Seat No.	

B.Sc.

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester - I) Examination, March - 2016

ENGLISH COMPULSORY

English for Communication (Paper - I)

Sub. Code : 59673

Day and Date : Monday, 28 - 03 - 2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

Instructions : **1)** **All questions are compulsory.**

2) **Figures to the right indicate full marks.**

Q1) A) Complete the following sentences by the correct alternative: [5]

a) 'When the Mop count did not Tally' is _____.

i) a story ii) an essay

iii) a poem iv) a letter

b) The world couldn't fall to pieces because of _____.

i) heat ii) luck

iii) cold iv) rain

c) Velan left his home when he was _____ years old.

i) 18 ii) 17

iii) 16 iv) 15

d) _____ are a little wiser in their pleasures.

i) Men ii) Women

iii) Children iv) Animals

e) Sonnet consists of _____ lines.

i) 12 ii) 14

iii) 16 iv) 18

B) Do as directed: [5]

a) Give synonym for : curious.

b) Give antonym for : dismiss.

c) Give the adverb form of : amuse.

d) Form a word by using prefix 'un-'.

e) Fill in the gap using appropriate word from the pair given below:

I told him a _____ yesterday. (Story / storey)

Q2) A) Answer the following questions in 3-4 sentences each: (Any Three): [9]

a) Why does the surgeon want to dismiss the young nurse?

b) What was Velan's request to the tree cutters?

c) What are the differences between amusements of children and grown ups?

d) How does the science forcefully banish the beauty of Nature?

e) How is the world, according to Gordon Challis?

B) Write short-notes in about 50-60 words each (Any Two): [6]

a) OT Nurse.

b) The central idea of the poem 'The Thermostatic Man'.

c) Velan as a gardener.

Q3) a) [illegible] gadget. [5]

[illegible]

b) [illegible] the process of: [5]

"How [illegible] the Bank".

(4) a) Narrate your experience about the accident seen by you. [5]

b) i) Write a paragraph comparing information given in the table about the percentage of passing students at Degree level. [5]

Degree	Year - 2010	2011	2012
B.Sc.	73%	70%	68%
B.Com.	60%	62%	65%
B.A.	67%	69%	71%

ii) Read the following passage and present it in a tree-diagram. [5]

There are two main types of drinks. Alcoholic and non-alcoholic. Alcoholic drinks are spirits and wines. Non-alcoholic drinks are divided into hot drinks and cold drinks. Hot drinks are tea, coffee etc. Cold drinks are further divided into aerated and non-aerated drinks. Aerated cold drinks are lemonade and soda. The non-aerated drinks are squashes and fruit juices.

Seat No.	

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Total No. of Pages : 3

B.Sc.(Part-I) (Semester-II) Examination, April-2016
ENGLISH COMPULSORY
English for Communication (Paper-II)
Sub. Code : 59680

Day and Date : Saturday, 09-04-2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) A) Complete the following sentences by the correct alternative: [5]

a) The lotus is a symbol of _____.

i) money ii) lust

iii) purity and peace iv) anger

b) The girl in While the Auto waits wished to marry to _____.

i) a man of high station ii) an educated man

iii) a businessman iv) a man of lowly station

c) The speaker in A poison tree tried to give his enemy the impression that he was his _____.

i) well-wisher ii) relative

iii) senior iv) companion

P.T.O.

d) A Guardian Angel is a _____ story.

i) happy ii) horrible

iii) sade iv) critical

e) _____ is a speaker in Night of the Scorpion.

i) the son ii) the mother

iii) the father iv) a peasant

B) Do as directed: [5]

a) Give synonym for : peasant.

b) Give antonym for : increase.

c) Give the noun form for : grow.

d) He reserved one (berth / birth) in the Mahalaxmi Express.
(Use the correct word from the pair and rewrite sentence).

e) Use the phrase in your own sentence : to feed.

Q2) A) Answer the following questions in 3 to 4 sentences each: (Any Three) [9]

a) Why do we worship lakshmi during Diwali?

b) Why did the girl come in the park?

c) What is the moral of the poem A poison tree?

d) Why did Noor Mariam advise the narrator to join school?

e) What is the superstitious belief of the peasants?

2) **Write** short notes in about 50 to 60 words each (Any Two): [6]

a) The title of the poem Night of the scorpion.

b) Aunt Mariam.

c) Romance in While the Auto Waits.

3) **Write** a letter of application in response to the following advertisement. [5]

WANTED

A production Manager

Graduate with fluency in English,

Computer is must. Exp. essential,

Interested candidate apply to:

The Manager,

Mahindra Product Ltd.,

145, MIDC Pimpri, Pune - 18

4) HDFC Pune requires an Assistant Manager and you have completed MBA with good knowledge of English, Sales Management and Computer Application. Prepare a C.V. [5]

5) Write an imaginative interview for the post of a Receptionist. [5]

6) a) Express your agreement/disagreement on the following topic: [5]

"Computers will create unemployment in our country".

b) Write a paragraph stating your opinion on: [5]

"Crime in Cinema".

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Seat No.

D-66

Total No. of Pages : 3

B.Sc.(Part-I) (Semester-I) Examination, March-2016
COMPUTER SCIENCE
Introduction to Computer & Modern Operating Environment (Paper-I)
Sub. Code : 59668

Day and Date : Tuesday, 29-03-2016

Time : 3.00 p.m. to 5.00 p.m.

Total Marks : 50

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

Q1) Select correct alternatives and rewrite the sentences: [10]

a) EEPROM stands for _____.

i) Electrically Erasable Programmable Read Only Memory

ii) Electronic Erasable Programmable Read Only Memory

iii) Easily Erasable Programmable Read Only Memory

iv) Easily Electronic Programmable Read Only Memory

b) _____ converts an entire program into machine language.

i) Interpreter ii) Simulator

iii) Command iv) Compiler

c) _____ is an example of Impact Printer.

i) Laser Printer ii) Line Printer

iii) Dot Matrix iv) Drum Printer

d) Microprocessor as switching device are for _____ generation of computer.

i) Third
ii) Second
iii) First
iv) Fifth

e) _____ memories allows simultaneous read and write operation.

i) EPROM
ii) RAM
iii) ROM
iv) None of above

f) _____ is the Logic Gate.

i) OR
ii) AND
iii) NOT
iv) All of above

g) Base 10 refers to _____ number system.

i) Decimal
ii) Hexadecimal
iii) BCD
iv) Octal

h) _____ device is used as the standard pointing device in GUI.

i) Track Ball
ii) Key Board
iii) Mouse
iv) Joystick

i) [illegible] is _____.

i) [illegible] Translation
ii) Formula Translation
iii) [illegible] Translation
iv) Floppy Translation

j) _____ is a extension of MS Excel file.

i) [illegible]
ii) *.doc
iii) [illegible]
iv) *.mdb

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Q2) Attempt Any Two from the following: [20]

a) Explain Generation of computer.

b) Explain NAND & NOR Gate briefly.

c) What is operating system? Explain types of O.S.

Q3) Write short note on following (Any Four): [20]

a) Explain Binary Number System with example.

b) Write a note on Key Board.

c) Explain NOT gate.

d) Explain features of Microsoft Excel.

e) Write note on RAM & ROM.

f) Explain High level language.

●●●●●

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Total No. of Pages : 3

Seat No.

B.Sc. (Part - I) (Semester - I) Examination, March - 2016

COMPUTER SCIENCE

Introduction to Programming in 'C' (Paper - II)

Sub. Code : 59668

Day and Date : Wednesday, 30 - 03 - 2016

Time : 3.00 p.m. to 5.00 p.m.

Total Marks : 50

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

Q1) Choose Correct Alternative and rewrite it (one mark each) [10]

a) A declaration floats b; occupies _____ of memory.

i) 1 byte ii) 4 bytes

iii) 8 bytes iv) 16 bytes

b) C programming language was developed by_____.

i) Dennis Ritchie ii) Ken Thompson

iii) Bill Gates iv) Peter Norton

c) _____ is the valid range of numbers for int data type.

i) 0 to 256 ii) –32768 to +32767

iii) –65536 to +65536 iv) no specific range

d) _____ is a valid declaration of two dimensional integer array variable.

i) int a[5] ii) int a[5][5]

iii) int a[5][5][5] iv) a{5}{5}

P.T.O.

e) _____ symbol of flowcharts is used to decision making.

i) Oval
ii) Arrows
iii) Rhombus
iv) Parallelogram

f) Goto statement is _____.

i) Used to jump the control of program
ii) Used for user defined iteration
iii) Same as switch case statement
iv) None of above

g) _____ function in C used to calculate length of given string.

i) strlength( )
ii) strl( )
iii) strlen( )
iv) none of these

h) _____ is called as post-test loop.

i) while loop
ii) do while loop
iii) both (i) and (ii)
iv) none of these

[redacted] ( ) function of C language called as _____.

