433 : Biodiversity Assessment

Q9) What is biosphere? Describe global biodiversity hotspots. **[20]**

Q10) Give a detailed account of endangered flora and fauna of India. Add a note on its management strategies. **[20]**

Q11) Explain in detail classification of class Mammalia up to order level with suitable examples. **[20]**

Q12) Write short notes on : **[20]**

a) Commensalism.

b) Aquatic adaptation.

c) Modern tools of biodiversity assessment.

d) Zoogeographical realms.

SECTION - IV

ZY-435 : Apiculture

Q13) Describe the digestive system of worker bee and add a note on food and feeding behavior. **[20]**

Q14) Describe external morphological features of queen, worker and drone. **[20]**

Q15) Describe chemical composition and economic importance of various bee products. **[20]**

Q16) Write short notes on : **[20]**

a) Queen rearing techniques.

b) Taxonomy of bee.

c) Fungal diseases of bees.

d) Summer season management of bee colony.

Total No. of Questions : 6] SEAT No. :

P2664 [Total No. of Pages : 2

[4731] - 2012
M.A/M.Sc. (Semester - II)
GEOGRAPHY
Gg - 206 : Geography of Energy Resources
(2013 Pattern) (Credit System)

Time : 2.30 Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. 4.***
2) ***Question No. 5 and 6 are compulsory.***
3) ***Draw figures/maps wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of map stencils and calculator is allowed.***

Q1) a) Mention the types and forms of energy material. **[2]**

b) Describe the pattern of energy consumption in the metropolitan cities of the world. **[4]**

c) Compare and contrast the pattern of energy use in the developed and developing countries. **[4]**

Q2) a) Mention the various policy models for energy management processes. **[2]**

b) Discuss the future prospects of energy conservation in India. **[4]**

c) Discuss the spatial pattern of energy needs in India. **[4]**

Q3) a) What is the importance of energy conservation? **[2]**

b) Give an account of the coal reserves of the world. **[4]**

c) Mention the relative advantages and disadvantages of Hydro power as an energy resource. **[4]**

P.T.O.

Q4) a) What are secondary resources? Give examples. **[2]**

b) Describe the traditional methods of energy conservation. **[4]**

c) Describe the geopolitical issues related to the use of nuclear energy resources. **[4]**

Q5) a) Mention the various energy related agreements of India with other countries. **[4]**

b) Describe the methods of sustainable management of energy resources. **[5]**

Q6) a) Describe the temporal pattern of energy use in the transport sector of India. **[4]**

b) Discuss the institutional arrangements for mitigation of energy crises in India. **[5]**

Total No. of Questions : 6] SEAT No. :

P2665 [Total No. of Pages : 2

[4731] - 2013
M.A./M.Sc. (Semester - II)
GEOGRAPHY
Gg - 208 : Geoinformatics - I
(2013 Pattern) (Credit System)

Time : 2.30 Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to 4.***
2) ***Question 5 and 6 are compulsory.***
3) ***Draw figures/maps wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of map stencils and calculator is allowed.***

Q1) a) Name the various tasks in GIS. **[2]**

b) Explain any four GIS tasks in brief. **[4]**

c) Chart the history of GIS. **[4]**

Q2) a) Define ordinal scale. **[2]**

b) Give the characteristics of logical relationship in spatial data base. **[4]**

c) Write a note on elements of GIS. **[4]**

Q3) a) Define the term contiguity in topology building. **[2]**

b) Write a note on semiautomatic editing. **[4]**

c) Explain the process of topology building with suitable examples. **[4]**

Q4) a) Define map algebra. **[2]**

b) Giving suitable examples explain SQL with respect to the attribute query. **[4]**

c) Write a note on the operations from algebraic theory. **[4]**

P.T.O.

