Veer Narmad South Gujarat University
Udhna Magdalla Road, Surat
M.Sc. (Environmental Science)
Semester - I

Date: ________  Time: 3 Hrs  Total Marks 70

Seat No.

Mention below given details in Answer Book.
Name of Examination: M.Sc. – Environmental Science (Semester I)
Name of the Subject: Fundamentals of Environmental Science & Ecology Paper No: Ens 101
Subject Code No:

Student’s Signature

Instructions:
1. Figures to the right indicate full marks of the question.
2. Draw neat and labeled diagrams whenever necessary.

Q.1 Answer the following (Any Three) 18
2. Describe various regions of atmosphere and explain stratosphere.
3. Describe composition of Hydrosphere.
4. Explain Nitrogen cycle in detail.

Q.2 Answer the following (Any Three) 18
1. What is GHG? Explain its contribution towards Global Warming.
2. What is Acid Rain? Explain its formation in atmosphere. Give its harmful effects.
4. Describe grazing and detritus food chain with examples.

Q.3 Answer the following (Any Three) 18
1. Discuss the protected area and protected species in India.
2. Define wetlands. Write the types of wetlands.
3. Explain the concept of flow of energy in an ecosystem.
4. Explain the terms: (i) Pyramids of number (ii) Trophic levels

Q.4 Write Short Notes (Any Two) 16
1. Desert ecosystem
2. Important projects in conservation of wild life in India
3. Solar Energy
Veer Narmad South Gujarat University

Udhna Magdalla Road, Surat
M. Sc. (Environmental Science)
SEM-1
ENS 103: Environmental Microbiology

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Date _______________ Time 3 hrs Total Marks 70

Instructions:
1. Figures to the right indicate full marks of the question.
2. Draw neat and labelled diagrams whenever necessary.

Q-1: Answer the Following (Any Three) (18)
(a) Name the domains of Carl Woese classification. Write a detailed note on Woese classification.
(b) What is microscopy? Compare and contrast among bright field microscope and electron microscope, dark field microscope.
(c) Give classification and overview of protozoa and algae.
(d) Draw labelled, schematic diagram of prokaryotic cell. Give the function of each components of the cell.

Q-2: Answer the Following (Any Three) (18)
(a) Explain classification of bacteriological media with suitable example.
(b) Give a detailed account on Koch’s postulates.
(c) Explain the role of fungi in environment cleaner bioprocess.
(d) What do you mean by sterilization? Explain use of physical methods for sterilization.

Q-3: Answer the Following (Any Three) (18)
(a) What are viruses? Discuss any two methods of their cultivation in laboratory.
(b) Discuss each phase of bacterial growth curve in detail.
(c) Describe applications of xerophiles.
(d) Give detailed note on endospore formation in prokaryotes.

Q-4: Write Short notes (Any Two) (16)
(a) Lysogenic cycle of phage lambda.
(b) Algae as bio fertilizer.
(c) Viroid and prions.

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Veer Narmad South Gujarat University
Udhna Magdalla Road, Surat
M.Sc. (Environmental Science)
Semester - I

Date: __________  Time: 3 Hrs  Total Marks 70

Mention below given details in Answer Book.  Seat No.
Name of Examination:
M.Sc. – Environmental Science (Semester I)
Name of the Subject: Analytical Techniques
Paper No: Ens 104
Subject Code No: __________________________  Student’s Signature

Instructions:
1. Figures to the right indicate full marks of the question.
2. Draw neat and labeled diagrams whenever necessary.

Q.1 Answer the following (Any Three) 18
  1. Write the factors affecting sampling programme. Describe the problems observed during sampling.
  2. Explain the working of basic buffer solution. Find the pH of a buffer solution containing 0.2 mole per litre sodium acetate and 0.15 mole per litre acetic acid.
  3. Define temporary and permanent hardness. Explain its determination in waste water sample.
  4. Discuss the principle, Nernst equation and application of Oxidation Reduction Potential.

Q.2 Answer the following (Any Three) 18
  1. Why preservation of samples is required? How will you (i) store and (ii) preserve the collected water samples?
  2. Define primary standard with example. Explain preparation and standardization of 0.1 N sodium thiosulphate.
  3. Explain TDS, TSS and TS along with the gravimetric method used to determine them.

Q.3 Answer the following (Any Three) 18
  1. How will you determine percentage purity of benzoic acid using non aqueous titrations?
  2. What is pH? Give Nernst equation to calculate pH.
  3. Explain pH determination with Glass electrode.
  4. Write about Purpose of water quality measurement and Sampling System.
  4. Discuss the significance of color and alkalinity data.

Q.4 Write Short Notes (Any Two) 16
  1. Explain iodometric and iodimetric titrations with example and application in water analysis.
  2. Discuss various types of Ultrasound Flow meters with their principle and applications.
  3. Define: Turbidity, Explain units and write about Forward Scattering Turbidity Meter.
Instructions: 1. All questions carry equal marks.
   2. Attempt any FIVE questions.
   3. Draw labelled diagram wherever it necessary

1. What is reservoir? Give an account of its classification and distribution on Ganga Brahmaputra and Krishna river system. 14

2. Short notes.
   (A) Classification of Lakes 07
   (B) Thermal stratification 07

3. Short notes.
   (A) Vimbanad Lake 07
   (B) Pulicut Lake 07

4. Explain the physical and chemical properties of Sea water. 14

5. What is spring and neap tides? Describe the formation process and affecting factor these tides. 14

6. What is recreational fishing? Explain sport fishes of India. 14

7. Short Notes.
   (A) Shell fishes 07
   (B) Ornamental fishes
Mention below given details in Answer Book

Name of the Examination:
M.Sc. (AQUATIC BIOLOGY) SEMESTER- I, November, 2016

Name of the Subject:
AQB 102 INSTRUMENTATION AND RESEARCH METHODOLOGY

Subject Code No.:
1 3 0 1

Marks: 70
Time: 3 hrs.

Instructions: 1. All questions carry equal marks.
2. Attempt any FIVE questions.
3. Draw labelled diagram wherever it necessary

1. What is VIS spectrophotometry? Describe labelled diagram and working procedure of double beam spectrophotometers.

2. Describe the principle and applications of Electron microscope. Give its brief descriptions with labelled diagram.

3. Draw a labelled diagram and describe the principle and application of electrophoresis. Explain the methodology of protein electrophoresis.

4. (A) Types of rotors
   (B) Density gradient centrifugation

5. Draw the labelled diagram of following and give an account on their principles and applications:
   (A) Conductivity meter
   (B) Turbidimeter

6. What are NMR and IR Spectrometry? Describe its principle and application.

7. Detail description with labelled diagram and working method of following
   (i) Fluorescent microscope
   (ii) Bright field microscope
INSTRUCTIONS: 1. ATTEMPT ANY FIVE QUESTIONS.
   
   2. ALL QUESTIONS CARRY EQUAL MARKS.

Q.1 GIVE DETAIL ON THE MICROORGANISMS ASSOCIATED WITH FRESH AND MARINE WATER BODIES.

Q.2. GIVE GENERAL STRUCTURE & CHARACTERS OF FUNGI AND VIRUSES.

Q.3. WRITE PHOSPHORUS AND SULPHUR CYCLES AND THEIR SIGNIFICANCE ALSO INCLUDE NOTES ON DECOMPOSITION OF ORGANIC MATTER IN AQUATIC ECOSYSTEM

Q.4. GIVE DETAIL NOTES ON NUTRITION & GROWTH OF MICROORGANISMS. ADD BRIEF NOTES ON PHYSICO-CHEMICAL PARAMETERS AFFECTING MICROBIAL GROWTH

Q.5. WRITE DIFFERENT ASPECTS ON MICROBIAL QUALITY CONTROL OF PROCESSED FISHERY PRODUCTS?

Q.6. EXPLAIN HOW DETECTION, ISOLATION, CULTIVATION OF MICROORGANISMS IS DONE?

Q.7. WHAT ARE PATHOGEN? HOW THEIR PREVENTION AND CONTROL IS POSSIBLE?
Q.1 EXPLAIN THE ROLE OF PLANKTON IN FOOD WEB STRUCTURE AND NUTRIENT CYCLE.

Q.2 WHAT IS HABs. WRITE ITS CAUSES AND EFFECTS.

Q.3 DEFINE TERM PERiphyton. WRITE ITS ROLE IN AQUATIC ENVIRONMENT.

Q.4 DEFINE BIOLUMINESCENCE. WRITE DETAIL NOTES ON LUMINOUS PLANKTON.

Q.5 WHAT IS TERTIARY PRODUCTIVITY? WRITE ONE OF THE METHODS TO ESTIMATE TERTIARY PRODUCTIVITY.

Q.6 (A) CLASSIFY PLANKTON IN BRIEF.

(B) FIXATION AND PRESERVATION OF PLANKTON,

Q.7 WRITE IMPORTANCE OF ALGAE AS A SOURCE OF NUTRIENTS.
Instructions:

(1) Name of the Examination

Subject name

Sub. Code

(2) Attempt all questions.
(3) Marks for each question is given on right side in bracket.

Q-1 Answer any four of the following:

a) If $X_i \sim U(-\pi/2, \pi/2)$ and $Y = \lambda \tan x + \theta$, $\lambda > 0$, then obtain the distribution of $Y$.

b) Define Laplace distribution and derive its mean.

c) Define order statistics and also write its applications.

d) If $X \sim \text{PSD}$ and its mean $\mu_i = \frac{\theta}{(1-\theta)}$, then find its p.m.f.

e) Define Poisson Pascal distribution, and derive its mean and variance.

Q-2 Answer any two of the following:

a) Define Cauchy distribution and show that its mean does not exist. Also find its quartile.

b) Derive non-central t distribution.

c) If mean and variance of a power series distribution are specified then the p.m.f. of it can also be determined uniquely.

Q-3 Answer any two of the following:

a) Derive truncated normal distribution from right side.

b) Define Neyman type-A distribution. Obtain it mean, variance and probability generating function.

c) If $X \sim \text{PSD}$ having mean np, and variance npq, then derive the probability mass function of X.

Q-4 Answer any two of the following:

a) Define mixture of two distributions, and also derive it's mean and variance.

b) If random variable $P \sim \beta(\alpha, \beta)$ and for $P=p$, the random variable $X \sim \text{b(n,p)}$, then find unconditional distribution of $X$. Also find its mean and variance.

c) Derive quartiles of Laplace distribution.

Q-5 Write notes on any two of the following:

a) Lognormal distribution

b) Non-central $\chi^2$-distribution

c) Order Statistics

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1
M.Sc.(Statistics) Semester I Examination November - 2016
Subject: Statistics

Paper 105: Computer Programming Language "C"

[Total Marks: 70]

Time: 3 Hours

Instructions:

(1) Name of the Examination

M.Sc.(Statistics) Semester – I Examination, Nov. - 2016

Subject name

Statistics: Paper 105: Computer Programming Languages "C"

Sub. Code

(2) Attempt all questions.

(3) Each question carries 14 marks.

Q:1 Answer the following questions.(Any 3)

1. Write a note on C Data types.
2. Write a note on relational operators in C.
3. Write a note on “C” Tokens.
4. Write a note on ternary operator in C.