[redacted] function
ii) keyword
[redacted] and (ii)
iv) none of these

[redacted] representation of an algorithm is called as_____.

[redacted]
ii) Data flow Diagram
[redacted]
iv) Pseudo code

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Q2) Attempt any two out of three (10 marks each) [20]

a) Explain different characteristics and Notation of Algorithm.

b) What is a variable? Explain its type in detail.

c) Explain any four string function with its syntax and example.

Q3) Attempt any four (5 marks each) [20]

a) Explain bitwise operators in C.

b) Explain syntax of Nested if statement.

c) Explain concept of constant with its types.

d) Explain for loop with example.

e) Explain History of C language.

f) Explain multidimensional array with example.

x x x

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Total No. of Pages : 3

Seat No.

B.Sc. (Part - I) (Semester - II) (New) Examination, April - 2016

COMPUTER SCIENCE (Paper - IV)

Programming Techniques using C

Sub. Code : 59691

Day and Date : Monday, 11 - 04 - 2016 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

Q1) Select correct alternative and rewrite the statement. [10]

a) The Program that calls the function is referred to as the _____.

i) Called function ii) Calling function

iii) Subprogram iv) Subroutine

b) The variables that are both alive and active throughout the entire program are known as _____ variables.

i) local ii) internal

iii) external iv) static

c) A function which calls itself is called _____ function

i) nested function ii) user defined

iii) recursion iv) built in function

P.T.O.

d) The values of actual arguments are assigned to the formal arguments on a _____ basis, starting with the first argument.

i) one to many
ii) many to many
iii) one to one
iv) None of above

e) Only _____ of a variable can be stored in a pointer variable.

i) value
ii) address
iii) pointer
iv) file

f) A pointer variable cannot be multiplied by a _____.

i) constant
ii) variable
iii) operand
iv) zero

g) A _____ is a collection of related data elements of different type.

i) function
ii) array
iii) pointer
iv) Structure

h) A _____ is a collection of data items under one name in which the items share the same storage.

i) structure
ii) union
iii) function
iv) None of these

i) _____ is a file handling function used to retrieve the current file pointer position.

i) retrieve [ ]
ii) ftell [ ]
iv) retry [ ]

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j) When an existing file is opened using 'w' mode, the contents of file are _____.

i) deleted ii) copied to other file

iii) appended iv) concated

Q2) Attempt any Two of the following. [20]

a) Explain the categories of functions in C.

b) Define pointer? Explain pointer to array.

c) Explain how to open and close a file with example.

Q3) Attempt any Four of the following: [20]

a) Explain getc [ ] and putc [ ] functions in files.

b) Explain pointer arithmetic.

c) What is recursion? Explain with example.

d) Define structure with example.

e) What is fprintf [ ] function? Explain its use.

f) Explain the structure within structure with example.

4

X X X

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Total No. of Pages : 3

B.Sc. (Part-I) (Semester-I) Examination, March-2016
CHEMISTRY
Physical Chemistry (Paper-I)
Sub. Code : 59676

Day and Date : Tuesday, 29-03-2016

Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

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

Q1) Choose the most correct alternative for the following and rewrite the sentences: **[10]**

a) The formula $K = \frac{C_1}{\sqrt{C_2}}$ indicate that the solute is present as a _____ molecule in second solvent.

i) double ii) single

iii) triple iv) none of these

b) All reversible heat engines operating between the same two temperature have _____ efficiency.

i) different ii) same

iii) unequal iv) none of these

c) In Isochoric process _____.

i) $\Delta P = 0$ ii) $\Delta V = 0$

iii) $\Delta H = 0$ iv) none of these

d) The reaction between $K_2S_2O_8$ and KI is an example of _____ reaction.

i) termolecular ii) bimolecular

iii) unimolecular iv) pseudo unimolecular

e) Velocity constant K of second order reaction is expressed in _____.

i) mole. lit^{-1} S^{-1} ii) lit^{-1} $mole^{-1}$ S^{-1}

iii) dm^3. $mole^{-1}$ S^{-1} iv) all of these

f) The gases which obeys the gas laws at all temperature and pressure are called as _____.

i) real gases ii) ideal gases

iii) non-ideal iv) none of these

g) Pc, Vc and Tc are known as _____.

i) Gas constants ii) Van Der Waal's constants

iii) Velocity constants iv) Critical constants

h) The particle emitted in the decay of $^{232}_{90}Th$ to $^{228}_{89}Ac$ is _____.

i) α ii) β

iii) γ iv) α followed by β

j) The difference between calculated mass and observed atomic mass is _____.

i) mass ii) weight

iii) [illegible] iv) none of these

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j) Time for half change of a first order reaction is _____ of initial concentration of the reactactant.

i) independent

ii) dependent

iii) inversely proportional

iv) inversely proportional of square

Q2) Solve Any Two of the following: **[20]**

a) Define second order reaction. Derive expression for rate constant of a second order reaction with equal concentrations of reactants.

b) Derive Van Der Wall's equation for '*n*' moles of real gas.

c) Define heat engine. Derive expression for efficiency of heat engine with the help of Carnot cycle.

d) Derive the relation which shows that in the process of extraction, it is economical to use whole solvent in number of portions than to use all at once.

Q3) Solve Any Four of the following: **[20]**

a) A steam engine operates between 400 K and 773 K. Calculate its percentage efficiency.

b) A radioelement has a half-life period of 15 hours. What fraction of it will remain after 40 hours?

c) Derive the relation between half life period and decay constant.

d) Explain the causes of deviations from gas laws or ideal behaviour.

e) 50% of gas is decomposed in a second order reaction where $a = b$ in 40 minutes. What would be the time taken for 75% of the gas to decompose?

f) Write a note on order and molecularity of a reaction.

●●●●●

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Total No. of Pages : 3

Seat No.

B.Sc. (Part - I) (Semester - I) (New) Examination, March - 2016

CHEMISTRY

Inorganic Chemistry (Paper - II)

Sub. Code : 59676

Day and Date : Wednesday, 30 - 3 - 2016 Total Marks : 50

Time : 12.00 noon to 2.00 p.m.

Instructions : 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat diagrams and give equation whenever necessary.
4) Use of scientific calculator is allowed.

Q1) Select the most correct alternative for each of the following and rewrite the sentence. [10]

a) Urea in ammonia acts as _____donor.

i) Proton ii) OH^-

iii) Electron pair iv) anion

b) Elements in which last electron enter in outermost p-orbital is known as _____element

i) neutral ii) metalic

iii) p-block iv) d-block

c) _____ of the following is known as oil of vitriol.

i) HCl ii) H_2SO_4

iii) HNO_3 iv) CH_3COOH

d) Outermost shell electronic configuration of Noble gases is _____.

i) $ns^2\ np^5$ ii) $ns^2\ np^6$

iii) $ns^2\ np^4$ iv) $ns^2\ np^0$

e) Bond order of N_2 molecule is_____.

i) 1 ii) 2

iii) 3 iv) 4

f) According to LCAO principle formation of Bonding MO represented by equation_____.

i) $\Psi_A + \Psi_B = \Psi_b$ ii) $\Psi_A - \Psi_B = \Psi_b$

iii) $\Psi_A + \Psi_A = \Psi_2$ iv) $\Psi_A - \Psi_A = \Psi_2$

g) Sodium chloride structure is _____.

i) FCC ii) BCC

iii) Hexagonal iv) Simple cubic

h) Born-Haber Cycle is used to calculate _____.

i) Lattice energy ii) electron affinity

iii) Heat of formation iv) All of these

i) The electrostatic force of attraction between oppositely charged ions i.e. _____bond.

i) [redacted] ii) metallic

iii) [redacted] iv) co-ordinate

j) Para

i)

iii)

Q2) Attempt

a) Stat

b) Wh

c) Dis

d) Wh

Q3) Attempt

a) Di

b) W

c) W

d) E

e) D

f) W

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j) Paramagnetism depends upon_____.

i) paired electrons ii) unpaired electrons

iii) not on electron iv) proton

Q2) Attempt any two of the following. [20]

a) State and explain octet rule. Give its limitations.

b) What is ionic bond? Discuss energetic of ionic bond formation.

c) Discuss general periodic trend of Nitrogen family.

d) What are the assumptions of Valance bond theory? Give its limitations.