Q5) a) Write a note on layers and coverage. **[4]**

b) Define Raster data model and give the advantages and disadvantages of Raster data model. **[5]**

Q6) a) Explain with suitable examples spatial and attribute queries. **[4]**

b) Explain local grid operation in GIS. **[5]**

Total No. of Questions : 6] SEAT No. :

P2666 [Total No. of Pages : 2

[4731] - 2014

M.A./M.Sc. (Semester - II)

GEOGRAPHY

Gg - 209 : Geoinformatics - II

(2013 Pattern) (Credit System)

Time : 2.30 Hours] *[Max. Marks : 38*

Instructions to the candidates :

1) ***Attempt any two questions from Q. 1 to Q. 4.***
2) ***Question No.5 and 6 are compulsory.***
3) ***Draw figures/Maps wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of map stencils and Calculator is allowed.***

Q1) a) Define EMR. **[2]**

b) Explain the electromagnetic spectrum with suitable diagram. **[4]**

c) Explain the significance of remote sensing data in spatial analysis. **[4]**

Q2) a) What is meant by Path radiance? **[2]**

b) Explain the EMR with respect to the earth's surface. **[4]**

c) Explain the relationship of spectral bands with atmospheric windows. **[4]**

P.T.O.

Q3) a) Define the terms Principal point and Nadir. **[2]**

b) Explain how the scale is measured for an aerial photo. **[4]**

c) Explain the optical aspects of an aerial camera. **[4]**

Q4) a) Name the receivers of GPS signals. **[2]**

b) Give a brief description of the space segment and user segment of the GPS. **[4]**

c) Explain the types of multispectral scanners in remote sensing. **[4]**

Q5) a) What is a remote sensor? Explain the terms spectral and spatial resolution. **[4]**

b) Give spectral and spatial chracteristics of IRS LISS I, II, III, IV and PAN data products. **[5]**

Q6) a) Explain how shape, texture and pattern helps in interpretation of an aerial photograph. **[4]**

b) What do you mean by BSQ and BIL? Explain with suitable examples their differentiating characteristics. **[5]**

Total No. of Questions : 6] SEAT No. :

P2687 [Total No. of Pages : 2

[4731] - 4010

M.A/M.Sc. (Semester - II)

GEOGRAPHY

Gg - 404 : The Geography of Food Security of India

(2013 Pattern) (Credit System)

Time : 2.30 Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any two questions from Question No. 1 to Q. 4.***
2) ***Question No. 5 and 6 are compulsory.***
3) ***Draw figures/maps wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of map stencils and calculator is allowed.***

Q1) a) Explain the term food security. **[2]**

b) Explain the importance of availability of food. **[4]**

c) Describe the production of food crops in India. **[4]**

Q2) a) Define agricultural productivity. **[2]**

b) Explain the economic difficulties in access of food. **[4]**

c) Evaluate food security conditions at state level. **[4]**

Q3) a) What is food stability? **[2]**

b) Examine the demerits of the Food Security Bill. **[4]**

c) Explain the importance of food security in India. **[4]**

Q4) a) Name the socio-economic aspects of food security. **[2]**

b) Give the distribution of cash crops in India. **[4]**

c) Discuss the availability of food for the masses. **[4]**

P.T.O.

Q5) a) Examine the role of newspapers in spreading knowledge about food security in India. **[4]**

b) "Social injustice still exists in India". Discuss. **[5]**

Q6) a) Discuss the food security conditions in India. **[4]**

b) Give the distribution of cash crops in India. **[5]**

Total No. of Questions : 6] SEAT No. :

P2688 [Total No. of Pages : 2

[4731] - 4011
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg - 405 : Geography of Health
(2013 Pattern) (Credit System)

Time : 2½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any two questions from question No. 1 to 4.***
2) ***Question No. 5 and 6 are compulsory.***
3) ***Draw figures/maps wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of map stencils and calculator is allowed.***

Q1) a) Define health Geography? **[2]**

b) Write short note on approaches to geography of health. **[4]**

c) Discuss role of climate change in arising diseases. **[4]**

Q2) a) What is non-communicable disease (NCD)? **[2]**

b) Define deficiency diseases? Write the types of deficiency diseases. **[4]**

c) Explain WHO classification of diseases. **[4]**

Q3) a) What is diffusion of diseases? **[2]**

b) Write short note on malnutrition. **[4]**

c) Describe health care system in India. **[4]**

Q4) a) Write relation between gender and health. **[2]**

b) Explain the impact of water pollution on health in rural area. **[4]**

c) Discuss the health problems of tribal communities in India. **[4]**

P.T.O.