Q:2 Answer the following questions in brief.(Any 3)

1. Write a note on type casting.
2. Write a note on for loop structures in C.
3. Write a note on Conditional operator.
4. Write the differences between while loop and do...while loop with illustration.

Q:3 Answer the following questions in brief.(Any 3)

1. Develop a program for calculating sum of two number using functions.
2. Develop a program to convert given no. of days into years, months and days.
3. Develop a program for the pattern given below.

If $n=4$ then output = 1

\[
\begin{array}{cccc}
2 & 1 \\
3 & 2 & 1 \\
4 & 3 & 2 & 1 \\
\end{array}
\]

Q:4 Answer the following questions. (Any 3)

1. Write a note on function.
2. Write a note on array.
3. Write a note on structure.
4. Discuss the uses of getch(), getch() and getchar() function.

Q:5(A) Answer whether the following statements are true or false.

1. "t" character is used for "t" type variables.
2. getch() is used only to stop the program.
3. We can perform addition of int and long data in a single statement.
4. break statement will terminate program.

Q:5(B) Answer the following questions in short.

1. int Array[2][3]; “For the above declaration statement show memory allocation in C along with its initial values.”
2. int s; s = 3*466*1-8/5; “What will be the value of s?”
3. How to get ASCII value of any character?
4. printf(""Good morning !"" today is a very beautiful day."); “Give the output”.
5. Give one example of an infinite loop in C.
Veer Narmada South Gujarat University, Surat  
M Sc (Tech) Instrumentation Sem-1 Examination Oct/Nov 2016  
Instrumentation Paper : INS 12 (General Electronics)

Instructions:  
1) Figures to right indicate full marks.  
2) Abbreviations have their usual meanings.

Q. 1  Answer the following.  
A) State the characteristics of digital ICs.  
B) Explain positive and negative logic.  
C) Add $1011011101_2 + 1110101011_2$ and $11101011_2 + 1101110101_2$  
D) State characteristics of an Ideal Op Amp.  
E) Define CMRR.  
F) Convert $9A56_{16}$ and $AB8D_{16}$ to Decimal and Binary equivalent number.  
G) Define asynchronous counter.

Q. 2  Attempt Any TWO  
A) Discuss RC Coupled amplifier and derive necessary expression for voltage gain in mid-frequency range.  
B) Explain the different type of Breakdown and hence discuss principle and working of Zener Diode.  
C) Discuss C-B Push-pull Amplifier and explain cross over distortion.  
D) Design and explain the 4-bit asynchronous counter.

Q. 3  Attempt Any TWO  
A) How will you use Op Amp as a Adder, Subtractor and Averaging Amplifier.  
B) Using K-map design digital circuit for the following  
$f = \Sigma m(0,1,2,4,6,7,8,9,11,13) + d(3,15)$  
C) Explain Analog to digital converter.  
D) Using K-map design and implement, using suitable hardware, Gray to Binary decoder.

Q. 4  Attempt Any TWO  
A) write short notes on following:  
(a) CMRR  
(b) Transient Response.  
(c) Slew rate  
B) Discuss the 4-1 multiplexer and 1-4 demultiplexer.  
C) Explain the working of a JK flip-flop.  
D) Discuss the characteristics of an Ideal Op Amp? And explain the concept of virtual ground and summing point.

Q. 5  Attempt Any TWO  
A) Discuss Op Amp as a Integrator and as a comparator  
B) Explain the working of a RS Flip-flop.  
C) Using K-map design and implement, using suitable hardware, Binary to Gray encoder.  
D) Discuss C-B Push-pull Amplifier and explain cross over distortion.
M.Sc. (Tech.) (In Instrumentation) (Sem. I)
Examination Nov / Dec - 2016
Paper: INS-13 Measurement Technique

[Time: 3 Hours] [Total Marks: 70]

Instructions:

Fill up strictly the details of signs on your answer book.

Name of the Examination:
M.Sc. (TECH.) (IN INSTRUMENTATION) (SEM. I)

Name of the Subject:
INS-13 Measurement Techniques

Subject Code No.: NIL

Section No. (1, 2,...): NIL

Students' Signature

1. Answer Any four [14]
   1. What is transducer? Discuss factor influencing in choice of transducer.
   2. Explain classification of transducer.
   4. Explain Gaussian error distribution with example.
   5. What is standard? Explain classification of it.

2. Answer Any Three [14]
   1. Explain displacement measurement with block diagram.
   2. Explain Hall Effect transducer with necessary diagram.
   3. Explain working principle and construction of LVDT.
   4. Explain concept of impedance matching in brief.

3. Answer Any Three [14]
   1. Explain signal to noise ratio with necessary equation.
   2. Derive the equation of gauge factor for strain gauge.
   3. Explain photovoltaic cell in detail.
   4. Explain Gaussian probability curve.

4. Answer Any Three [14]
   1. Explain pizzo electric effect.
   2. Explain high pressure measurement using capacitive transducer.
   3. Explain the concept of histogram and variance.
   4. Explain the concept of white noise and Johnson noise.

5. Answer Any Two [14]
   1. Explain in detail generalize block diagram of measurement system.
   2. A round steel bar, 0.02 m in diameter and 0.40 m in length, is subjected to a tensile force of 33,000 kg, where $E=2 \times 1010$ kg/m2. Calculate the elongation, L, in meters.
   3. Explain chi-square goodness of fit with example.
M.Sc. (Applied Statistics)
Semester: I Examination, Oct./Nov., 2016
Paper: MAS-103
Sub.: Sampling Techniques

Time: 3 Hours] [Total Marks: 70

Instructions:

(1) Attempt all questions.
(2) Each question carries 14 marks.
(3) Answer any two out of the three bits given in each question.
(4) Draw the figure and give example wherever necessary.

Q-1 (i) Explain the following terms with examples

   a. Population, parameter and Sample
   b. Sampling Unit and Sampled unit
   c. Probabilistic and Non-probabilistic sampling.

(ii) Discuss main steps of a sample survey.
(iii) Write a detailed note on determination of sample size.

Q-2 (i) Discuss applications of different sampling schemes, giving practical examples.

(ii) A sample of size n is selected by SRSWOR from a population of size N, to estimate the population total. Suggest an unbiased estimator. Derive expressions of its variance and an unbiased estimator of variance.

(iii) Explain stratified sampling. What is the problem of allocation? Discuss proportional and Neyman’s allocations in detail.
Q-3(i) Define systematic sampling. Explain the difference between linear and circular systematic sampling methods. Discuss advantages of the circular systematic sampling over the linear systematic sampling.

(ii) Why is it needed to obtain variance of systematic mean in terms of intraclass correlation coefficient? Hence draw the condition under which it is more efficient than mean per unit estimator based on SRSWOR.

(iii) Explain the data collection procedure for a demographic survey.

Q-4(i) Explain cluster sampling. Following usual notations for equal sized clusters show that cluster mean is an unbiased estimator of the population mean and its variation is

\[ \nu(\bar{y}_c) = \frac{N - n}{Nn} \frac{NM - 1}{M^2(N - 1)} S^2 \left( 1 + \frac{(M - 1)\rho_u}{M - 1} \right) \]

where \( \rho_u \) is intra-class correlation coefficient.

(ii) Write a detailed note on two stage sampling.

(iii) Explain the rationale behind the use of auxiliary variable X, positively correlated to the character under study. Construct the ratio estimator for population total based on a SRSWOR sample. Obtain its bias and variance to the first order of approximation.

Q-5(i) Explain the data collection procedure to conduct a survey of agricultural area.

(ii) Define regression estimator for finite population mean, when b is estimated on the basis of a simple random sample drawn without replacement. Compare its efficiency with that of ratio estimator, after obtaining required expressions.

(iii) What is the rationale behind the use of product method of estimation? Obtain MSE to the first order of approximation for the product estimator defined to estimate the population mean. Derive the condition under which it will be better than the mean per unit estimator.
(2) Attempt all questions.
(3) Each question carries 14 marks.
(4) Answer ANY TWO bits from each Question.
(5) Use of Scientific calculator is permitted.

Q:1 (a) Define Quality and Statistical Quality Control. Also explain the statistical basis for constructing Mean chart. Also explain its purpose.
(b) When should the control charts for defectives and number of defects be constructed? Discuss c-chart and u – chart in detail.
(c) Write a detailed note on Run Theory exists in SQC.

Q:2 (a) Trace the various ways TQM has been defined and give its comprehensive definition.
(b) Write in detail Leverage of Productivity.
(c) Differentiate between service quality and product quality in detail.

Q:3 (a) Write a detailed note on sequential sampling plan.
(b) Explain work procedure of double sampling plan for attribute. Also derive its probability of acceptance.
(c) Write the procedure for single sampling plan for variables. Also discuss the unknown sigma single sampling plan with one sided specification.

Q:4 (a) Define reliability and explain its need. Discuss general formulation of reliability.
(b) Derive the hazard rate and reliability function. Discuss Gamma distribution as a life time distribution of a component.
(c) Let t be the lifetime of a product following normal distribution. Derive an expression for MLE of R(t), when μ and σ² are unknown.

Q:5 Write detailed note on any TWO of the following:
(1) Types of Accelerated tests.
(2) CUSUM chart.
(3) Single sampling plan for attributes.
Subject: Applied Statistics
Paper MAS 105: Introduction to MS Office & Internet

Time: 3 Hours
[Total Marks: 70]

Instructions:

(1) Name of the Examination

Subject name
Paper MAS 105: Introduction to MS Office & Internet

Sub. Code

(2) Attempt all questions.
(3) Marks for each question is given on right side in bracket

Q.1 Answer following questions: (Any FOUR)

   a) Explain Auto-format in MS Excel with example.
   b) Write-down the usages of following shortcuts:
      i) Ctrl+x,  ii) ctrl+k  iii) ctrl+:  iv) ctrl+g  v) F1
      vi) ctrl+pgup  vii) ctrl+a  viii) ctrl+p  ix) ctrl+i  x) ctrl+9
   c) Explain Auto-filter in MS Excel with example.
   d) Explain Goal Seek in MS Excel with example.

Q.2 Do as directed.
   a) Explain any FIVE functions of MS-Excel from followings.
      i) POISSON  ii) EXP  iii) SUMPRODUCT  iv) COMBIN  v) CHIINV
      vi) SUMSQ
   b) Explain any FOUR HTML tags from followings.
      i) <STRONG>  ii) <1>  iii) <A>  iv) <SUB>
      v) <HR>

Q.3 Answer following questions: (Any THREE)
   a) What is unordered list in HTML? How we can change bullets of the list?
      Justify your answer with example. Also explain definition list with example.
   b) Explain usage of table tag in HTML document.
   c) How we can change font settings on HTML document? Explain various
effects with example.
   d) Explain HTML image tag and its all attributes with example.

Q.4 Write a note on following in detail: (Any THREE)
   a) Slide layout in MS Power Point.
   b) Slide transition in MS Power Point.
   c) Mail merge in MS Word.
   d) Macro in MS Word.

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Date: 2016
Marks: 70

Instructions: 1. Attempt any five questions.
2. All questions carry equal marks.