Q3) Attempt any four of the following. [20]

a) Distinguish between bonding and antibonding molecular orbital's

b) What are clathrate compounds? Give its uses.

c) Write note on structure of NaCl.

d) Explain Arrhenius concept for acids and bases.

e) Discuss the structure of HNO_3.

f) Write note on Born-Haber cycle.

X X X

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Total No. of Pages : 3

Seat No. 1

B.Sc. (Part - I) (Semester - II) (New) Examination, April - 2016

CHEMISTRY (Paper - IV)

Industrial Chemistry

Sub. Code : 59683

Day and Date : Monday, 11 - 04 - 2016 Total Marks : 50

Time : 12.00 noon to 2.00 p.m.

Instructions : 1) All questions are compulsory.
2) Figures to the right indicates full marks.
3) Draw neat labelled diagrams and equations wherever necessary.
4) Use of scientific calculator and logarithmic table is allowed.

Q1) Select most correct alternative among those given below and rewrite the sentence. [10]

a) The ratio of number of moles of substance to the total number of moles of all the substanes present in the Solution is known as _____.

i) Mole fraction ii) Van't Hoff factor

iii) Depression constant iv) Normality

b) Soft water give good _____ with soap.

i) Precipitate ii) Lather

iii) Scum iv) Insoluble solid

c) _____ is not secondary gas fuel.

i) Producer gas ii) Methane

iii) Coal gas iv) LPG

P.T.O.

d) Often seeding is needed in unit operation called_____.

i) Distillation ii) Filtration

iii) Sublimation iv) Crystallization

e) _____ is easily accepted by plants from soil

i) NH_3 ii) N_2

iii) NO^-_2 iv) NO_3^-

f) The elements which are used by plants in very small quantities are know as_____

i) Nutrients ii) Compost

iii) Tonic iv) Divron

g) Hexane is immisible in _____.

i) Water ii) Benzene

iii) Chloroform iv) Ethanol

h) The sharp metallic rattling sound produced during the working of inter combustion engine is called as _____.

i) Knocking ii) Antiknocking

iii) Combustion iv) Flash point

i) P^H range of potable water is _____.

i) 6.5 to 8.5 ii) 4.5 to 8.0

iii) 2.0 to 4.5 iv) 8.0 to 11.5

j) The solution containing the maximum quantity of solute at given temperature and pressure is known as _____ solution.

i) Supersaturated ii) Unsaturated

iii) Saturated iv) Plasma

Q2) Answer the following (any two): [20]

a) Define molarity and molality. Calculate the molarity of mixture containing 40 ml of 0.05 molar HCl, 50 ml of 0.1 molar H_2SO_4 and 10 ml of 0.1 N HNO_3.

b) Explain the various sources of water and give the main quality characteristic of water.

c) What is distillation? Explain in detail various type of distillation.

d) What are nutrients? Give brief accounts of macro and micro nutrients with its important functions.

Q3) Attempt any Four of the following: [20]

a) Explain antiknocking compounds.

b) Explain the polar and non polar solvent.

c) Give the properties of good fuels.

d) Discuss the essential requirements of soil.

e) Explain sublimation method of purification of solids.

f) Give the characteristic of potable water.

X X X

Seat No.	

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester -I) (New) Examination, April - 2016
ZOOLOGY (Paper -I)
Animal Diversity -I
Sub. Code:59678

Day and Date :Saturday, 02-04-2016
Time :12.00 noon to 2.00 p.m.

Total Marks :50

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

Q1) Select the correct answer from each of the following and rewrite the sentence **[10]**

a) Earthworm belongs to class _____.

i) Hirudinea ii) Polychaeta

iii) Oligochaeta iv) Nematoda

b) The outer layer of sycon is formed from _____ cells.

i) Scleroblast ii) Pinacocytes

iii) Amoebocytes iv) Myocytes

c) In paramoecium, during conjugation each exconjugant produces _____ daughter paramoecia.

i) Five ii) Four

iii) Two iv) Three

d) Tapeworm causes a disease called _____.

i) Ascariasis
ii) Taeniasis
iii) Elephantiasis
iv) Giardiasis

e) _____ is not the excretory product of Earthworm.

i) Amonia
ii) Urea
iii) Uric acid
iv) Creatin ine

f) The central cavity of the sponge is called _____.

i) Gastrovascular cavity
ii) Spon gocoel
iii) Lumen
iv) Coelom

g) The body of Ascaris lumbricoid is covered by _____.

i) Tunic
ii) Test
iii) Pellicle
iv) Cuticle

h) In Earthworm supra-pharyngeal ganglia is located in _____ segmen

i) 8^{th}
ii) 3^{rd}
iii) 5^{th}
iv) 7^{th}

During favorable climatic conditions paramoecium undergoes _____ reproduction.

Sexual
ii) Asexual
Budding
iv) Regeneration

j) Hydra is _____ animal.

i) Triploblastic ii) Diploblastic

iii) Coelomate iv) Pseudocoelomate

Q2) Answer the following questions (Any two): [20]

a) Describe the nervous system of Earthworm.

b) Describe parasitic adaptations in Ascaris.

c) Describe conjugation in paramoecium.

Q3) Write short notes on (any four): [20]

a) Looping and somersaulting in Hydra.

b) Parasitic adaptations in Tapeworm.

c) General characters of Porifera.

d) Binary fission in paramoecium.

e) Septal nephridium of Earthworm.

f) Scolex of Tapeworm.

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester -I) (Revised) Examination, April - 2016
ZOOLOGY (Paper -II)
Cell Biology and Genetics
Sub. Code:59678

Day and Date :Sunday, 03-04-2016

Time :12.00 noon to 2.00 p.m.

Total Marks :50

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

Q1) Select the correct answer from each of the following and rewrite the sentence **[10]**

a) The Ribosomes are present on the outer surface of the membrane of _____.

i) Smooth Endoplasmic Reticulum ii) Rough Endoplasmic Reticulum

iii) Golgi complex iv) Lysosomes

b) In _____ chromosome , the centromere is located at the terminal end.

i) Telocentric ii) Metacentric

iii) Submetacentric iv) Acrocentric

c) The space between outer and inner nuclear membrane is called _____ space

i) Nucleosomal ii) Cytoplasmic

iii) Perinuclear iv) Nucleolar

P.T.O.

d) The source of illumination in electron microscope is _____.

i) A beam of electron
ii) Natural light
iii) X-rays
iv) UV-light

e) The plasma membrane _____.

i) Surrounds cytoplasm
ii) Separates nucleus from cytoplasm
iii) Acts as a nucleolus
iv) Both (ii) and (iii)

f) Mendelian classical monohybrid phenotypic ratio is _____.

i) 9:3:3:1
ii) 9:3:4
iii) 3:1
iv) 2:1

g) _____ blood group person is called as "Universal donor".

i) AB
ii) O
iii) A
iv) B

h) The pink color flower in Mirabilis jalapa is a example of _____

i) Co-dominance
ii) Incomplete dominance
iii) Co-recessive
iv) Dominance

i) Genotype of AB blood group person is _____.

i) [redacted]
ii) I^AI^A
iii) [redacted]
iv) II

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j) The PKU disease associated with metabolic breakdown of _____.

i) Phenylalanine ii) Valine

iii) Alanine iv) Proline

Q2) Answer the following questions (Any two): [20]

a) Describe the ultrastructure and functions of Mitochondria.

b) Describe the Mendelian dihybrid cross with suitable example.

c) Explain multiple alleles with reference to ABO blood group system.

Q3) Write short notes on (any four): [20]

a) Principle of segregation.

b) Co-dominance

c) Functions of lysosome.

d) Types of endoplasmic reticulum.

e) Sickle cell anemia.

f) Ultrastructure of Ribosomes.