Q5) a) Describe the impact of pollution on human health in urban environment. **[4]**

b) Explain how geographical factors affecting on human health. **[5]**

Q6) a) Explain the causes of transmission of diseases. **[4]**

b) Write significance of primary health care centers. **[5]**

Total No. of Questions : 6] SEAT No. :

P2689 [Total No. of Pages : 2

[4731] - 4012

M.A./M.Sc. (Semester - IV)

GEOGRAPHY

Gg - 407: Regional Geography of SAARC Countries

(2013 Pattern) (Credit System)

Time : 2.30 Hours] *[Max. Marks : 38*

Instructions to the candidates :

1) ***Attempt any two questions from Q.No. 1 to Q. 4.***
2) ***Question Number 5 and 6 are compulsory.***
3) ***Draw figures/maps wherever necessary.***
4) ***Figures to the right indicates marks.***
5) ***Use of map stencils and calculator is allowed.***

Q1) a) Write latitude and longitude of India. **[2]**

b) Describe culture of Nepal. **[4]**

c) Write a note on origin of Maldives. **[4]**

Q2) a) What do you mean by Peninsular location. **[2]**

b) Explain in brief agricultural system in Shrilanka. **[4]**

c) Explain Ganga river System. **[4]**

Q3) a) Enlist the subranges of Himalayas. **[2]**

b) Write a note on "Population composition of Afghanistan". **[4]**

c) Explain the climate of Maldives. **[4]**

P.T.O.

Q4) a) Name the major rivers in Bhutan. **[2]**

b) What are the objectives of SAARC organisation. **[4]**

c) Write a note on strategic location Bangladesh. **[4]**

Q5) a) Write a note on "forest in Nepal." **[4]**

b) Explain the economical composition in India. **[5]**

Q6) a) Explain the physiographic divisions of Bhutan. **[4]**

b) Describe Socio-cultural status of Pakistan. **[5]**

Total No. of Questions : 7] **SEAT No. :**

P2643 **[Total No. of Pages : 1**

[4731] - 410
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg - 441 : Regional Geography of Europe
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Explain the major soil types and their distribution in Europe.

Q2) Give an account of water and land resources in Europe.

Q3) Discuss the balance of trade and impact of globalization in Europe.

Q4) Discuss the population resource in Europe.

Q5) Give an account of urbanization in Europe.

Q6) Give an account of industrial revolution in Europe.

Q7) Write notes on any two :

a) Geological structure of Europe.

b) Development of tourism in Europe.

c) Problems of industrialization in Europe.

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Total No. of Questions : 7] **SEAT No. :**

P2644 **[Total No. of Pages : 1**

[4731] - 411
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg. - 442 : Regional Geography of South East Asia
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Explain major soil types and their distribution in South East Asia.

Q2) Discuss the salient features of agriculture in South East Asia.

Q3) Explain the problems and prospects of industrialization in South East Asia.

Q4) Write an essay on development of transportation in South East Asia.

Q5) Give an account of population composition in South East Asia.

Q6) Explain the development and importance of tourism in South East Asia.

Q7) Write notes on any two :

a) Major vegetation types in South East Asia.

b) Singapore as a tourist attraction.

c) Urbanization in South East Asia.

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Total No. of Questions : 7] **SEAT No. :**

P2645 **[Total No. of Pages : 1**

[4731] - 412
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg. - 443 : Regional Geography of North America
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Describe the chief relief features of North America.

Q2) Describe the distribution of the major soil types of North America.

Q3) Give an appraisal of the water and land resources of North America.

Q4) Give an account of irrigation in North America.

Q5) Examine the problems and prospects of industrialization of North American.

Q6) Discuss the role of North America in the process of Globalization.