Q.1 Write importance of mineral and vitamins in fishes.
Q.2 What is GaSI? Discuss it in detail.
Q.3 Define term probiotics or antibiotics and give detail on it.
Q.4 Discuss about binders and write its importance in aquaculture.
Q.5 Write detail notes on Principles of nutrition.
Q.6 What is proximate composition? Write notes on proximate composition of fish.
Q.7 Give detail notes on types of aqua feeds.
Instructions: 1. All questions carry equal marks.
   2. Attempt Any FIVE questions.

1. What is toxicity? Describe in detail about the factors affecting toxicity. 14
2. What is sewage? Explain the sewage treatment methods. 14
3. (A) Industrial discharges 07
   (B) Sources f pollutants 07
4. Write on bioassay test, its application and procedure for assessing the static bioassay. 14
5. Short notes
   (A) Biological concern of effluent 07
   (B) Effects of oil pollution 07
6. Describe in detail about acid rain and its effects on aquatic system. 14
7. Write on principle, concept and test procedure of toxicity evaluation. 14
VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Mention below given details in Answer Book

- Name of the Examination:
  M. Sc. (AQUATIC BIOLOGY) SEMESTER – II April 2016

- Name of the Subject:
  AQB 203 : FISHERIES LEGISLATION

- Subject Code No.:
  1 3 6 0

Instructions: 1. All questions carry equal marks.
2. Attempt Any FIVE questions.

1. What do you understand about fisheries legislation? Describe its role in fisheries management. 14

2. What are the inland fisheries governance and issue of property rights in inland water bodies. 14

3. Give a brief account on leasing policies of inland water bodies. Describe its role in fisheries development. 14

4. What is aquaculture authority act? Describe its role in aquaculture management practices in Gujarat. 14

5. Short notes.
   (a) Constitution of sea 07
   (b) Environmental protection Act. 07

6. (a) CPCB 07
   (b) Biodiversity act 07

6. What is EEZ? Explain its role in nation’s economy. 14
Date: 2016
Marks: 70

Instructions: 1. Attempt any five questions.
2. All questions carry equal marks.

Q.1. Discuss a fish as a cytogenetic model.
Q.2. Give notes on sex reversion and sex control in fish and its technique.
Q.3. Give detail on application of bioinformatics in various field of Aquatic biology.
Q.4. Write short notes on
   1. Androgenesis    2. Gynogenesis
Q.5. Write types of PCR and explain the PCR techniques applied in the field of Aquatic Biology.
Q.7. Define DNA and RNA. Give detail notes on mutations and structure of RNA.
Q.1 Answer the following (Any two)
1. Explain instrumental set-up of FES and discuss each of its component briefly.
2. Write application of Atomic Absorption Spectroscopy.
   Give detail account about instrumental setup of AAS.
3. Write detailed note on Hollow Cathode Lamp used in AAS.

Q.2 Answer the following (Any two)
1. Explain NDIR technique for determination of CO with principle, working mechanism and instrument set up with diagram.
2. What is the necessity of monochromatic radiation?
   Describe working of any one dispersing Device in detail.
3. Explain Calibration Curve method for Spectrophotometer by giving suitable example

Q.3 Answer the following (Any two)
1. Write down names of Detector used in GC.
   Give an account of an Electron Capture Detector used for GC.
2. Write down criteria in selecting Carrier Gas for GC and give examples.
   Explain Sample Injection System used in GC.
3. Explain terms: Reverse and Normal Phase HPLC, Isocratic and Gradient Elution.

Q.4 Write Short notes (any two)
1. Discuss principle of IEC and discuss Detector for IEC.
2. Explain the criteria for selecting a liquid stationary phase used in GLC.
   Name two polar and two non-polar liquid stationary phase used in GLC.
4. Draw layout and describe HPLC with its Principle and working.
   Why it is superior to GC?
Q.1 Answer the following (Any two)  
1. Discuss causes of biodiversity loss.  
2. Give detail account on role of nitrogen fixing bacteria in soil fertility.  
3. Explain principle mechanisms of biodegradation.

Q.2 Answer the following (Any two)  
1. Explain types of biopolymers with their sources.  
2. Give the effect of toxicants on biological organisms.  
3. Discuss in detail role of WHO in public health project development.

Q.3 Answer the following (Any two)  
1. Give detail account on merits and demerits of biopesticides.  
2. Explain method of bioleaching of copper.  
3. Discuss the Toxins of *Bacillus thuringiensis*.

Q.4 Write Short notes (Any two)  
1. Significance of dose and threshold limit value in toxicological study.  
2. Application of biosurfactant.  
3. Occupational health: risk and management

00000
Q.1. Answer any two of the Following:  
   a) Explain the principle, working and applications of Liquid Scintillation counter 
   b) Structure of Atom as given by J J Thomson. 
   c) Explain the Penetration capacity and the type of damage caused by alpha, beta and 
      gamma rays in tissue ?

Q.2. Answer any two of the Following:  
   a) An atom has 2K, 8L, 5m e'. Write electronic configuration and indicate 
      i. no.of sub shells 
      ii. no of orbitals 
      iii. no.of unpaired orbitals 
      iv. no.of electrons having l=1 
   b) Give the block diagram of UV-Vis double beam spectrophotometer and add a 
      note on the function of each component. 
   c) Explain the principle and application of ion exchange chromatography

Q.3. Answer any two of the Following:  
   a) Explain the principle of separation in HPLC and its application in biological 
      science 
   b) Give a neat labelled diagram of electro magnetic spectrum 
   c) Write electronic configurations of H,C,O,P & S and its biological importance?

Q.4. Write short notes on any three:  
   a) Autoradiography 
   b) LASERS  
   c) Chromatography Performance parameters 
   d) Half life of radioactive elements and its importance
# VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
## DEPARTMENT OF BIOSCIENCES

**Mention below given details in Answer Book**

Name of Examination: M.Sc. Biosciences (II Semester) April 2016  
Name of the Subject: Bios 204 –Biostatistics and Bioinformatics  
Subject Code No.: 1375  
Section No. (I,II) nil  
Seat No:  
Student’s Signature:  

**Instructions:**
1. Make neat diagrams where ever necessary  
2. Marks are indicate on the right hand side parentheses  

Total Marks: 70  
Time: 3 hrs.

## Q-1
**Attempt any two of the following:**  
(a) Define Bio statistics and write its aim and application.  
(b) Explain measure of central tendency in detailed  
(c) Discuss Binomial distribution and its characteristics.  

## Q-2
**Attempt any two of the following:**  
(a) Discuss chi square test for 2x2 contingency table.  
(b) Explain Karl Pearson’s method of measuring correlation.  
(c) Find correlation of coefficient between the height of fathers and sons from the following data.  

<table>
<thead>
<tr>
<th>Height of fathers</th>
<th>65</th>
<th>66</th>
<th>67</th>
<th>68</th>
<th>69</th>
<th>70</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of sons</td>
<td>67</td>
<td>68</td>
<td>66</td>
<td>69</td>
<td>72</td>
<td>72</td>
<td>69</td>
</tr>
</tbody>
</table>

## Q-3
**Attempt any two of the following:**  
(a) Give a brief account of various bioinformatic programs and tools  
(b) Explain the metabolic pathway databases & Protein structure databases  
(c) Write a detailed note on DNA microarray.  

## Q-4
**Write short notes on any two of the following:**  
(a) Molecular medicine  
(b) Personalized medicine  
(c) Bioinformatics in Forensic analysis
M.Sc. (Statistics) Semester-II Examination, April/May – 2016  
Subject: Statistics  
Paper : 205: Statistical Quality Control and Reliability  

Time: 3 Hours  
Total Marks: 70

Instructions:

(1) Name of the Examination
M.Sc. (Statistics) Semester-II, April/May - 2016

Subject name
205- Statistical Quality Control and Reliability

Sub. Code

Seat No:

Signature of student

(2) Attempt all questions.
(3) Each question carries 14 marks.
(4) Use of calculators and statistical tables are permitted.

Q:1 Answer any TWO of the following: [14]
(a) Write concept of a process for statistical Quality control. Also set control limits for mean chart and S-chart.
(b) When you will use charts for defective and charts for defect. Explain the statistical basis for constructing np chart and C chart.
(c) Write detailed note on CUSUM chart.

Q:2 Answer any TWO of the following: [14]
(a) Explain the concept of total quality management and its benefit.
(b) Discuss the role of strategic management of Quality in an organization.
(c) Write detailed note on quality cost.

Q:3 Answer any TWO of the following: [14]
(a) Define AQL and LTPD. Explain operating characteristic (OC) curve for single sampling plan for attributes.
(b) Explain double sampling plan for attributes in detail.
(c) Discuss the procedure for single sampling plan by variables. Also discuss the unknown sigma single sampling plan with one-sided specification.

Q:4 Answer any TWO of the following: [14]
(a) Define reliability and survival function. Also explain reliability of systems.
(b) Let t be lifetime of a product which follows Normal distribution. Derive an expression for MLE of R(t) when both μ and σ² are unknown.
(c) Obtain an expression for probability density function of lifetime as a function of hazard function. Hence show that if hazard function is constant then the lifetime model is exponential.

Q:5 Answer short notes on any TWO of the following: [14]
(1) Censored sampling.  (2) Run theory.
(3) Service Quality vs. product quality.  (4) Sequential sampling plan.

*********************************************************************************************
1. Describe (any TWO):
   a) Describe various methods & principles of Compatibility test.
   b) Describe tissue-processing & various type of microtomes used for paraffin-sectioning.
   c) Mention the main contents of PAP stains and describe the method of its preparation.
      Describe the staining procedure for cytological smears.

2. Write notes on (any THREE):
   a) Preservation & Utilization of Blood components.
   b) Rh blood group with Du testing
   c) Describe the procedure of FNAC. Mention its advantages.
   d) Fixatives used in histopathology.

3. Write short notes on (any FOUR):
   a) Hemolytic disease of Newborn
   b) Procedure of antigen retrieval for immunohistochemistry.
   c) Antibody titration & its significance
   d) Mounting medium for museum specimens.
   e) Cytocentrifuge & its applications.

4. Answer in brief (any NINE):
   a) Indications of Direct Coombs test
   b) Uses of Exfoliative cytology
   c) Clearing agents
   d) Febrile reaction
   e) SAGM
   f) Mordant
   g) Two applications of Microwave in histopathology.
   h) Special stains with their significance in histopathological diagnosis.
   i) Fixation of cytosmears
   j) Rapid H&E staining
VNSGU, SURAT.
M. Sc. MLT: Semester-II Examination
May-June-2015

Paper-II: MLT: 204: Enzymes, Hormones, Vitamins & Nutrition
Date: 25-06-2015 Total Marks: 70 Time: 3 Hours

Instructions:
1. Answers should be legible and to the point.
2. Use diagrams and flow-charts wherever necessary.
3. Figures to the extreme indicate full marks.
4. Write answer to each question on a new page.

Que. 1: Answer any three \( (3 \times 6 = 18) \)
   a. Significance and applications of enzymes in medical practice.
   b. Sources, chemistry, functions and deficiency manifestations of vitamin C.
   c. Describe different modes of action of hormones.
   d. Obesity.

Que. 2: Answer any three \( (3 \times 6 = 18) \)
   a. Metabolic functions of vitamins folic acid and B12.
   b. Wald's visual cycle.
   c. Balanced diet.
   d. Isoenzymes.