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d) The PKU disease associated with metabolic breakdown of _____.

i) Phenylalanine ii) Valine

iii) Alanine iv) Proline

Q2) Answer the following questions (Any two): [20]

a) Describe the ultrastructure and functions of Mitochondria.

b) Describe the Mendelian dihybrid cross with suitable example.

c) Explain multiple alleles with reference to ABO blood group system.

Q3) Write short notes on (any four): [20]

a) Principle of segregation.

b) Co-dominance

c) Functions of lysosome.

d) Types of endoplasmic reticulum.

e) Sickle cell anemia.

f) Ultrastructure of Ribosomes.

Seat No.

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester - II) (New) Examination, April - 2016
ZOOLOGY (Paper - III)
Animal Diversity - II
Sub. Code : 59685

Day and Date : Saturday, 16 - 04 - 2016

Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

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

Q1) Select the correct answer from the following and rewrite the complete sentence. [10]

a) Herdemania belongs to class _____.

i) Thaliacea
ii) Ascidiacea
iii) Larvacea
iv) Leptocardi

b) In Amphioxous afferent branchial arteries carry blood to the _____.

i) Lungs
ii) Gills
iii) Skin
iv) Stomach

c) Placoid scales are found in _____.

i) Cartilegenous fishes
ii) Bony fishes
iii) Teleostei
iv) Clupeiformes

P.T.O.

d) In Amphioxus solenocytes are concerned with _____.

i) respiration ii) excretion

iii) feeding iv) reproduction

e) There are _____ pairs of protonephridia present in Amphioxus.

i) 40 ii) 50

iii) 90 iv) 100

f) Liver diverticulum of Amphioxus is concerned with _____.

i) respiration ii) excretion

iii) digestion iv) osmoregulation

g) Pair of vocal sacs and nuptial pad present in _____.

i) Male frog ii) Female frog

iii) Salamander iv) Ichthyophis

h) The pulmonary artery in frog supplies blood to _____.

i) Liver ii) Lung

iii) Kidney iv) Testis

i) In frog, pancreas is the _____ type of gland.

i) endocrine ii) exocrine

iii) mixed iv) none of these

j) The structural and functional unit of circulatory system in frog is _____

i) [redacted] ii) lung

iii) [redacted] iv) gills

Q2) Answer the following questions (any two): [20]

a) What is excretion? Describe the structure of nephron and a note on physiology of urine formation.

b) Describe the digestive system of Amphioxus.

c) Describe the female reproductive system of frog.

Q3) Write short notes on (any four): [20]

a) Sexual diamorphism in frog.

b) Protonephridium in Amphioxus.

c) Truncus arteriousus.

d) Cycloid Scales

e) Cutaneous respiration.

f) General characters of Pisces.

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Seat No.	

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Total No. of Pages : 2

B.Sc.(Part-I) (Semester-II) Examination, April-2016.
ZOOLOGY
Ecology, Ethology, Evolution and Applied Zoology (Paper-IV)
Sub. Code : 59685

Day and Date : Sunday, 17-04-2016
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

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

Q1) Select the correct answer from each of the following and rewrite the sentence: **[10]**

a) Association between two different organisms where one is benefitted while the other is neither benefitted or harmed is called _____.
i) Symbiosis
ii) Commensalism
iii) Mutualism
iv) Parasitism

b) Study of organisms in relation to surrounding is called _____.
i) Economy
ii) Bioeconomics
iii) Ecology
iv) Pathology

c) The study of behavioral characteristics of animals is called _____.
i) Evolution
ii) Ethology
iii) Ecology
iv) Philology

d) The uppermost layer of atmosphere is called _____.
i) Troposphere
ii) Mesosphere
iii) Stratosphere
iv) Thermosphere

e) The animal that imitates is called _____.
i) Model
ii) Closely related species
iii) Mimic
iv) Original species

f) Peripatus is a 'connecting link' between _____.
i) Annelid and arthropod
ii) Platy helminthes and annelids
iii) Annelid and mollusks
iv) Arthropods and mollusks

P.T.O.

g) _____ is a example of 'living fossil'.

i) King crab ii) Cray fish

iii) Spider crab iv) Dog fish

h) The rearing of silkworms for the production of raw silk is called _____.

i) Apiculture ii) Pisciculture

iii) Sericulture iv) Pearl culture

i) The adult silk moth lives for _____.

i) 3-5 days ii) One month

iii) 20-22 days iv) One and half month

j) _____ is a social insect.

i) Cockroach ii) Honey bee

iii) Mosquito iv) House fly

Q2) Answer the following questions (Any Two): **[20]**

a) Explain ecological pyramids with reference to pyramid of numbers.

b) What is Camouflage? Explain with camouflage in Chameleon.

c) What are fossils? How are they formed? Mention their importance.

Q3) Write short notes on (Any Four): **[20]**

a) Rain forest.

b) Mimicry.

c) Reptilian characters of Archaeopteryx.

d) Affinities of sphenodon.

e) Life cycle of *Bombyxmori*.

f) Queen bee.

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Total No. of Pages :3

Seat No.

B.Sc. (Part -I) (Semester -I) Examination, April - 2016
MATHEMATICS
Complex Numbers and Algebra (Paper - I)
Sub. Code: 59681/59674

Day and Date :Monday, 04 - 04 - 2016 Total Marks : 50

Time :3.00 p.m. to 5.00 p.m.

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

Q1) Select the correct alternatives for each of the following and rewrite the statements: [10]

a) The value of $\frac{(\cos 3\theta + i\sin 3\theta)^5}{(\cos 2\theta - i\sin 2\theta)^{-4}} =$ _____ is

i) $\cos 3\theta + i\sin 3\theta$ ii) $\cos 7\theta + i\sin 7\theta$

iii) $\cos 9\theta + i\sin 9\theta$ iv) $\cos\theta + i\sin\theta$

b) nth roots of Unity are given by _____, $k = 0, 1, 2, 3, ----, n\text{-}1$.

i) $\cos\frac{2k\pi}{n} + i\sin\frac{2k\pi}{n}$ ii) $\cos\frac{k\pi}{n} + i\sin\frac{k\pi}{n}$

iii) $\cos\frac{2k\pi}{n} - i\sin\frac{2k\pi}{n}$ iv) $\cos\frac{3k\pi}{n} + i\sin\frac{3k\pi}{n}$

c) Which of the following is wrong?

i) $\cosh^2 x - \sinh^2 x = 1$ ii) $\cos ix = \cos hx$

iii) $\sin ix = \sin hx$ iv) $e^{ix} = \cos x + i\sin x$

d) The Matrix $\begin{pmatrix} 9 & 4-i & 3+2i \\ 4+i & 1 & 6+5i \\ 3-2i & 6-5i & 2 \end{pmatrix}$ is _____.

i) Symmetric ii) Skew - Symmetric

iii) Skew - Hermitian iv) Hermitian

P.T.O.

e) The Eigen values of matrix $\begin{pmatrix} 1 & 2 \\ -1 & 4 \end{pmatrix}$

i) 1,2 ii) 2,3

iii) 3,4 iv) 1,4

f) If rank A = rank [A: B] < no. of variables, then the equation AX=B has _____ solutions.

i) Unique ii) No

iii) Infinite iv) Zero

g) The matrix of quadratic form x^2+2y^2+6xy is _____.

i) $\begin{bmatrix} 1 & 4 \\ 2 & 1 \end{bmatrix}$ ii) $\begin{bmatrix} 1 & 4 \\ 2 & -1 \end{bmatrix}$

iii) $\begin{bmatrix} 1 & 4 \\ 2 & 2 \end{bmatrix}$ iv) $\begin{bmatrix} 1 & -2 \\ 4 & 2 \end{bmatrix}$

h) The quadratic form of matrix $\begin{bmatrix} 1 & -4 \\ 2 & -2 \end{bmatrix}$ is _____.

i) $x^2+6xy+2y^2$ ii) $x^2+2xy+2y^2$

iii) $x^2-2xy+2y^2$ iv) $x^2-2xy-2y^2$

i) The identity element of Group G = {1, -1, i, -i} under the multiplication is _____.

i) 1 ii) –1

iii) i iv) –i

j) Which of the following is not a group?

i) (Z, ·) ii) (N, .)

iii) (R, ·) iv) (N, +)

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(C) Attempt any two of the following: [20]

a) State and prove the Demoivre's Theorem for all rational values of n.

b) Define Group by stating the axioms under operation '*' and show that inverse of element in the group G is unique.

c) Define Hermitian and Skew-Hermitian matrices. Prove that every square matrix can be uniquely expressed as the sum of Hermitian and Skew-Hermitian matrix.