Q7) Write notes on any two :

a) Geostrategic importance of North America.

b) Transport system in North America.

c) USA's involvement in international issues.

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Total No. of Questions : 7] **SEAT No. :**

P2646 **[Total No. of Pages : 1**

[4731] - 413
M.A/M.Sc. (Semester - IV)
GEOGRAPHY
Gg. - 444 : Geography of Japan
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Explain the relationship between relief and drainage in Japan.

Q2) Give the distribution and importance of major minerals in Japan.

Q3) Give an account of major crops in Japan.

Q4) Describe the importance and technology of fishing industry in Japan.

Q5) Explain the factors affecting industrial development of Japan.

Q6) Explain the characteristics of population of Japan.

Q7) Write notes on **any two** :

a) Major and minor islands of Japan.

b) Major ports in Japan.

c) Education, tourism and international relations of Japan.

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Total No. of Questions : 7] **SEAT No. :**

P2647 **[Total No. of Pages : 1**

[4731] - 414
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg. - 445 : Geography of India
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Give an account of Ganga and Godavari river systems in India.

Q2) Describe the major climatic regions of India.

Q3) Give an account of coal and petroleum distibution in India.

Q4) Give the distribution and production of wheat and jowar in India.

Q5) Give an account of population distribution in India.

Q6) Explain the regional development of Chhota Nagpur region.

Q7) Write notes on **any two** :

a) Geographical and relative location India.

b) Major forest types in India.

c) Major soil types in India.

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Total No. of Questions : 7] **SEAT No. :**

P2648 **[Total No. of Pages : 1**

[4731] - 415
M.A./M.Sc. (Semester - IV)
GEOGRAPHY
Gg - 424 : Research Methodology
(2008 Pattern)

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

Instructions to the candidates:

1) ***Attempt any four questions.***
2) ***All questions carry equal marks.***
3) ***Use of map stencils is allowed.***

Q1) Explain the procedure of intersection and traverse survey.

Q2) Explain the data base creation for physical and cultural features on SOI toposheet.

Q3) Explain the concept of stereoscopic view.

Q4) Explain bivariate and multivariate correlation analysis.

Q5) Describe the applications of GIS in geography.

Q6) "Questionnaire, interviews and field mapping are the major components of field work". Discuss.

Q7) Write notes (any two)

a) Satellite images.

b) Indexing.

c) Research problem.

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Total No. of Questions : 8] SEAT No. :

P3220 [Total No. of Pages : 4

[4737] - 2005
M.Sc. (Computer Science) (Semester - II)
206 : ARTIFICIAL INTELLIGENCE
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

Q1) a) What are Frames? Explain the relationships used in frame representation. Why is it useful to distinguish between regular classes and meta classes? **[4]**

b) Explain the best first search algorithm comment on the significance of using the OR graphs for this type of search. **[4]**

c) State any 2 AI techniques. **[2]**

Q2) a) State the two approaches of taking advice in "Learning by taking advice". Explain in brief the steps in automated advice taking. **[4]**

b) The following is a problem which can be solved using state-space search techniques "We have 3 jugs of capacities 3, 5 & 8 litres respectively. There is no scale on the jugs; so it is only their capacities that we certainly know. Initially, the 8 liter jug is full of water, the other two are empty. We can pour water from one jug to another, and the goal is to have exactly 4 liters of water in any of the jugs. There is no scale on the jugs and we do not have any other tools that would help. The amount of water in the other two jugs at the end is irrelevant". **[4]**

Formalize the above problem in terms of state-space search. You should:

i) Suggest suitable representation for the problem.

ii) State the initial & final/goal states are in this representation.

iii) List the actions as operators/rules for getting from one state to the next, giving any conditions on when they may be applied.

c) Comment. In A* algorithm, if h' rarely overestimates h then A* is admissible. **[2]**

P.T.O.