Que. 3: Answer any three \( (3 \times 6 = 18) \)
   a. Sources, chemistry, functions and deficiency manifestations of thiamin.
   b. Isoenzymes.
   c. Functions and deficiency manifestations of vitamin E.
   d. Kwashiorkor and marasmus.

Que. 4: Answer any four \( (4 \times 4 = 16) \)
   a. Metabolic role of pyridoxine.
   b. Biological value and mutual supplementation of proteins.
   c. Describe any four factors affecting enzyme activity.
   d. Classify hormones with examples.
   e. Allosteric enzymes with examples.
VNSGU, SURAT.
M. Sc. MLT: Semester-II Examination
May-June-2015
Paper-II: MLT: 204: Enzymes, Hormones, Vitamins & Nutrition
Date: 25 -06 -2015
Total Marks: 70
Time: 3 Hours

Instructions:
1. Answers should be legible and to the point.
2. Use diagrams and flow-charts wherever necessary.
3. Figures to the extreme indicate full marks.
4. Write answer to each question on a new page.

Que. 1: Answer any three \((3 \times 6 = 18)\)
   a. Functions and deficiency manifestations of vitamin D.
   b. Factors affecting enzyme activity.
   c. Biological value, chemical score and mutual supplementation of proteins.
   d. Mechanism of action steroid hormones.

Que. 2: Answer any three \((3 \times 6 = 18)\)
   a. Balanced diet.
   b. Functions and deficiency manifestations of Vitamin B12.
   c. Functions, sources and deficiency manifestations of ascorbic acid.
   d. Explain enzyme inhibition with examples.

Que. 3: Answer any three \((3 \times 6 = 18)\)
   a. BMR: definition, factors affecting and applications.
   b. Mechanism of action of peptide hormones.
   c. Clinical significance of isoenzymes.
   d. Deficiency manifestations and sources of Vitamin A.

Que. 4: Answer any four \((4 \times 4 = 16)\)
   a. Pellagra
   b. Kwashiorkor
   c. Clinical significance of enzymes.
   d. Specific dynamic action of food.
   e. Riboflavin
Instructions:

(1) Name of the Examination

Subject name
MAS: 202: Statistical Inference-II

Sub. Code

(2) Attempt all questions.
(3) Each question carries 14 marks.
(4) Answer any two out of the three bits given in each question.

Q-1 (a) Define the following terms:
   i. One sided hypothesis
   ii. UMPU test
   iii. Type II error
   iv. Randomised test
   v. p-value
   vi. Size of the test
   vii. Run test

(b) Given any data from a population with a known distribution, how will you decide the test?

(c) Let \( f(x, \theta) = \frac{1}{\theta} \), \( 0 < x < \theta \), for testing \( H_0: \theta = 1 \) against \( H_1: \theta = 2 \), obtain Type-I and Type-II error when the critical region is \( X \geq 0.5 \). Also derive the power function of the test.

Q-2 (a) Explain the concept of small sample. Discuss application of t as a test of significance of population correlation coefficient and test of significance of population regression coefficient.

(b) Discuss any two applications of chi-square in testing of hypotheses.

(c) Let \( X \sim N(\theta, \sigma^2) \), \( \sigma \) is known and we want to test the hypothesis \( H_0: \theta = \theta_0 \) against \( H_1: \theta = \theta_1 \) (\( \theta_0 < \theta_1 \)). On the basis of random sample \( x_1, x_2, \ldots, x_n \) from a given population, derive the simple likelihood ratio test.

Q-3 (a) Discuss the concept of SPRT. Also explain its properties.

(b) Derive SPRT for testing \( H_0: \theta = \theta_0 \) Vs \( H_1: \theta = \theta_1 \) (\( \theta_0 < \theta_1 \)) on the basis of a
sequential observations $x_1, x_2, \ldots, x_n$ from $X \sim \text{Poisson}(\theta)$. Also derive its OC and ASN functions.

(c) Write down the difference between Parametric testing and Nonparametric Testing.

Q-4 (a) In detail explain Median tests.
(b) Explain the applications of Kolmogorov-Smirnov Test.
(c) Name the Nonparametric tests to test whether two populations are identically distributed or not. Explain anyone of them in detail.

Q-5 Write detailed notes on any two of the following:
(a) Wilcoxon Test
(b) Test of significance of two normal population variances.
(c) Large sample tests for mean.
M. Sc. (Applied Statistics)  
Semester: II Examination, April-2016  
Paper: MAS-203  
Sub.: Multivariate Analysis  

Time: 3 Hours]  
[Total Marks: 70  

Instructions:  

1.  

Name of the Examination  
Subject name:  
MAS: 203: Multivariate Analysis  
Sub. Code  

2. Attempt all questions.  
3. Each question carries 14 marks.  
4. Answer any two out of the three bits given in each question.  
5. Draw the figure and give example wherever necessary.  

1. (a) Discuss real life applications of multivariate analysis.  
   (b) State the p. d. f. of multivariate distribution along with its important properties.  
   (c) Let $X \sim N_3(\mu, \Sigma)$, $\mu' = (-5, 12, 7)$ and $\Sigma = \begin{pmatrix} 16 & -0.4 & -0.2 \\ -0.4 & 24 & 0.3 \\ -0.2 & 0.3 & 45 \end{pmatrix}$. Find the corresponding distributions and probabilities of (i) $P(X_1 + X_3 > 5X_2)$ and (ii) $P((X_3 - 7) > -4)$  

2. (a) Discuss utility of multivariate analysis of variance.  
   (b) For a random sample of 15 observations we have  
   $\bar{x} = (7, 5, 8)$ and $S^{-1} = \frac{1}{5} \begin{pmatrix} 1.04 & -0.2 & 0.4 \\ -0.2 & 2.9 & 0.03 \\ 0.4 & 0.03 & 1.6 \end{pmatrix}$. Carry out the test for  
   $H: \mu' = (2, 2, 2)$ against possible alternatives at 5% level of significance.  
   (c) With necessary assumptions, based on the following data test $H: \mu_1 = \mu_2$ against possible alternatives at 5% level of significance.
3. (a) State the multiple linear regression models with assumptions. Discuss its some real life situations where such model can be apply.
(b) Suppose the following data for $n=15$.

<table>
<thead>
<tr>
<th>Observations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>$X_1^{(1)}$</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>55</td>
<td>62</td>
<td>53</td>
<td>20</td>
</tr>
<tr>
<td>$X_1^{(2)}$</td>
<td>58</td>
<td>62</td>
<td>34</td>
<td>55</td>
<td>75</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>$X_2^{(1)}$</td>
<td>30</td>
<td>33</td>
<td>85</td>
<td>61</td>
<td>55</td>
<td>35</td>
<td>57</td>
</tr>
<tr>
<td>$X_2^{(2)}$</td>
<td>53</td>
<td>49</td>
<td>50</td>
<td>55</td>
<td>70</td>
<td>84</td>
<td>67</td>
</tr>
</tbody>
</table>

\[
(X'X)^{-1} = \begin{bmatrix}
5.68 & 3.72 \\
-0.019 & 0.041 \\
3.72 & -0.015 & 2.64
\end{bmatrix}
\]
and \(\hat{\sigma} = 2.305\)

(i) Estimate $Y_0$ at $X_0 = (1, 14.21, 12.34)$ and (ii) Find 95% confidence interval for $E(Y_0)$ at given $X_0$.

(c) Write a note on factor analysis.

4. (a) Describe the Canonical correlation analysis.
(b) Let $\pi_i \sim N_2(\mu_i, \Sigma)$, $i=1, 2$, where

\[
\mu_1 = \begin{pmatrix} 7 \\ -3 \end{pmatrix}, \quad \mu_2 = \begin{pmatrix} 5 \\ -2 \end{pmatrix} \quad \text{and} \quad \Sigma = \begin{pmatrix} 16 & -1/4 \\ -1/4 & 25 \end{pmatrix}.
\]

Construct Fisher’s linear discriminant function. Classify an observation $X_0 = \begin{pmatrix} 3.1 \\ 0.9 \end{pmatrix}$. Obtain the total probability of misclassification.

(c) Describe the method of extraction of principal component from correlation matrix.

5. Write notes on any two of the following:
(a) Applications of Hotelling $T^2$ statistic.
(b) Wilk’s $\Lambda$ criteria
(c) Correspondence analysis.

*****
VEER NARMAD SOUTH GUJARAT UNIVERSITY

M.SC. AQUATIC BIOLOGY

NAME OF THE PAPER:

AQB-301 - FISH PHYSIOLOGY AND ENDOCRINOLOGY

SUBJECT CODE NO.: 1 4 3 1

MARKS: 70
DATE: 19/11/2016

INSTRUCTIONS: 1. ATTEMPT ANY FIVE QUESTIONS.
2. ALL QUESTIONS CARRY EQUAL MARKS.

Q.1 WRITE NOTES ON DIFFERENT TYPES OF ACCESSORY RESPIRATORY ORGANS IN FISHES.
Q.2. GIVE AN ACCOUNT OF EXCRETORY END PRODUCTS IN FISHES. EXPLAIN UREA CYCLE.
Q.3. WHAT IS DEVELOPMENT? WRITE DIFFERENT EVENTS OF INCUBATION IN FISHES.
Q.4. PANCREAS- AS AN ENDOCRINE GLAND.
Q.5. WRITE STRUCTURE AND FUNCTION OF TELEOST HEART WITH DIAGRAM.
Q.6. EXPLAIN FECUNDITY. ADD NOTES ON LARVA AND METAMORPHOSIS.
Q.7. WRITE THE NOTES ON THE PHEROMONES IN FISHES.
Instructions: 1. All questions carry equal marks.
   2. Attempt Any FIVE questions.
   3. Draw labelled diagram wherever it necessary

1. Define correlation and describe the types and application of correlations. 14

2. What is fisheries economics? Describe the farm economics of 1 ha carp farming. 14

3. Short notes (any two)
   (a) CLIMPROD 07
   (b) Economics of Sea mussel farming (0.25 ha) 07
   (c) Hardwares

4. What is diffusion and innovation? Describe types of adopters. 14

5. Describe the meaning, objectives and characteristics of co-operative societies. 14

6. What is computer software? Explain the types of computers. 14

7. Describe in detail about LFSA. 14
November/December, 2016

Instructions:
1. All questions are compulsory
2. Each questions carry equal marks
3. Draw neat diagram whenever necessary

Q.1 Describe in detail on pond breeding of hybrids

Q.2 Write on
   a. Transportations of trout eggs
   b. Rancidity and autolysis

Q.3 Discuss briefly on extraction of oil from fish body and fish liver

Q.4 Discuss
   a. Methods for preservation with principles of reducing temperature
   b. Drying and smoking

Q.5 What is remote sensing technique? Write on its mechanism and application in Aquatic Biology.

Q.6 Write on:
   a. Hybridization and its significance
   b. Stocking of hybrids in reservoir

Q.7 Write in detail on different methods of closed systems for transportation of live fishes.