(D) Attempt any four of the following: [20]

a) Find all the roots of the equation $x^5+1=0$, using complex numbers.

b) If $\tan(u+iv)=x+iy$ then show that

i) $x^2+y^2+2x\cot 2u=1$

ii) $x^2+y^2-2y\coth 2v+1=0$

c) By using Caley Hamilton theorem, find the inverse of a matrix

$$\begin{pmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{pmatrix}$$

d) Test the consistency of the following equations and solve them

$x+y+z=6,\quad x+2y+3z=14,\quad x+4y+7z=30$

e) Write the Quadratic form of the matrix $\begin{pmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ -3 & -2 & 1 \end{pmatrix}$.

f) If $Z_6=\{0, 1, 2, 3, 4, 5\}$ be any set and $a * b$ = remainder left when $a+b$ is divided by 6, then show that $(Z_6, *)$ is a group.

EEE

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Total No. of Pages :3

B.Sc. (Part -I) (Semester -I) Examination, April - 2016
MATHEMATICS
Calculus (Paper - II)
Sub. Code: 59674

Day and Date : Tuesday, 05 - 04 - 2016
Time : 3.00 p.m. to 5.00 p.m.

Total Marks : 50

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

Select the correct alternatives for each of the following and rewrite the statements: **[10]**

a) If $y = 10^{100x}$ then y_{100} = _____.

i) $10^{100}\ 10^{x}$ ii) $10^{10}\ x^{10}\ (\log 10)^{10}$

iii) $100^{100}\ 10^{100x}\ (\log 10)^{100}$ iv) $10^{100}\ 100^{10x}\ (\log 10)^{10}$

b) If $f(x, y) = x^4 + y^4 - 2x^2y^2$ then $(f_{xy})_{x=y=1}$ = _____.

i) 7 ii) –8

iii) 8 iv) 4

c) The infinite series $1 + x + x^2 + x^3 +$ ------ is expansion of _____.

i) $\log(1 + x)$ ii) e^{x}

iii) e^{-x} iv) $(1-x)^{-1}$

d) The radius of curvature S = a log cosec ψ is _____.

i) a cosec ψ ii) $-a$ cot ψ

iii) $a \tan\psi$ iv) a^2 cosec^2 ψ

e) If $y = (\sin^{-1} x)^2$ then value of $\frac{d^2y}{dx^2} - x\frac{dy}{dx}$ is _____.

i) 0 ii) 4

iii) 2 iv) –2

P.T.O.

f) If $u = \dfrac{x^{1/3} + y^{1/3}}{x^{1/2} + y^{1/2}}$ and $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = nu$ then $n =$ _____.

i) $1/12$ ii) $-1/6$

iii) $1/6$ iv) $-1/16$

g) The value of $\lim\limits_{x \to 0} \dfrac{(1-\cos x)(1-e^x)}{2x^3}$ is _____.

i) 2 ii) $-1/4$

iii) $1/2$ iv) $1/4$

h) The product of curvature and radius of curvature at any point on curve is _____.

i) 0 ii) 1

iii) -1 iv) $1/2$

i) If $\sin x = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + \text{---}$ then the value of a_3 = _____

i) $-1/6$ ii) $-4/5$

iii) $2/3$ iv) 0

j) The radius of curvature for curve $xy = 4$ at point (2, 2) is _____

i) $\sqrt{2}$ ii) $7\sqrt{2}$

iii) $2\sqrt{2}$ iv) $3\sqrt{2}$

Q.2) Attempt any two of the following: [2

a) If $y = e^{ax}\sin(bx+c)$ then prove that $y_n = r^n e^{ax}\sin(bx+c+n\phi)$ where $r = \sqrt{a^2+b^2}$ & $\phi = \tan^{-1}(b/a)$. Hence find nth derivative of $e^{3x}\sin x\cos x$.

b) If $Z = f(x,y)$ is homogeneous function of x, y of degree n then prove that $x^2\frac{\partial^2 z}{\partial x^2} + 2xy\frac{\partial^2 z}{\partial x\partial y} + y^2\frac{\partial^2 z}{\partial y^2} = n(n-1)z$. If $u = \log\left\{\frac{x^4+y^4}{x+y}\right\}$, then find $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$.

c) Derive the expression for radius of curvature for parametric equation of the curve $x = f(t), y = \psi(t)$ where t is a parameter. Find the radius of curvature for the curve $x = at^2, y = 2at$ at any point t.

Q.3) Attempt any FOUR of the following: [20]

a) If $y = \cos(m\sin^{-1}x)$ then show that $(1-x^2)y_{n+2} - (2n+1)x\,y_{n+1} + (m^2-n^2)y_n = 0$.

b) Expand tan x in powers of x by Maclaurin's series.

c) Find the radius of curvature for the curve $y^2 = 8x$ at the point (9/8, 3).

d) Find $\lim_{x\to 0} x\log(\tan x)$.

e) If $u = \frac{1}{\sqrt{x^2+y^2+z^2}}; x^2+y^2+z^2 \neq 0$. Show that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = 0$.

f) If $f(x,y) = \cos(4x+5y)$ then find $f_x, f_y, f_{xx}, f_{yy}, f_{xy}$.

EEE

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2018

Seat No.

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester - II) Examination, April - 2016

MATHEMATICS

Geometry (Paper - III)

Sub. Code : 59681

Day and Date : Monday, 18 - 04 - 2016

Time : 3.00 p.m. to 5.00 p.m.

Total Marks : 50

Instructions : 1) **All questions are compulsory.**

2) **Figures to the right indicate full marks.**

Q1) Select the correct alternative for each of the following and rewrite the statement: **[10]**

a) If the transformation formulae are $x=\frac{1}{2}x'-\frac{\sqrt{3}}{2}y', y=\frac{\sqrt{3}}{2}x'+\frac{1}{2}y'$, then the angle θ through the axes are rotated is _____.

i) 0 ii) $\pi/6$

iii) $\pi/4$ iv) $\pi/3$

b) Polar equation of the initial line is _____.

i) $\theta=\pi/2$ ii) $\theta=-\pi/2$

iii) $\theta=0$ iv) $\theta=\pi$

c) The equation $r = a$ represents _____.

i) A straight line passing through the pole

ii) circle

iii) points

iv) A straight line not passing through the pole

d) The cartesian equation of $r = a \cos \theta$ is _____.

i) $x^2 + y^2 = 1$ ii) $x = y$

iii) $xy = 2$ iv) $x^2 + y^2 - ax = 0$

e) The locus of points whose powers with respect to two spheres are equ is _____.

i) sphere ii) plane

iii) line iv) circle

f) The equation of the sphere through origin and making intercepts (3, 1, on the co-ordinate axes is _____.

i) $x^2 + y^2 + z^2 = 3$

ii) $x^2 + y^2 + z^2 - 3x - y - 2z = 0$

iii) $x^2 + y^2 + z^2 = 1$

iv) $x^2 + y^2 + z^2 - 6x - 2y - 4z = 0$

g) The centre and radius of the sphere $x^2 + y^2 + z^2 - 2x + 4y + 6z -$ is _____.

i) (1, 2, 3), 5 ii) (2, –4, –6), 5

iii) (1, –2, –3), 5 iv) (–2, 4, 6), 5

h) The equation of right circular cone with vertex at origin and axis a axis is _____.

i) $x^2 + y^2 = z^2 \sec^2 \theta$ ii) $x^2 + y^2 = z^2 \tan^2 \theta$

iii) $x^2 + y^2 = y^2 \tan^2 \theta$ iv) $x^2 + y^2 = z^2 \cot^2 \theta$

i) Every section of a right circular cone by a plane perpendicular to its is a _____.

i) circle ii) parabola

iii) plane iv) hyperbola

j) If under rotation of axes, without shifting the origin, the expres $ax^2 + 2hxy + by^2$ is transformed to $a'x'^2 + 2h'x'y' + b'y'^2$ then _____

i) $a + b = a' - b'$ ii) $a + b + h = a' + b' + h'$

iii) $ab - h^2 = a'b' - h'^2$ iv) $ab + h^2 = a'b' + h'^2$

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Q2) Attempt any TWO of the following: **[20]**

a) If by rotation of axes the expression $ax^2 + 2hxy + by^2$ becomes $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that $a + b$ and $ab - h^2$ are invariants.

b) Obtain the polar equation of the conic in the form $\frac{l}{r} = 1 + e\cos\theta$ and show that in any conic the sum of the reciprocals of the segments of a focal chords is constant.

c) Find the equation of the cone whose vertex is at the point (x_1, y_1, z_1) and whose generators interseet the conic $ax^2 + 2hxy + by^2 + 2gx + 2fy + \tau = 0, z = 0$.