Q3) a) Represent the following sentence into the appropriate semantic network diagram. "Isha loaned the book to Ria". **[4]**

b) State the benefits and drawbacks of representing knowledge using frame representation. How can frames be converted to semantic nets. **[4]**

c) What is a heuristic function? **[2]**

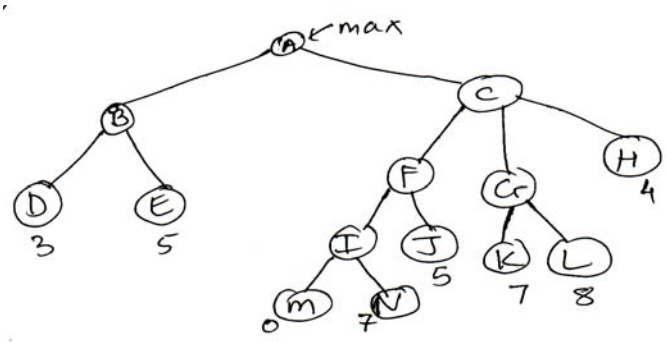
Q4) a) Consider the following statements :

"The law states that it is a crime for an Argeon to sell weapons to hostile nations. The country sumar, an enemy of Argeon, has some missiles, all of its missiles were sold to it by colonel Juma, who is an Argeonan". Represent the above information in WFF's. **[4]**

b) What is prenex normal form? Explain the method of eliminating existential quantifiers when converting predicates to clausal form. **[4]**

c) State the significance of alpha cutoff in alpha-beta pruning. **[2]**

Q5) a) Consider the following game tree



Perform a left-to-right alpha-beta pruning on the tree. Indicate where the cut-offs occur. ' **[4]**

b) Write a short note on role learning. **[4]**

c) Translate the following FOPL statement to English. **[2]**

$$\forall x : \text{IsABunny}(x) \wedge \text{IsAStudent}(x) \wedge \text{Istaking BI}(x) \Rightarrow \text{IsCute}(x) \wedge \text{IsCool}(x)$$

Q6) a) Define forward & backward chaining. Differentiate between the two **[4]**

b) Write a short note on simulated annealing search strategy. **[4]**

c) What does MTRANS primitive act indicate in a conceptual dependency representation? **[2]**

Q7) a) Given the following equation :

$$\begin{array}{r} \text{SEND} \\ +\ \text{MORE} \\ \hline =\ \text{MONEY} \end{array}$$

The aim is to assign each letter a unique integer in the range 0 - 9 so that the sum is correct.

This problem can be defined as a constraint satisfication problem (CSP) in terms of variables (V), domains (D) & constraints (C).

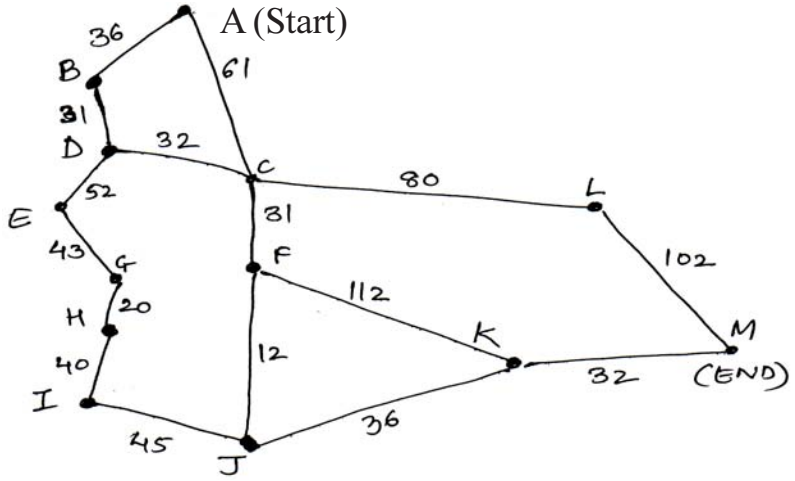
State the initial solution, initial constraints.Describe any one step of reducing the domain & creating additional constraints. **[5]**

b) Consider the following English statements & their WFF's equivalent.