******
Instructions: 1. All questions carry equal marks.
   2. Attempt Any FIVE questions.
   3. Draw labelled diagram wherever it necessary

1. Write an account on Prawn hatchery and its management. 14
2. Describe the age and growth of fish and its estimating methods. 14
3. Define induced breeding and describe the PGE and striping method of induce Breeding. 14
4. What if hatchery? Describe in detail about D-85 and circular hatchery 14
5. What are fishing gears? Describe in detail about active fishing gears. 14
6. Short notes
   (a) Materials used for fishing crafts 07
   (b) Maintenance and preservation of fishing gears 07
7. (a) Traditional fishing methods 07
    (b) Crafts of West coast of India 07

Student’s signature
Veer Narmad South Gujarat University
Udhna Magdalla Road, Surat
M.Sc. (Environmental Science)  
Semester - III

Date: ___________  Time: 3 Hrs  Total Marks 70

<table>
<thead>
<tr>
<th>Mention below given details in Answer Book.</th>
<th>Seat No.</th>
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<tbody>
<tr>
<td>Name of Examination: M.Sc. – Environmental Science (Semester III)</td>
<td></td>
</tr>
<tr>
<td>Name of the Subject: Air Pollution and Control Technology</td>
<td></td>
</tr>
<tr>
<td>Paper No: Ens 302</td>
<td>Student’s Signature</td>
</tr>
<tr>
<td>Subject Code No:</td>
<td></td>
</tr>
</tbody>
</table>

Instructions:
1. Figures to the right indicate full marks of the question.
2. Draw neat and labeled diagrams whenever necessary.

---

**Q.1 Answer the following (Any Three)**
1. List the various gaseous pollutants found in air and explain any five.
2. Explain Temperature Inversion.
4. Discuss in detail carbon adsorption technique for control of air pollution.

**Q.2 Answer the following (Any Three)**
1. Explain how locations for sampling sites are selected.
2. Define Smog and explain the effect of Lead on animals.
3. Give detail account on exhaust emission from automobile.
4. Discuss in detail frequency weighting networks of noise pollution.

**Q.3 Answer the following (Any Three)**
1. Define Stokes Law and explain sedimentation and filtration technique for collection of air pollutants.
2. Give detail account on working of cyclones along with its schematic diagram.
3. Elaborate a note on crank case emissions due to automobile air pollution.
4. Discuss in techniques to detect noise-monitoring-sound level meter.

**Q.4 Write Short Notes (Any Two)**
1. Discuss recent developments in the automobile industry to reduce air pollution.
2. Give Permissible standards for noise pollution.
3. Factors that influence atmospheric deterioration to economic important materials.
Veer Narmad South Gujarat University
Udhna Magdalla Road, Surat

M.Sc. (Environmental Science)
Semester - III

Date: __________ Time: 3 Hrs Total Marks 70

Mention below given details in Answer Book. 
Name of Examination:
M.Sc. – Environmental Science (Semester III)
Name of the Subject: Solid & Hazardous Waste Management
Paper No: ENS 301
Subject Code No: __________ Seat No.
Student’s Signature

Instructions:
1. Figures to the right indicate full marks of the question.
2. Draw neat and labeled diagrams whenever necessary.

Q.1 Answer the following (Any Three) 18
1. Discuss categories of solid waste, sources and contents.
2. Describe transfer and transport of municipal solid waste.
3. Explain in detail about sanitary landfill of municipal solid waste.
4. Explain recycle and reuse of solid waste by giving any suitable example.

Q.2 Answer the following (Any Three) 18
1. What is hazardous waste? Discuss classification of hazardous waste.
2. Discuss treatment of hazardous waste by distillation-phase transfer technique.
3. Discuss sources of biomedical waste.
4. Describe energy recovery system for solid waste.

Q.3 Answer the following (Any Three) 18
1. Explain Stationary and Hauled container for transport of MSW.
2. Explain pyrolysis and give its merits and demerits.
3. Discuss segregation of biomedical waste.
4. Write down sources of radioactive pollution.

Q.4 Write Short Notes (Any Two) 16
1. Sources of E-waste.
2. Treatment Storage and Disposal Facility for hazardous waste.
3. Radioactive decay and effects of radioactive waste on living things.
**Veer Narmad South Gujarat University**  
Udhna Magdalla Road, Surat  

**M. Sc.: Environmental Science**  
Semester - **III**

<table>
<thead>
<tr>
<th>Time: 3hrs</th>
<th>Total marks: 70</th>
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<tr>
<td>Mention below given details in answer book</td>
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<td>Section No.: (1, 2)</td>
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<tr>
<td>M.Sc. - Environmental Science (semester III)</td>
<td></td>
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<tr>
<td>Name of the subject: Industrial Waste Water Treatment (ENS-303)</td>
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<td>Student's signature</td>
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</tbody>
</table>

**Instructions:**  
1. Figures to the right indicate full marks of the question  
2. Draw neat and labeled diagrams whenever necessary

<table>
<thead>
<tr>
<th>Q:1</th>
<th>Answer the Following. (Attempt Any Three)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Discuss the waste water characteristics of Dairy industry in Indian condition. Draw the flow chart for effluent treatment plant of Dairy industry.</td>
</tr>
<tr>
<td>2.</td>
<td>Explain importance of neutralization and equalization process in industrial waste water treatment.</td>
</tr>
<tr>
<td>3.</td>
<td>Discuss the various methods for treatment of typical textile industry manufacturing cotton material.</td>
</tr>
<tr>
<td>4.</td>
<td>Explain the treatment option available for Paper and pulp industry.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q:2</th>
<th>Answer the Following. (Attempt Any Three)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Discuss the characteristics and the treatment option available for pharmaceutical waste water.</td>
</tr>
<tr>
<td>2.</td>
<td>Discuss the physico chemical waste water treatment in process industry with example.</td>
</tr>
<tr>
<td>3.</td>
<td>Discuss the concept of Electro dialysis Process with figure.</td>
</tr>
<tr>
<td>4.</td>
<td>Explain the importance of tertiary treatment with examples.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q:3</th>
<th>Answer the Following. (Attempt Any Three)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Which industries require the colour removal treatment? Explain various methods to remove the colour from industrial effluent.</td>
</tr>
<tr>
<td>2.</td>
<td>Discuss various methods for removal of Iron and Manganese from waste water by oxidation process.</td>
</tr>
</tbody>
</table>
| 3. | Write the significance of following characteristics for industrial waste water.  
   1. BOD  2. COD  3. Oil and Grease |
| 4. | Enlist various Nitrogen Removal Process. Explain any one in detail with figure. |

<table>
<thead>
<tr>
<th>Q:4</th>
<th>Write short notes on (Attempt Any Two)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bio filtration techniques</td>
</tr>
<tr>
<td>2.</td>
<td>Lime soda Process</td>
</tr>
<tr>
<td>3.</td>
<td>Sludge treatment</td>
</tr>
</tbody>
</table>
Veer Narmad South Gujarat University
November - 2016
M. Sc. – Biosciences (Animal Science)
SEM-III EXAMINATION

301 (A): Structures and functions in invertebrates and vertebrates.

Time 3 hrs  Total Marks 70

Mention below given details in answer book
Name of the Examination:
M.Sc. – Biosciences Semester -III
Name of the subject: 301 (A): Structures and functions in invertebrates and vertebrates.

<table>
<thead>
<tr>
<th>Subject Code No.</th>
<th>1</th>
<th>4</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
</table>

Instructions: All the questions are compulsory.
Digits to right are indicating marks of the question.
Draw labelled diagrams if necessary.

Q. 1 Write detailed notes on: (ANY TWO) [18]
   a) What is arthropodization? How it helps in movement?
   b) Origin, significance and related theories of coelom.
   c) Movement in Echinoderms and molluscs.

Q. 2 Write notes on: (ANY TWO) [18]
   a) Structural adaptations of aquatic animals with reference to swim.
   b) Movement in polychaetes and platyhelminthes.
   c) How animals run?

Q. 3 Give detailed account on: (ANY TWO) [18]
   a) Comparison of reproductive system of amniotes.
   b) Mollusc larvae.
   c) Asexual reproduction in invertebrates.

Q. 4 Attempt ANY TWO of the following: [16]
   a) Evolutionary significance of larval forms.
   b) Explain filter feeding in Sabella.
   c) Feeding and digestion in echinodermata.
Veer Narmad South Gujarat University  
November - 2016  
M. Sc. – Biosciences (Animal Science)  
SEM-III EXAMINATION  

302 (A): Comparative functional anatomy.  

Time 3 hrs  
Total Marks 70  

<table>
<thead>
<tr>
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<th>Seat No.:</th>
</tr>
</thead>
<tbody>
<tr>
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<td>M.Sc. – Biosciences Semester -III</td>
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<tr>
<td>Name of the subject: 302 (A): Comparative functional anatomy.</td>
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<tr>
<td>Subject Code No.: 1</td>
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Instructions:  
All the questions are compulsory.  
Digits to right are indicating marks of the question.  
Draw labeled diagrams if necessary.

Q. 1 Write detailed notes on: (ANY TWO)  
\[18\]

a) Similarities and differences in digestive organs of tetrapods.

b) Evolutionary comparison of heart in tetrapods.

c) Differences between amentotelic, urocotelic and urecotelic animals with reference to kidney.

Q. 2 Write notes on: (ANY TWO)  
\[18\]

a) Mechanism of respiration in amniotes.

b) Comparison of brain in amniotes.

c) Aortic arches in amniotes.

Q. 3 Give detailed account on: (ANY TWO)  
\[18\]

a) Adaptations of marine animals with reference to osmoregulation.

b) Reprocessing of urea in young camel.

c) Osmoregulatory mechanism of animals in freshwater and estuarine environment.

Q. 4 Attempt ANY TWO of the following:  
\[16\]

a) Physiological adaptation of desert squirrel.

b) Wonderful net.

c) How terrestrial animals osmoregulate their body?
Veer Narmad South Gujarat University  
November - 2016  
M. Sc. – Biosciences (Animal Science)  
SEM-III EXAMINATION

303 (A): Microscopic anatomy of mammalian tissues and their functions.

Time 3 hrs  
Total Marks 70

Name of the examination:  
M.Sc. – Biosciences Semester -III

Name of the subject: 303 (A) Microscopic anatomy of mammalian tissues and their functions.

Instructions: All the questions are compulsory. Digits to right are indicating marks of the question. Draw labeled diagrams if necessary.

Q. 1 Write detailed notes on: (ANY TWO)  
   a) Covering and Glandular epithelium.  
   b) Structure Bone.  
   c) Intercellular junctions of epithelium.

Q. 2 Write detailed notes on: (ANY TWO)  
   a) Bronchial tree.  
   b) Salivary glands.  
   c) Histological and functional aspects of capillaries.

Q. 3 Give detailed account on: (ANY TWO)  
   a) Mammary gland.  
   b) Nephron and urinary bladder.  
   c) Structure Testis.

Q. 4 Attempt ANY TWO of the following:  
   a) Histochemical analysis of DNA and RNA.  
   b) Common tunics of blood vessels.  
   c) Skin epidermis.
Q. 1  Define Bombay duck fisheries? Write its detailed method and importance in fisheries. [18]

OR

Q. 1  Define Induced breeding. Describe the technique in detail.

Q. 2  Write notes on: (ANY TWO) [18]
   a)  Hatcheries, spawning and rearing.
   b)  Identical characteristics of prawn M. rosenbergii.
   c)  Plankton culture.