Q3) Attempt any FOUR of the following: **[20]**

a) Obtain the transformed equation of $x^2 + 4xy + y^2 - 4x + 4y - 8 = 0$ when the origin is shifted to $(-2, 2)$ and then the axes are rotated through an angle 45°.

b) Find the centre and radius of the circle $r = 3\sin\theta + 3\sqrt{3}\cos\theta$.

c) Find the centre and radius of the circle $x^2 + y^2 + z^2 - 2y - 4z - 11 = 0$ and $x + 2y + 2z - 15 = 0$.

d) Find the equation of the sphere through the circle $x^2 + y^2 + z^2 - 2y - 4z - 11$, $x + 2y + 2z = 3$ and passing through the centre of the sphere $x^2 + y^2 + z^2 + 4x - 6y + 2z = 1$.

e) Find the equation of the sphere which passes through the circle $x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0$, $3x - 4y + 5z = 15$ and cuts the sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally.

f) Find the equation of cone with vertex (1, 1, 0) and guiding curve $x^2 + z^2 = 4, y = 0$.

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2016

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Total No. of Pages : 3

Seat No.

B.Sc. (Part - I) (Semester - II) (New) Examination, April - 2016

MATHEMATICS

Differential Equations (Paper - IV)

Sub. Code : 59681

Day and Date : Wednesday, 20 - 04 - 2016 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

Q1) Select correct alternative for each of the following and rewrite the statement: [10]

a) An equation which involves only one independent variable and differential coefficients with respect to it is called _____ differential equation.

i) Partial ii) Total

iii) Ordinary iv) Simultaneous

b) The solution of $(y - px)(p - 1) = p$ is _____.

i) $y = cx$ ii) $y = cx + c/c-1$

iii) $y = p$ iv) $y = c$

c) P.I. of $\frac{1}{D^2 + a^2} \cos ax$ is _____.

i) $\frac{x}{2a} \sin ax$ ii) $-\frac{x^2}{2!}\frac{1}{4a^2} \sin ax$

iii) $\frac{x}{2a} \cos ax$ iv) $-\frac{x^2}{2!}\frac{1}{4a^2} \cos ax$

d) The differential equation $p^4 - 2xy\,p + 8x^2 = 0$ is of the type.

i) Solvable for x ii) Solvable for p

iii) Solvable for y iv) Solvable for x and y

P.T.O.

e) If $\frac{\frac{\partial N}{\partial x}-\frac{\partial M}{\partial Y}}{M}$ is a function of x, say $f(x)$ then I.F. = _____.

i) $e^{\int f(x)dx}$ ii) $e^{\int f(y)dy}$

iii) e^{x} iv) e^{y}

f) The equation $Mdx + Ndy = 0$ is said to be exact if _____.

i) $\frac{\partial M}{\partial y}=\frac{\partial N}{\partial x}$ ii) $\frac{\partial M}{\partial x}=\frac{\partial N}{\partial y}$

iii) $\frac{\partial^2 M}{\partial x^2}=\frac{\partial^2 M}{\partial y^2}$ iv) $\frac{\partial^2 M}{\partial y^2}=\frac{\partial^2 N}{\partial x^2}$

g) The solution of the differential equation $\frac{ydx-xdy}{y^2}=0$ is _____.

i) $\frac{y}{x}=c$ ii) $\frac{x+y}{y}=c$

iii) $\frac{x}{y}=c$ iv) $x+y=c$

h) $\frac{1}{D+a}f(x)=$

i) $e^{-ax}\int f(x)e^{ax}\,dx$ ii) $e^{ax}\int f(x)e^{-ax}\,dx$

iii) $e^{-ax}\int f(x)e^{-ax}\,dx$ iv) $e^{ax}\int f(x)e^{ax}\,dx$

i) $\frac{1}{(D-1)^2(D^2+4)}e^{x}=$ _____.

i) $\frac{x^2e^x}{2!}$ ii) $\frac{x^2e^x}{10}$

iii) $\frac{x^2e^x}{5!}$ iv) $\frac{x^2e^x}{20}$

j) The solution of $(D-1)^2 y = 0$ is _____.

i) $y = (c_1 + c_2x)e^x$ ii) $y = (c_1 + c_2x)e^{-x}$

iii) $y = c_1 \cos x + c_2 \sin x$ iv) none of these

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Q2) Attempt any two of the following: **[20]**

a) In usual notation, prove that $\frac{1}{f(D^2)}\cos ax=\frac{1}{f(-a^2)}\cos ax$ if $f(-a^2)\neq 0$, and hence solve $(D^2 - 5D + 6)y = \cos x$.

b) If $f(D)y = X$ where $X = e^{ax} v$ and v is a function of x, then prove that $\frac{1}{f(D)}e^{ax}=e^{ax}\frac{1}{f(D+a)}v$ and hence solve $(D^2 - 4D + 4)y = x^2e^{2x}$.

c) Define exact differential equation. If $Mdx + Ndy = 0$ is an exact differential equation then prove that $\frac{\partial M}{\partial y}=\frac{\partial N}{\partial x}$.

Q3) Attempt any four of the following: **[20]**

a) Solve $\frac{dy}{dx}+2y\tan x=\sin x$.

b) Find the orthogonal trajectories of the curve $x^3 - 3xy^2 = a$.

c) Solve $(y - px)^2 = a^2p^2 + b^2$.

d) Solve $\frac{d^2y}{dx^2}-4\frac{dy}{dx}+4y=x\sin x$.

e) Solve $(D^2 - 3D + 2)y = e^x \sin hx$.

f) Solve $(x^2 + y^2 + 1)dx - 2xy\,dy = 0$.

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2016

Seat No.	

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Total No. of Pages : 3

B.C.S. (Part - I) (Semester - I) Examination, April - 2016

STATISTICS

Descriptive Statistics - I (Paper - I)

Sub. Code : 59700

Day and Date : Friday, 01 - 04 - 2016

Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

Instructions :
1) **All questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Use of calculator and statistical table is allowed.**

Q1) Choose the correct alternative: **[10]**

a) Median of the values 20, 25, 23, 30, 37 is _____.

i) 30 ii) 27

iii) 25 iv) 23

b) Quartiles can be located using _____.

i) Frequency polygon ii) Histogram

iii) Ogive curves iv) None of these

c) For open ended classes we can use _____ measure of dispersion.

i) Range ii) M.D.

iii) Q.D. iv) S.D.

d) The first ordered central moment is equal to _____.

i) 1 ii) 0

iii) Mean iv) None of these

P.T.O.

e) If a constant value 50 is added to each observation of a set then mean of set is _____.

i) Increased by 50
ii) 50 times the original
iii) Decreased by 50
iv) Not affected

f) Given that $\mu_4 = 24$, $\mu_2 = 3$ then the distribution is _____.

i) Leptokurtic
ii) Platykurtic
iii) Mesokurtic
iv) Symmetric

g) _____ is unitless measure.

i) Range
ii) Variance
iii) Q.D.
iv) C.V.

h) Arithmatic mean of first 'n' natural number is _____.

i) $\frac{n}{2}$
ii) $\frac{n+1}{2}$
iii) $\frac{n-1}{2}$
iv) $\frac{(n+1)(2n+1)}{6}$

i) For heterogeneous population, a sample can be drawn using _____ sampling method.

i) SRSWR
ii) SRSWOR
iii) Stratified
iv) Systematic

j) In exclusive type of classification _____ limits are excluded.

i) Upper
ii) Lower
iii) Both
iv) None of these

Attempt any two of following: [20]

a) What is meant by measures of central tendency? Define mean, median and mode. Discuss effect of change of origin and scale on mean.

b) Explain the term skewness. Describe different types of measures of skewness.

c) Define the different measures of dispersion. State merits and demerits of S.D.