English Statement	FOPL/WFF's
Jack owns a dog	$\exists x : \text{dog}\ (x) \wedge \text{Owns (Jack, } x)$
Every dog owner is an animal lover	$\forall x :\ (\exists y : \text{Dog (y)} \wedge \text{Owns } (x, y) \Rightarrow \text{Animal Lover } (x))$
No animal lover kills an animal	$\forall x : \text{Animal Lover } (x) \Rightarrow (\forall y : \text{Animal } (y) \Rightarrow \sim \text{Kills } (x, y))$
Either Jack or curiosity killed Tuna, the cat	Kills (Jack, Tuna) $\vee$ kills (curiosity, Tuna) Cat (Tuna) $\forall x : (\text{cat } (x) \Rightarrow \text{Animal } (x))$

Using Resolution, Prove that curiosity did not kill tuna. **[5]**

Q8) a) Consider the following map (not-drawn to scale) **[5]**



Using A* Algorithm, work out a route from town A to town M. Use the following cost functions

- G (n) = The cost of each move as the distance between each town (shown on the map)

- H (n) = The straight line distance between any town & town M. These distance are given in the table below

Straight line distance to M :-

A	223
B	222
C	166
D	192
E	165

F	136
G	122
H	111
I	100
J	60

K	32
L	102
M	0

State the route to M & the cost of that route.

b) Describe the unification algorithm why is it useful to generate the most general unifier possible by this algorithm? **[5]**

Total No. of Questions : 8] SEAT No. :

P3221 [Total No. of Pages : 2

[4737] - 2006

M.Sc.(Computer Science) (Semester - II)

CS - 207 : ADVANCE ALGORITHMS

(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates :

1) ***All questions carry equal marks.***
2) ***Attempt any five out of eight.***
3) ***All subquestions in each question are compulsory.***

Q1) a) Write a note on B trees. **[4]**

b) What are Fibonacci heaps? Where are they used. **[4]**

c) Where are the applications of string searching. **[2]**

Q2) a) What is descrete optimization? **[4]**

b) Explain strength & weaknesses of dynamic trees. **[4]**

c) In which situations the heuristic optimization is used? **[2]**

Q3) a) Where do we use ellipsoid method? Explain in datail. **[4]**

b) What are suffix trees? **[4]**

c) Explain topological sort with small example. **[2]**

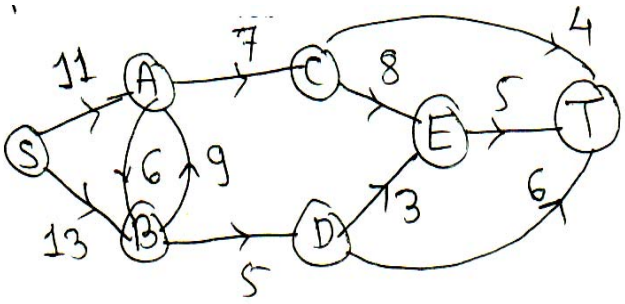
Q4) a) Explain the types of enumeration methods. **[4]**

b) Discuss any significant use of approximation algorithm. **[4]**

c) What is K median problem? **[2]**

P.T.O.

Q5) a) Find out maximum flow through the network. **[4]**



b) Write a note on vertex cover problem. Which method is used to solve it? **[4]**

c) Write any 2 applications of splay trees. **[2]**

Q6) a) Explain the working of Knuth-Morris-Pratt algorithm. **[4]**

b) Write a note on steiner forest problem. **[4]**

c) Where is cutting plain method used? **[2]**

Q7) a) Write a note on Simplex method. **[5]**

b) How is TSP solved using Complete enumeration. **[5]**

Q8) a) Explain the concept of "Universal Steiner trees" with its applications. **[5]**

b) Compare & contrast Rabin Crap method & Boyer-Moore algorithm. **[5]**

Total No. of Questions : 8] **SEAT No. :**

P3394 **[Total No. of Pages : 3**

[4738] - 4006

M.C.A. (Science Faculty) (Semester - IV)

CA - 408 : SOFT COMPUTING

(2013 Pattern) (Credit System)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***

Q1) Attempt the following: **[4]**

a) What is fuzz relation? Explain the operations on fuzzy relation.