Q. 3  Write detailed note on Ghol – dara and its economic importance in Gujarat. [18]

OR

Q. 3  Name commercial fisheries of Gujarat? Write a detailed note on pomfret fisheries.

Q. 4  Attempt ANY TWO of the following: [16]
   a)  General and identical characters of rohu and catla.
   b)  Pearl oyster culture and its importance.
   c)  Food and feeding habits of fishes.
Veer Narmad South Gujarat University, Surat
M. Sc. Bioscience (Microbiology) Semester-III
Examination 2016

[Time: 3 Hours] [Total Marks: 70]

Instructions:
1. Mention below given details in answer book

   Name of the Examination:

   M. Sc. Bioscience (Microbiology) Semester-III
   BIOS-(M)-303 - Immunology
   Subject Code No. 1 5 4

   Seat No.: Student’s signature

2. Figures to the right indicate full marks.
3. Draw neat and labeled diagrams wherever necessary.

Q. 1. Attempt any Two from the following (18)

   A. Discuss the T-cell receptor (TCR).
   B. Write a note on phagocytosed microbes are killed by multiple mechanisms.
   C. What is the difference between the innate and adaptive immune system?

Q. 2. Attempt any Two from the following (18)

   A. Enlist and explain the primary lymphoid organs of the immune system.
   B. Discuss the lymph nodes and the spleen as secondary lymphoid organs.
   C. Elaborate the development and activation of B cells.

Q. 3. Attempt any Two from the following (18)

   A. Explain the antibodies mediated humoral immunity
   B. Discuss the Cell-mediated immunity.
   C. Explain the role various cytokines in immunity.

Q. 4. Answer any One from the following (16)

   A. Discuss the cancer immunotherapy.
   B. Elaborate the types of hypersensitivity.

-xxx-
Veer Narmad South Gujarat University, Surat  
M. Sc. Bioscience (Microbiology) Semester-III  
Examination 2016

[Time: 3 Hours]  
[Total Marks: 70]

Instructions:
1. Mention below given details in answer book
   Name of the Examination:

   M. Sc. Bioscience (Microbiology) Semester-III
   BIOS-(M)- Bioprocess and Bioprocess Engineering Principles
   Subject Code No. 1 4 5 5

   Seat No.: 
   Student's signature

2. Figures to the right indicate full marks.
3. Draw neat and labeled diagrams wherever necessary.

Q. 1. Attempt any Two of the following (18)
   A. Explain the secondary screening of industrial important microorganisms.
   B. Discuss the study of non-cultivable microbes by metagenomics.
   C. Describe the various techniques for strains improvement.

Q. 2. Attempt any Two of the following (18)
   A. Explain the media optimization strategies.
   B. Elaborate the foam control and antifoam agents.
   C. Describes the key carbon sources used as a media component.

Q. 3. Attempt any Two of the following (18)
   A. Explain the various methods for measurement of process variables.
   B. Explain various types of fermentor.
   C. Writes a note on design and construction of fermentor and CSTR.

Q. 4. Attempt any One of the following (16)
   A. Explain the various physical and chemical methods for cell disruption.
   B. Elaborate various chromatographic methods for product purification.

-xxx-
Q.1. Attempt any two of the following:  
   a. Explain the concept of biological monitoring and discuss how algae can be used to monitor pollution in fresh water bodies.  
   b. Describe the morphology of a diatom cell and add a note on reproduction in bacillariophyceae.  
   c. Give an account of range of thallus structure of algae with suitable examples for each type.

Q.2. Attempt any two of the following:  
   a. Give an account of toxins produced by Cyanobacteria and their effects  
   b. Discuss the structure and functions of heterocyst in blue green algae.  
   c. Describe the protoplasmic structures in A Cyanobacterial cell

Q.3. Attempt any two of the following:  
   a. Discuss the salient features of typical red algae with reference to their life cycle  
   b. Discuss the nutrition modes in Chrysophyceae  
   c. Give the general characters and classification of Euglenophyta

Q.4. Write short notes on any three of the following:  
   a. Circadian rhythm in Euglenophyta  
   b. Function of Gas vacuoles and Akinites in Cyanobacteria  
   c. Red tides  
   d. Mico algal biotechnology  
   e. Chlorophyll pigments in algae
Q.1. Attempt any two of the following:  
   a. Explain the types of lichens and reproduction in lichens.  
   b. Describe the ultrastructure of fungal cell  
   c. Explain the phenomenon of heterothallism in fungi

Q.2. Attempt any two of the following:  
   a. Explain the principles and modern trends in the classification of fungi  
   b. Discuss the contribution of Indian Mycologists  
   c. Discuss the differences between higher fungi and lower fungi

Q.3. Attempt any two of the following:  
   a. Discuss the economic importance of fungi with special reference to their secondary metabolites.  
   b. Draw a labeled diagram of infection cycle and describe attachment of pathogen to the host.  
   c. Write a note on biological control of plant diseases

Q.4. Write short notes on any three:  
   a. Enlist the pathogens of banana crop and describe any one in detail  
   b. Write a note on the fungal diseases of rice  
   c. Fungi in symbiosis  
   d. Epidemiology and quarantine
Q. 1  Answer the following (Any 2)  
1). Describe reproduction in Bryophyte  
2). Explain the structure of Sporophyte of Anthoceros  
3). Write short note on salient features of Bryophytes

Q. 2  Answer the following (Any 2)  
   a). Discuss about the apospory, apogamy and parthenogenesis  
   b). Telome theory in pteridophytes  
   c). Write short note on *Zygopteris*

Q. 3  Answer the following (Any 2)  
   a). Explain classification of Pteridophyte  
   b). Write a short note on alternation of generation  
   c). Describe the differences between Pteridophytes and Gymnosperms

Q. 4  Answer the following (Any 2)  
   a). Describe the general characters and economic importance of Gymnosperms  
   b). Write a short note on *Cycadales*  
   c). Write a short note on *Ginkgoales*
Q.1. Attempt any two of the following [18]
   a. Give an account of Principles of Ayurveda and explain the concept of Doshas
   b. Give a detailed account of five airs of Vata or Pitta
   c. Discuss the contribution of Charak and Sushrut to the development of Ayurveda

Q.2. Write short notes on any three of the following [18]
   a. Describe the medicinal use of laghu panchmoola plants of Dashmooala
   b. Give the chemical constituents and important properties of Terminalia arjuna and Abrus precatorius
   c. Contribution of Shri Bapalal Vaidya

Q.3. Explain the medicinal Properties, and phytochemistry of any four of the following [16]
   Gums and resin yielding plants
   a. Sterculia urens
   b. Acacia nilotica
   c. Anogeissus latifolia
   d. Bombax malabarica
   e. Commiphora wightiana
   f. Boswellia serrata

Q.4. Write short Notes on any three of the following [18]
   a. Describe the arganoleptic evaluation of crude drug
   b. Methods of determination of ash value and moisture content
   c. Microbial infestation in medicinal plants
   d. Foaming index
   e. Solvent extraction values
Instructions:

(1) Name of the Examination

Subject name
Statistics: Paper 304: Mathematical Economics
Sub. Code

(2) Attempt all questions.
(3) Each question carries 14 marks.
(4) Use of scientific calculator is permitted.

Q:1 Answer any two of the following: [14]
(a) Define time series with it components. Explain additive and multiplicative model of a time series stating with the assumptions and mention uses of time series analysis.
(b) Derive Harrod-Domar growth model for continuous case.
(c) Explain the concept of Input-Output analysis. Discuss, stating assumptions, the Leontief’s model of inter-industry relations for open sector.

Q:2 Answer any two of the following: [14]
(a) Describe the method of least squares for determining trend with its merits and demerits.
(b) Define AR model for time series. Explain its properties, identification, estimation and forecasting.
(c) Write a detail note on Solow’s growth model.

Q:3 Answer any two of the following: [14]
(a) Describe method of fitting trend by Gompertz curve.
(b) What is seasonal variation in time series? Give example. Explain link relative method of computing the indices of seasonal variation.
(c) Describe Samuelson-Hicks model in detail.

Q:4 Answer any two of the following: [14]
(a) Write a detail note Mahalanobis four sector model.
(b) Explain stationary time series with its properties and types.
(c) Define ARIMA model for time series. Explain its properties, identification, estimation and forecasting.

Q:5 Write detail notes on any two of the following: [14]
(a) Mahalanobis two sector model.
(b) Variate difference method.
(c) Multiplier and Accelerator

************************************************************************************************************
M. Sc. (Semester-III) Examination(Self-Finance)
November – 2016
Environmental Chemistry : Paper-II
(Water pollution and analysis)

Time : 3 hours
Subject Code No.: [ Total marks : 70

Instructions: 1. All questions are compulsory.
2. Figures to the right indicate full marks of the questions.

Q.1. Answer any three from the following 18
(a) Describe polyphosphates and their hydrolysis.
(b) Give a brief account of heavy metals as water pollutants.
(c) Write a note on dissolved gases in water. How does CO₂ affect pH of water?
(d) Give an account on elemental water pollutants.

Q.2. Answer any three from the following 18
(a) What is BOD? Give method for its determination and its significance.
(b) Explain industrial waste water treatment.
(c) Give the examples of coagulants used in the municipal water treatment and explain how they work.
(d) Write a note on water disinfection.

Q.3. Answer any three from the following 18
(a) Explain working of ion selective electrodes and give their applications.
(b) Describe classical methods of water analysis.
(c) Explain the aerobic and anaerobic water treatment.
(d) Explain the principle of gas chromatography. Give its applications for water analysis.

Q.4. Answer any four from the following 16
(a) Write a note on complexation and chelation.
(b) Explain the determination total nitrogen and sulfur.
(c) Give the applications of ion exchange chromatography.
(d) Discuss the importance of gradient elution in HPLC.
(e) Describe water quality parameters.
(c) Obtain the optimum solution for the following transportation problem:

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<th>Warehouses</th>
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<th>W₂</th>
<th>W₃</th>
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<td>100</td>
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</table>

Q-4 Attempt any two of the following.

(a) (I) Define different types of costs associated with inventory control.

(II) A machine shop produces three products 1, 2 and 3 in lots. The shop has a warehouse whose total floor area is 600 sq. meters. The relevant data for the three items are given below:

Product : 1 | 2 | 3
Annual demand (Units/year) : 4000 | 2500 | 8000
Cost/unit (Rs.) : 8 | 12 | 3
Set-up cost per lot (Rs.) : 80 | 180 | 60
Floor area required (sq. meters) : 0.60 | 0.75 | 0.30

The carrying charge on each item is 20% of the average inventory valuation per annum. No stock outs are allowed. Determine the optimal lot size for each item.

(b) Solve the following traveling salesman problem.

To

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</tbody>
</table>

(c) (i) What is sequencing problem. Write the algorithm to solve n jobs two machines sequencing problem.

(ii) Find the sequence that minimizes the total elapsed time required (when passing is not allowed) to complete the following tasks on three machines:

Task : 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
Machine A : 11 | 14 | 13 | 18 | 17 | 17 | 16 | 14 | 12
Machine B : 14 | 16 | 15 | 12 | 11 | 17 | 11 | 16 | 19
Machine C : 23 | 25 | 24 | 21 | 20 | 26 | 20 | 25 | 30

Also find the total elapsed time.

Q-5 Write short notes on any two of the following.

(a) Multi-items deterministic inventory models.
(b) Dynamic programming.
(c) Simulation and their applications.