Attempt any four of following: [20]

a) Write a note on simple random sampling.

b) The first three moments about 1 are 2, 25 and 80 respectively. Find mean, s.d. and β_1.

c) Explain procedure for construction of ogive curves.

d) Discuss effect of change of origin and scale on central moments.

e) Compute M.D. about mean for following data.

120, 180, 380, 410, 330, 350, 420, 480, 310, 280

f) For a moderately asymmetric distribution, the values of mean and median are 264 and 276 resp. Estimate value of mode.

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Total No. of Pages : 3

Seat No.

B.Sc. (Part-I) (Semester - I) Examination, April -2016

STATISTICS

Descriptive Statistics - I (Paper - I)

Sub. Code : 59679

Day and Date :Saturday, 02 - 04 - 2016 Total Marks : 50

Time : 12.00 noon to 2.00 p.m.

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

Q1) Choose the most correct alternative. [10]

a) Which of the point/s partitions entire observations into ten equal parts?

i) Median ii) Deciles

iii) Quartiles iv) Percentiles

b) Which of the following measure of central tendency is computable for continuous frequency distribution with open end classes?

i) Median ii) Mode

iii) Third quartile iv) all of these

c) Arithmetic mean (AM) of 100 observations was 100. If 100 is added to each observation then AM of new observations will be _____.

i) 200 ii) 0

iii) 100 iv) 300

d) Which of the followings is independent of change of origin transformation?

i) Arithmetic mean (AM) ii) Variance

iii) Range iv) Both (ii) and (iii)

P.T.O.

e) Variance of 10 observation was 9. If 8 is added to each observation t variance of new observations will be _____.

i) 17 ii) 10

iii) 9 iv) 8

f) Coefficient of variation is _____.

i) Positive ii) Non-negative

iii) Unitless iv) Non-negative and Unitless

g) If third central moment is zero then _____.

i) $\beta_1=0$

ii) $\beta_2=0$

iii) Frequency distribution is symmetric

iv) Only (i) and (iii) are true

h) If frequency distribution is leptokurtic then _____.

i) $\beta_1>3$ ii) $\beta_2>3$

iii) $\gamma_2>0$ iv) Both (ii) and (iii)

i) In case of n dichotomous attributes, total number of ultimate classe _____.

i) 3^n ii) 2^n

iii) n^2 iv) n^3

j) If dichotomous attributes A and B are independent then _____.

i) $\frac{(AB)}{(B)}=\frac{(A\beta)}{(\beta)}$ ii) $\frac{(AB)}{(A)}=\frac{(\alpha B)}{(B)}$

iii) $(AB)(\alpha\beta)=(A\beta)(\alpha B)$ iv) All the above

Q2) Attempt any two of the followings: **[20]**

a) What is a measure of central tendency? Derive an expression for median in case of continuous frequency distribution.

b) Define mean deviation. State and prove minimal property of mean deviation.

c) Define r^{th} raw moment and r^{th} central moment. Derive expressions for first four central moments in terms of raw moments.

Q3) Attempt any four of the followings: **[20]**

a) Define Bowley coefficient of skewness. Show that its limits are –1 to 1.

b) Define the following terms.

i) Attribute.

ii) Class.

iii) Class order.

iv) Ultimate class.

v) Positive class.

c) Define consistency of a set of given class frequencies.

Derive conditions for consistency in terms of positive class frequencies for two dichotomous attributes A and B?

d) Obtain an expression for combined geometric mean of two groups.

e) State and prove effect of change of origin and scale property of variance.

f) Write a short note on kurtosis.

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Total No. of Pages : 4

B.Sc. (Part-I) (Semester - I) Examination, April -2016
STATISTICS
Elementary Probability Theory (Paper - II)
Sub. Code : 59679

Day and Date :Sunday, 03 - 04 - 2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Choose the most correct alternative. **[10]**

a) The sample space corresponding to the experiment " Three seeds are planted and total number of seeds germinated are recorded after a week" is _____.

i) (0,3) ii) {0,1,2,3}

iii) {1,2,3} iv) [0,3]

b) Which of the following is a pair of mutually exclusive events in the drawing of a single card from a pack of 52 playing cards?

i) A heart and a queen ii) An even number and a spade

iii) A club and red card iv) An ace and an odd number

c) The probability of drawing one white ball randomly from a bag containing 6 red, 8 black, 10 yellow and 1 green ball is _____.

i) $\frac{1}{25}$ ii) 0

iii) 1 iv) $\frac{14}{25}$

P.T.O.

d) Probability of the event either A or B happen is _____.

i) $P(A).P(B)$ ii) $P(A)+P(B)$

iii) $P(A \cup B)$ iv) $P(A \cap B)$

e) If A and B are two events such that $B \subseteq A$, then the value of P(A) is _

i) equal to P(B) ii) greater than or equal to

iii) less than or equal to P(B) iv) none of these

f) If A is an event, then P(A|A) is _____.

i) One ii) Zero

iii) P(A) iv) Not determined.

g) The event $A_1, A_2, \ldots\ldots, A_n$ are said to represent a partition of sample if it satisfies the condition _____.

i) $A_i \cap A_j = \phi$ for all i & j, $(i \neq j)$

ii) $A_1 \cup A_2 \cup \ldots\ldots \cup A_n = \bigcup_{i=1}^{n} A_i = \Omega$

iii) Both (i) and (ii)

iv) Only (ii) but not (i)

h) If $A \subset B$, then P(B|A) is _____.

i) Zero ii) One

iii) $\frac{P(A)}{P(B)}$ iv) $\frac{P(B)}{P(A)}$

i) Which of the following condition is true for independence of two events A and B? _____.

i) P(A).P(B) ii) P(A|B) = P(A)

iii) P(B|A) = P(B) iv) All the above

j) Let A and B be two events such that P(A)=0.4, P(B)=K and $P(A \cup B)$=0.7. If A and B are independent then the value of K is _____.

i) 0.2 ii) 0.7

iii) 0.4 iv) 0.5

Q2) Attempt any two of the following: **[20]**

a) Define the following terms with examples

i) Elementary event.

ii) Sure event.

iii) Impossible event.

iv) Exhaustive events.

v) Complement of an event.

b) State and prove addition theorem of probability for two events A and B. Also state the same for three events A,B,C.

c) State and prove Baye's theorem.

[20]

Q3) Attempt any four of the following:

a) For any two events A &B show that $P(A \cap B) \geq 1 - P(A') - P(B')$

b) If A and B are events defined on Ω then show that

$P(A'|B) = 1 - P(A|B), P(B) > 0$.

c) Define pairwise and mutual independence & three events.

d) Give the axiomatic definition of probability.

e) If A and B are independent then show that A' and B' are also independent.

f) A card is drawn from a pack of cards. Find the probability that it will be jack card given that it is black card.

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Total No. of Pages : 3

Seat No.

B.Sc.(Part-I) (Semester-II) Examination, April-2016

STATISTICS

Descriptive Statistics-II (Paper-III)

Sub. Code : 59686

Day and Date : Saturday, 16-04-2016 Total Marks : 50

Time : 12.00 noon to 2.00 p.m.