b) Given the following fuzzy numbers and using zadeh's extension principle, calculate $\underset{\sim}{K} = \underset{\sim}{I} \cdot \underset{\sim}{J}$. **[4]**

$$\underset{\sim}{I} = \underset{\sim}{3} = \left\{\frac{0.2}{2} + \frac{1}{3} + \frac{0.2}{4}\right\}$$

$$\underset{\sim}{J} = \underset{\sim}{2} = \left\{\frac{0.1}{1} + \frac{1}{2} + \frac{0.1}{3}\right\}$$

c) What two requirements should a problem satisfy in order to be suitable for solving it by Genetic Algorithm. **[2]**

Q2) Attempt the following:

a) Explain Aggregation of fuzzy rules. **[4]**

b) Explain how Genetic Algorithm works. **[4]**

c) What is weight space? **[2]**

Q3) Attempt the following:

a) Let X = {*a*,*b*,*c*,*d*} and Y = {1,2,3,4} &

Let $\underset{\sim}{A} = \left\{\frac{0.1}{a} + \frac{0.7}{b} + \frac{0.5}{c} + \frac{1}{d}\right\}$

P.T.O.

$$\underset{\sim}{B} = \left\{\frac{0.3}{1} + \frac{1}{2} + \frac{0.8}{3} + \frac{0}{4}\right\}$$

$$\underset{\sim}{C} = \left\{\frac{0}{1} + \frac{0.5}{2} + \frac{1}{3} + \frac{0.7}{4}\right\}$$

Determine the implication relations : if x is in $\underset{\sim}{A}$ then Y is in $\underset{\sim}{B}$ **[4]**

b) Show that the boolean function OR is linearly seperable for bipolar input and bipolar target. **[4]**

c) What is soft computing? **[2]**

Q4) Attempt the following:

a) Briefly outline the procedure of gradient descent based learning. **[4]**

b) Find fuzzy union, Intersection and difference for following two fuzzy sets. **[4]**

$$\underset{\sim}{A} = \left\{\frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5}\right\}$$

$$\underset{\sim}{B} = \left\{\frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5}\right\}$$

c) Define the linguistic hedge 'slightly' for the linguistic atom 'α'. **[2]**

Q5) Attempt the following:

a) Describe any two neuron signal function with suitable diagram. **[4]**

b) For the following fuzzy relation R. Find λ - cut relation for $\lambda = 0.7$ and $\lambda = 0.4$

$$R = \begin{bmatrix} 1 & 0.8 & 0.4 & 0.2 \\ 0.8 & 1 & 0.3 & 0.1 \\ 0.4 & 0.3 & 1 & 0.2 \\ 0.2 & 0.1 & 0.2 & 1 \end{bmatrix}$$ **[4]**

c) Define any two logical connectives for a fuzzy logic. **[2]**

Q6) Attempt the following:

a) What is defuzzification? Explain any two defuzzification method. **[5]**

b) Explain any three features of the membership function. **[3]**

c) What is supervised learning. **[2]**

Q7) Attempt the following:

a) Explain perceptron learning algorithm with suitable example. **[5]**

b) Consider the following fuzzy sets **[5]**

$$\underset{\sim}{P} = \left\{\frac{0.1}{a} + \frac{0.3}{b} + \frac{0.7}{c} + \frac{1}{d}\right\}$$

$$\underset{\sim}{Q} = \left\{\frac{0.6}{e} + \frac{1}{f} + \frac{0.8}{g}\right\}$$

$$\underset{\sim}{T} = \left\{\frac{1}{h} + \frac{0.2}{i} + \frac{0.5}{j} + \frac{0.7}{k}\right\}$$

perform the operations -

i) $R = \underset{\sim}{P} \times \underset{\sim}{Q}$

ii) $S = \underset{\sim}{Q} \times \underset{\sim}{T}$

iii) R o S (R composition S)

Q8) Attempt the following:

a) Explain any five components of ANN. **[5]**

b) Explain how α - LMS reduces the linear error at the output of a neuron. **[5]**