*******************************************************************************

Subject: Applied Statistics

Paper: MAS-303 : DATABASE MANAGEMENT SYSTEM

Time: 3 Hours

[Total Marks: 70]

Instructions:

(1) Name of the Examination:

M.Sc.(Applied Statistics) Semester –III Examination,
Nov. - 2016

Subject Code:

MAS 303: DATABASE MANAGEMENT SYSTEM

Seat No:

Signature of student

(2) Attempt all questions.
(3) Figures on the right indicate marks for each question.

Q-1[A] State True or False with valid reasons [Any Five]

(1) Primary key allows the NULL value.
(2) The selected query can be applied to multiple tables also.
(3) The references clause indicates the foreign key constraint.
(4) The candidate key can be transferred to primary key.
(5) 2nd normal form removes partial functional dependency.
(6) The count(*) function count total number of records in a table.

Q-1[B] Draw the ER diagram for hospital information system for following entities:

Hospital, Patient, Doctor, Staff, Medicine, Ward, Department

Q-2 Answer the following questions in brief [Any Six]:

(1) What is update table command?
(2) Explain FOR and WHILE loop.
(3) What is transitive functional dependency?
(4) What is the use of Cursor?
(5) How to find average marks of one subject in student table with SQL?
(6) What is the difference between physical and logical data independence?
(7) What is the use of group by clause?

Q-3 Answer the following questions in detail [Any Three]:

(1) Explain architecture of DBMS in detail.
(2) What are the problems of traditional file system? Why DBMS is important? List out any 5 important systems which are using the database.
(3) How to join tables? Explain different types of joins in detail.
(4) Explain 1st and 2nd normal form in detail.

Q-4[A] Consider following table structures

Team_table (team_id, teamname (e.g. KKR, RajasthanRoyal, MI, DD), owner_name)
Player_table (player_id, playname, teamid, country, price)
Match_table (matchid, team_id1, team_id2, match_city, match_date)
Create these tables with necessary constraints like primary key and foreign key. Assume that records are present.

Q-4[B] Based on the information given in Q-4[A], solve the following queries [Any Three]:

(1) Find the player detail playing for ‘KKR’
(2) List the match detail for team ‘MI’
(3) Count total number of players playing for country ‘India’
(4) Find the match detail which are going to be played at ‘Rajkot’ city.

**************************************************************************
Subject: Applied Statistics
Paper 304: Design of Experiments

Time: 3 Hours

Instructions:

(1) Name of the Examination
Subject name
Statistics: Paper MAS 304: Design of Experiments
Sub. Code

Seat No:

Signature of student

(2) Attempt all questions.
(3) Each question carries 14 marks.

Q.1 Attempt any one of the following.
(1) (a) Define the following terms:
(i) Experimental unit
(ii) Yield
(iii) Treatment
(iv) Precision
(v) Symmetric BIBD
(b) Explain the principle of Local control.

(2) Give the complete analysis of L.S.D. when two observations are missing.

Q.2 Attempt any one of the following.
(1) Give complete analysis of R.B.D.
(2) Define C.R.D. Give complete analysis of C.R.D.

Q.3 Attempt any two of the following.
(1) Discuss cross over design.
(2) Define main and interaction effects for $2^3$ factorial designs and give the complete analysis of $2^3$ factorial experiments.
(3) Discuss the difference between
(a) Factorial design and confounding.
(b) Total confounding and partial confounding

Q.4 Attempt any one of the following.
(1) Give complete analysis of BIBD.
(2) Define BIBD and prove that $\lambda (v-1) = r(k-1)$
(3) (a) Construct $2^4$ factorial designs into 4 blocks with 4 plots each in a replicate when the interaction AB and BC are confounded. Also identify any other effect which is confounded in this layout.
(b) In a $2^5$ factorial experiments the key block is given by :
"(I), ad, bc, abcd, abe, ace, cde, and bde". Identify the confounded effect/s.

Q.5 Write short notes on any two of the following:
(1) Derive the formula for S.E. of the difference between any two treatments in R.B.D.
(2) Replication
(3) Split plot design

*****************************************************************************
Q1
Attempt any two
A Derive the Cartesian form of continuity equation
B Derive the non-conservation form of momentum equation
C Classify the quasilinear second order partial differential equation using crammer’s rule

Q2
Attempt any two
A Explain the Froward time central space method for heat Equation. How does it work?
B Classify the PDEs based on Eigen values
\[ (1 - c^2) \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0 \]
\[ \frac{\partial u}{\partial y} - \frac{\partial v}{\partial x} = 0 \]
C Classify the PDE
\[ (\theta_x^2 - c^2)u_{xx} + 2\theta_x\theta_y u_{xy} + (\theta_y^2 - c^2)u_{yy} = 0 \]

Q3
Attempt any two
A Solve the heat equation along with the boundary condition
\[ u(x,0) = \cos \frac{\pi}{2} x \quad -1 \leq x \leq 1 \]
\[ u(0,t) = u(1,t) = 0 \]
using central time central space Euler method for h=1/3 and k=1/36. Integrate up to two time levels.

B Solve the heat conduction equation \[ \frac{du}{dt} = 9 \frac{d^2 u}{dx^2} \] subject to the initial and boundary conditions \[ u(x,0) = 2x^2, \quad 0 \leq x \leq 2, \quad u(0,t) = 0, \quad u(2,t) = 8 \] using the Du –fort Frankel method for h = 1/4 and k=1/36. Integrate up to two time levels.

C Solve \[ u_t = c^2 u_{xx} \] using initial and boundary condition \[ u(x,0) = \sin(\pi x) \]; \[-1 \leq x \leq 1, \quad u(-1,t) = u(1,t) = 0 \] and \[ u(x,0) = 0 \] where \[ \Delta t = 1/3, \Delta t = 3/16 \text{Sec} \] and \[ c = 1 \]. Solve using Euler FTCS explicit method for 3 time levels.
Veer Narmad South Gujarat University, Surat
M.Sc. Mathematics: Semester-IV
Examination April/May - 2016
Subject: Mathematical Modelling
Paper-7002

Time: 3 Hours  

[Total Marks: 70]

Instructions:

(1) Name of the Examination:
   M.Sc. Mathematics Sem. IV, April/May, 2016
Subject name:
Mathematical Modelling
Subject Code: 1573

Seat No:

Signature of student

(2) Attempt all questions.

Q1 Attempt any two
   A Define the term Mathematical modelling.
   B Why mathematical Modelling?
   C Define the modelling process.

Q2 Attempt any two
   A Derive the mathematical model of falling stone with and without air resistance.
   B Derive the mathematical model of the spring mass system with gravity.
   C The tank contains 1000 gal of water in which initially 150 mg of salt is dissolved. Salty water runs in at a rate of 10 gal/min, and each gallon contains 5 mg of dissolved salt. The mixture in the tank is kept uniform by stirring. Salty water runs out at 10 gal/min. Find the amount of salt in the tank at any time t.

Q3 Attempt any two
   A Derive the mathematical model of discrete one - spice.
   B Determine the velocity and density relationship in traffic flow model.
   C Suppose that in Winter the daytime temperature in a certain office building is maintained at 75°F. The heating is shut off at 10 P.M. and turned on again at 6 A.M. On a certain day the temperature inside the building at 2 A.M. was found to be 60°F. The outside temperature was 50°F at 10 P.M. and had dropped to 45°F by 6 A.M. What was the temperature inside the building when the heat was turned on at 6 A.M.?

Q4 Attempt any two
   A Derive the mathematical model of RLC - circuit.
   B Derive the model of simple pendulum.
   C The outflow of water from a cylindrical tank with a hole at the bottom. Find the height of the water in the tank at any time if the tank has diameter 4 m, the hole has diameter 2 cm, and the initial height of the water when the hole is opened is 3.25 m. When will the tank be empty?

Q5 Attempt any two
   A Discuss the Kepler’s law of planetary motions.
   B Find the component of velocity and acceleration vectors along radial and transverse directions.
   C Define the motion under a centrifugal force.
(2) Attempt all questions.

Q:1 Attempt any TWO.
1. Classify the replacement problem. [10]
2. Which are the situation when the replacement of a certain item need to be done?
3. Discuss the limitation of queuing theory.

Q:2 Attempt any TWO.
1. What is “No passing rule” in sequencing problem? [08]
2. Define: (1) Processing time (2) Idle time (3) Processing order (4) Total elapsed time.
3. Write a note on “Application of queuing theory”.

Q:3 Attempt any TWO.
1. A manual stamper currently valued Rs 1,000 is expected to last two years and costs Rs. 4,000 per year to operate. An automatic stamper which can be purchased for Rs. 3,000 will last four years and can be operated at an annual cost of Rs. 3,000. If money carries a rate of interest of 10% per annum, determine which stamper should be purchased. [08]
2. An individual is planning to purchase a car. A new car will cost Rs. 1,20,000. The resale value of the car at the end of the year is 85% of the previous year value. Maintenance and operation costs during the first year are Rs. 20,000 and they increase by 15% every year. The minimum resale value of car can be Rs. 40,000. (i) When should the car be replaced to minimize average annual cost? (ii) If interest of 12% is assumed, when should the car be replaced? [08]
3. The cost of a new machine is Rs. 5000. The maintenance cost of nth year is given by $C_n = 500(n - 1); n = 1,2, \ldots$ Suppose that the discount rate per year is 0.5. After how many year it will be economical to replace a machine by a new one? [08]

Q:4 Attempt any TWO.
1. In the machine shop, 8 different product are being manufactured each requiring time on two machine A and B as given below:
Paper : MAS 403 : Data Mining

Time: 3 Hours
Instructions:

(1) Name of the Examination

Subject name
MAS 403 : Data Mining

Sub. Code

Seat No:

Signature of student

(2) Attempt all questions
(3) Figures to the right indicate marks of each question.
(4) Statistical tables are permitted.

Q:1 Answer any THREE questions in detail:

(a) Assuming 50% minimum support, calculate support and confidence for {Shoes, Shirt}.

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<th>Items Bought</th>
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</thead>
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</tr>
<tr>
<td>2</td>
<td>Shoes, Jacket</td>
</tr>
<tr>
<td>3</td>
<td>Shoes, Shirt</td>
</tr>
<tr>
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(b) Explain components of data mining system.
(c) Explain Decision tree with its advantages and disadvantages.
(d) Explain the pre processing step of data mining in detail.

Q:2 Answer any SIX of the following (in brief):

(a) What is ETL Process?
(b) What is binning process?
(c) What is roll up and drill down process?
(d) How to find association in buying preference of the customer?
(e) Define Discretization.
(f) Who is knowledge worker? What is the role of knowledge worker in OLAP application?
(g) What sequence pattern mining?

Q:3 Answer the following questions in detail (any THREE):

(a) What is Neural Network? Explain Back propagation algorithm.
(b) Explain the applications of data mining.
(c) What is intra-class similarity and inter-class similarity? Explain k-Means clustering algorithm in detail?
(d) Explain different schema in data warehouse multidimensional model.

Q:4 Answer the following questions in brief (any FOUR):

(a) Differentiate OLTP and OLAP.
(b) Explain the architecture of Data warehouse.
(c) How to handle noisy and missing data?
(d) What is Clustering? Explain Binary and Categorical type of data.
(e) Which Types of data can be mined? Explain in detail.

******************************************************************************
Q.1. Answer in Short (Any Four): (08)
   A. Define ‘Saprotroph’ and ‘Parasite’.
   B. Enlist any four fungicides used for plant disease control.
   C. Define: Sclerotia. Give one example of sclerotia forming fungi.
   D. What are the different modes of energy metabolism based on responses to oxygen availability?
   E. Define: Antheridium. Why it is named so?

Q. 2. Answer the following (Any Two): (14)
   A. Describe the life cycle of the Budding Yeast.
   B. Write a detailed note on the fungal parasites of plants.
   C. Write a detailed note on the biological control of fungal growth.

Q. 3. Answer the following (Any Two): (14)
   A. Describe the role of fungi as symbionts of plants.
   B. What are the major physical requirements for the growth of fungi? Elaborate.
   C. Write a note on any two groups of drugs used to control fungal infections in humans.

Q. 4. Write a note on (Any Two): (14)
   A. Morphological features of fungi
   B. Cellular reproduction of fungi
   C. Outline of fungal classification
M. Sc. (Integrated) Biotechnology Course Semester-V Examination
Dairy Technology
(Generic Elective Course)

[Time: 2 Hours] [Total Marks: 50]

Instructions:
1. Mention below given details in answer book
   Name of the Examination:
   M. Sc. Integrated Biotechnology Course Semester-V
   Name of the subject
   Generic Elective Course:
   Dairy Technology
   Subject Code No.
   Seat No.: 

2. Figures to the right indicate full marks.
3. Draw neat and labeled diagrams wherever necessary.

Q:1 Answer the following questions in short. (08)
   1) What is Limulus amoebocyte lysate (LAL) test?
   2) Which milk is marketed as skimmed milk?
   3) Name the most heat stable enzyme found in milk.
   4) What are the advantages of UHT milk?
   5) What is meant by Homolactic fermentation?
   6) Give any one example of synbiotic combination.
   7) Define: Salting of milk products.
   8) What is the role of Calcium Chloride during cheese production?

Q:2 Attempt any two of following. (14)
   1) Explain phosphatase test and Gerber’s test to assess the quality of milk.
   2) What are the methods for the preservation of milk other than drying?
   3) Which sources are responsible for the microbial contamination of milk? Give detailed information.

Q:3 Attempt any two of following. (14)
   1) What is cheese? Explain coagulum formation step involved in cheese production.
   2) Define fermentation. Give an account of acidophilus milk and Bulgarian sour milk.
   3) Write a note on heterolactic fermentation in brief.

Q:4 Attempt any two of following. (14)
   1) Compare and contrast prebiotics and probiotics.
   2) What are the criteria for the selection of probiotic organisms?
   3) What are the health benefits of probiotics claimed by researchers?
Q.1 Answer the following questions (Any Two). (18)

A. What are the criteria used to ascertain purity of enzymes? Describe any one preliminary method of enzyme purification.
B. What are the methods utilized to determine the molecular weight of a purified enzyme?
C. Why extraction of enzyme is important? Describe extraction of membrane-bound enzymes.

Q.2 Answer the following questions (Any Two). (18)

A. What is immobilization? Discuss crosslinking methods for the immobilization of enzymes.
B. How immobilized enzymes are better than soluble enzymes? Discuss applications of immobilized enzymes.
C. What are biosensors? Explain components, working and uses of optical biosensors.

Q.3 Answer the following questions (Any Two). (18)

A. What are the properties of enzymes which make them suitable for industrial use? Discuss applications of enzymes in detergent industry.
B. Describe contribution made by rDNA Technology in present day enzyme technology.
C. Describe the significance of coenzyme-regenerating systems.

Q.4 Write short notes on any two of the following. (16)

A. Applications of lactases
B. Uses of enzymes in fruit juice processing
C. Applications of Proteases in Leather and Wool industries
Veer Narmad South Gujarat University, Surat  
M. Sc. Bioscience Semester-I  
Examination 2016

[Time: 3 Hours] 

Instructions:
1. Mention below given details in answer book
   Name of the Examination: 
   Seat No.: 
   M. Sc. Bioscience Semester-I OLD 
   Bios- 103: General Physiology and Tissue 
   Culture (OLD) 
   Subject Code No. 1 7 7 5 
   Student’s signature
2. Figures to the right indicate full marks.
3. Draw neat and labeled diagrams wherever necessary.

Q.1 Answer the following questions (Any Two). (18)
   A. Discuss the various factors affecting the enzyme activity.
   B. Describe the classification of enzymes.
   C. Explain the physiological action of water soluble vitamins

Q.2 Answer the following questions (Any Two). (18)
   A. Explain the occurrence and biological role of bioluminescence.
   B. Describe the thermoregulation in a biological system.
   C. Explain the physiology of stress.

Q.3 Answer the following questions (Any Two). (18)
   A. Discuss the methods for sterilization of tissue culture explant.
   B. Elaborate the synthetic media for tissue culture.
   C. Discuss the technique for the monolayer culture.

Q.4 Answer the following questions (Any Two). (16)
   A. Discuss in details - Lymphocytes culture.
   B. Write in details Avian sarcoma.
   C. Write in brief cell line maintenance.

---XXX---
Veer Narmad South Gujarat University  
November - 2016  
M. Sc. – Biosciences SEM-I  


Time 3 hrs  
Total Marks 70

Mention below given details in answer book

<table>
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<th>M.Sc. – Biosciences Semester - I</th>
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<td>Name of the subject:</td>
<td><strong>Bios. 101 : Advanced cell biology (OLD).</strong></td>
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Instructions: All the questions are compulsory. Digits to right are indicating marks of the question. Draw labeled diagrams if necessary.

Q. 1 Write detailed notes on: **(ANY TWO)**  
   a) Rotary microtome and ultra microtome.  
   b) Write an explanatory note on tissue processing for light microscopy.  
   c) Ultracentrifugation and density gradient.

Q. 2 Write notes on: **(ANY TWO)**  
   a) A detailed procedure to study rat chromosomes.  
   b) Various banding techniques: An overview.  
   c) Cancer and chromosomes.

Q. 3 Give detailed account on: **(ANY TWO)**  
   a) Similarities and differences between prokaryotes and eukaryotes.  
   b) Structure and functions of Golgi complex.  
   c) Mitochondria.

Q. 4 Attempt **ANY TWO** of the following:  
   a) Hayflick limit.  
   b) Sex chromosomal syndrome.  
   c) Telomeres.
Veer Narmad South Gujarat University
November - 2016
M. Sc. - Biosciences SEM-I

Bios. 102: Genetics and Molecular Biology (OLD).

Time 3 hrs

| Instructions: All the questions are compulsory. Digits to right are indicating marks of the question. Draw labeled diagrams if necessary. |
|---|---|---|---|
| Q1. Discuss Any Two of the following [18] |
| a. Multiple Alleles |
| b. Explain DNA is the genetic material |
| c. Pre-Mendelain history of genetics |
| Q 2. Explain Any Two of the following [18] |
| a. Base excision repair (BER) and mismatch repair (MMR). |
| b. Similarities and differences in structure of DNA and RNA |
| c. Enzymes involved in DNA replication |
| Q 3. Attempt Any Two of the following [18] |
| a. Operon Concept |
| b. Genetic Code |
| c. Role of RNA polymerase in transcription |
| Q 4. Attempt Any Two of the following [16] |
| a. Explain the technique and applications of Southern Blotting. |
| b. Process of PCR. |
| c. Application of genetic engineering. |
Veer Narmad South Gujarat University
November - 2016
M. Sc. – Biosciences SEM-I

Bios. 104 : Environmental Biology (OLD).

Time 3 hrs

Total Marks 70

Mention below given details in answer book

Seat No.:

Name of the Examination:
M.Sc. – Biosciences Semester - I

Name of the subject: Bios. 104 : Environmental Biology (OLD).

Subject Code No.: 1 7 8 0

Student’s signature

Instructions: All the questions are compulsory.
Digits to right are indicating marks of the question.
Draw labeled diagrams if necessary.

Q.1 Answer ANY TWO of the following [18]

a) What is emergent property principle? Explain its relevance in ecology with suitable examples
b) Discuss the basic themes of Ecology

c) Describe the ecosystem from functional point citing suitable examples

Q.2 Answer ANY TWO of the following [18]

a) State and explain the Shelford’s law of tolerance and the associated principles with suitable examples.

b) Enlist the different types of interaction between species and elaborate on the negative interactions.

c) Explain the nitrogen cycle in the nature with the emphasis on the role of microorganisms in controlling the nitrogen cycle.

Q.3 Answer ANY TWO of the following [18]

a) Give an account of types of growth curves of organisms and add a note on the survival ship curves.

b) Explain the competitive exclusion principle with suitable examples.

c) What are the main causes of Ozone depletion in the stratosphere and what the consequences of this?

Q.4 Write short notes on ANY THREE of the following [16]

a) Applications of Remote sensing

b) Radioactive pollution

c) Factors responsible for the loss of diversity

d) Biosphere reserves.
M. Sc. (Integrated) Biotechnology Semester-IX Examination  
BT3002: Advances in Molecular Biology

[Time: 3 Hours]  
[Total Marks: 70]

Instructions:
1. Mention below-given details in answer book
   Name of the Examination: 
   M. Sc. (Integrated) Biotechnology Semester-IX
   Subject Code No. 1709

2. Figures to the right indicate full marks.
3. Draw neat and labeled diagrams wherever necessary.

Q-1: Describe in detail Any Two. (18)

A. Which is the most-accepted model organism among prokaryotes? Elaborate why?
B. What unique features make *Saccharomyces cerevisiae* a good eukaryotic model organisms?
C. Name a mammal that is widely used as model organism of modern biology research. Describe why this organism is selected.

Q-2: Attempt Any Two of the following (18)

A. Describe the principle and procedure of chain termination method of DNA sequencing.
B. Justify “Telomerese inhibition can kill cancer cells”.
C. What is F.I.S.H.? Describe use of this technique in mapping.

Q-3: Explain in detail Any Two. (18)

A. What is Duchene Muscular Dystrophy (DMD)? Describe finding and cloning of DMD sequences.
B. Describe how genetic basis of Alzheimer’s disease was studied.
C. Justify “Drug response in cancer can be indicted by Microarray Gene Expression Analysis”.

Q-4: Write short notes on Any Two. (16)

A. Molecular inversion technology
B. Human Cancer Genome Project
C. RNAi and growth of blood Vessels
Q.1 Answer the following (Any two)  
1. Discuss in detail role of agricultural practices in soil degradation.  
2. What is green manuring? Give its methods and application.  

Q.2 Answer the following (Any two)  
1. Write down details on steps in mineral exploitation.  
2. Elaborate strategies of coastal zone management.  
3. What is ecological succession? Give detail account on Restoration of biological diversity.

Q.3 Answer the following (Any two)  
1. Compare and contrast between Single Vs Multiple end point restoration strategies.  
2. Define the term: natural resources. Give detail account on Indian scenario of natural resources.  
3. Explain in detail the tools of forest management.

Q.4 Write Short notes (any two)  
1. Carbon sequestration.  
2. Watershed management  
3. Physical and chemical tools of restoration ecology