Instructions : 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q1) Choose the most correct alternative: [10]

a) The correlation coefficient between (X, X) is _____.

i) 1 ii) 0

iii) –1 iv) V(X)

b) If X and Y are independent then correlation coefficient between them is _____.

i) maximum ii) minimum

iii) zero iv) –1 or 1

c) Equations of two regression lines are: X + Y = 8 and X – Y = 4, then mean of X and Y are _____.

i) (2, 6) ii) (8, 4)

iii) (6, 2) iv) (0, 2)

P.T.O.

d) In case of rank correlation, if observation on X is repeated 3 times observation on Y is repeated 2 times then correction factor is _____

i) 2 ii) 2.5

iii) 3 iv) none of these

e) If b_{yx} and b_{xy} are two regression coefficients then which of the follow is false?

i) $b_{yx} = 0.5$ and $b_{xy} = 2$ ii) $b_{yx} = 0.2$ and $b_{xy} = 0.4$

iii) $b_{yx} = -0.3$ and $b_{xy} = -0.2$ iv) $b_{yx} = 0.1$ and $b_{xy} = -0.6$

f) The partial correlation coefficient $r_{12.3}$ is _____.

i) $\dfrac{r_{12} - r_{13}r_{23}}{\sqrt{(1-r_{13}^2)(1-r_{23}^2)}}$ ii) $\dfrac{r_{12} - r_{13}r_{23}}{\sqrt{(1-r_{23}^2)}}$

iii) $\dfrac{r_{12} - r_{13}r_{23}}{\sqrt{(1-r_{13}^2)}}$ iv) $\sqrt{\dfrac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1-r_{23}^2}}$

g) The order of residual $X_{1.23}$ is _____.

i) 0 ii) 1

iii) 2 iv) 23

h) If $R_{1.23} = 1$ then $R_{2.13}$ is equal to _____.

i) 0 ii) 1

iii) –1 iv) none of these

i) The multiple correlation coefficient lies between _____.

i) 0 to 1 ii) –1 to 1

iii) 0 to ∞ iv) –∞ to ∞

j) If $X_1 = a + b\,X_2 + c\,X_3$ is the best regression plane of X_1 on X_2 and under least square method then

i) $b = b_{12.3}$ and $c = b_{13.2}$ ii) $b = b_{1.23}$ and $c = b_{1.32}$

iii) $b = b_{23.1}$ and $c = b_{32.1}$ iv) $b = b_{12}$ and $c = b_{13}$

Q2) Attempt Any Two from the following: **[20]**

a) What is correlation? Define Karl Pearson's correlation coefficient (r) and show that it lies between –1 to 1.

b) Derive the equation of regression line of Y on X by using least square method.

c) Define multiple correlation coefficient ($R_{1.23}$). Obtain an expression for $R_{1.23}$ in terms of simple correlation coefficients.

Q3) Attempt Any Four from the following: **[20]**

a) Explain the concept of positive and negative correlation.

b) State and prove any one property of residual.

c) Show that the Karl Pearson's coefficient of correlation is a geometric mean of regression coefficients.

d) Define:

i) Spearman's rank correlation coefficient.

ii) Partial Regression coefficients.

iii) Residual of variable X_1 w.r.t. X_2 and X_3.

e) The regression equations are $4X - 5Y + 33 = 0$ and $20X - 9Y - 107 = 0$.

Find:

i) Regression Coefficients.

ii) Corr. (X, Y).

f) With usual notations, show that $b_{12.3} = \frac{b_{12} - b_{13}b_{32}}{1 - b_{23}b_{32}}$.

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Total No. of Pages : 4

Seat No.	

B.Sc.(Part-I) (Semester-II) Examination, April-2016
STATISTICS
Discrete Probability Distributions (Paper-IV)
Sub. Code : 59686

Day and Date : Sunday, 17-04-2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Choose the most correct alternative: **[10]**

a) If p.g.f. of discrete r.v. X is $(1 + s)/2$ then p.g.f. of $X + 1$ is _____.

i) $(s + s^2)/2$ ii) $(s - 1)/2$

iii) $(s + 1)^2/4$ iv) $(s + 1)$

b) If p.m.f. of r.v. X is as given below then mean of r.v. X is _____.

X	–1	1
P(x)	1/2	1/2

i) 0 ii) 1

iii) –(1/2) iv) –1

c) Let X be a discrete r. v. then V(–2X) = _____.

i) V(X) ii) 4 V(X)

iii) –2 V(X) iv) –4 V(X)

d) If F(x) is the distribution function of random variable X then F(∞) = _____.

i) 0 ii) 1

iii) –1 iv) ∞

P.T.O.

e) If X is a discrete r.v. with mean E(X), then $E[X-E(X)]^2$ is called _____

i) Mean ii) Variance

iii) S.D. iv) Median

f) The limiting distribution of hypergeometric distribution is binomial distribution if _____.

i) $N \to \infty, M/N \to 1/2$ ii) $N \to \infty, M/N \to p$

iii) $N \to 0, M/N \to 1$ iv) $N \to 0, M/N \to p$

g) Mean of Bernoulli Distribution is _____.

i) np ii) p

iii) npq iv) pq

h) If $X \sim B(n, p)$ then p.g.f. of X is _____.

i) $(sp + p)^n$ ii) $sp + q$

iii) $(sp + q)^n$ iv) $(sq + p)^n$

i) If X and Y are independent variables then $Cov(0.9X + 0.6, 0.8Y + 0.3)$ = _____.

i) 7.2 ii) 0

iii) 8.1 iv) $7.2Cov(X, Y) + 0.9$

j) The joint p.m.f. of (X, Y) is $P(x, y) = k(2x + 3y)$, where (x, y) = (1, 1), (1, 2), (2, 1), (2, 2), then k = _____.

i) 1/40 ii) 1/32

iii) 1/12 iv) None of these

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Q2) Attempt Any Two of the following: **[20]**

a) A random variable X has the following probability mass function.

X	0	1	2	3	4
P(x)	5k	4k	3k	2k	k

Find:

i) k

ii) P(X is at least 3)

iii) E(X)

iv) V(X)

v) The cumulative distribution function of X.

b) Define binomial distribution. Find its mean and variance.

c) Define expectation of function of bivariate r.v. (X, Y) and show that

i) $E(X + Y) = E(X) + E(Y)$

ii) If X and Y are independent then $E(XY) = E(X) \times E(Y)$

Q3) Attempt Any Four from the following: **[20]**

a) With reference to univariate discrete random variable

Define:

i) Median

ii) Mode

iii) Mean

b) Find recurrence relation for obtaining probabilities of hypergeometric distribution.

c) Define cumulative distribution function (c.d.f.) of a discrete rand variable and state its important properties.

d) The p.m.f. of discrete random variable X is given by

x	1	4	9
P(x)	0.2	0.5	0.3

Find:

i) $E\left(\sqrt{X}\right)$

ii) $E\left(\frac{1}{X}\right)$

iii) E(Y), where $Y = 2X + 2$.

e) How will you determine mean and variance of random variable X b using its p.g.f.?

f) The joint p.m.f. of bivariate r.v. (X, Y) is given by

x/y	1	2	3
0	0.1	0.2	0.3
1	0.1	0.1	0.2

Find:

i) $P(X = x / Y = 3)$

ii) $E(X/Y = 3)$

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Total No. of Pages : 4

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B.Sc. (Part - I) (Semester - I) Examination, March - 2016

PHYSICS

Mechanics and Properties of Matter (Paper - I)

Sub. Code : 59675

Day and Date : Thursday, 31-03-2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of log table/calculators is allowed.**
4) **Neat and labeled diagrams must be drawn wherever necessary.**

Q1) Select the correct alternatives from the following: **[10]**

a) Acceleration of a body rolling down in an inclined plane is independent of _____ of the body.

i) Mass

ii) Moment of inertia

iii) Volume

iv) Radius of gyration

b) The angular acceleration of compound pendulum is directly proportional to its _____.

i) Linear displacement

ii) Angular velocity

iii) Mass

iv) Angular displacement

P.T.O.

c) The gravitational potential at infinity is _____.

i) Maximum ii) Zero

iii) Minimum iv) Constant

d) The angle of contact between glass and mercury is _____.

i) A right angle

ii) An acute angle

iii) An obtuse angle

iv) Zero angle

e) A beam supported at both ends and loaded at the centre is equivalent t _____.

i) A cantilever

ii) Bent beam

iii) Two cantilever

iv) Three cantilever

f) The excess of pressure is _____ to the radius of the drop of t bubble.

i) Inversely proportional

ii) Directly proportional

iii) Equal

iv) Not equal

D-69

g) The viscosity of water _____ with the increase of pressure.

i) Decrease

ii) Increase

iii) Remains constant

iv) Becomes zero

h) The profile of advancing liquid in the capillary tube is _____.

i) Ellipse

ii) Parabola

iii) Hyperbola

iv) Caternary

i) The dimension of gravitational constant are _____.

i) $[M^{-1}L^{3}T^{-2}]$ ii) $[M^{-2}L^{2}T^{-1}]$

iii) $[M^{-3}L^{-1}T^{-2}]$ iv) $[M^{3}L^{-1}T^{-2}]$

j) The centre of suspension and centre of oscillation of a compound pendulum _____.

i) can not be interchangeable

ii) are interchangeable

iii) are not different points

iv) none of these

[20]

Q2) Attempt any two of the following:

a) Derive an expression for moment of inertia of a spherical shell about its diameter.

b) Describe the Jaeger's method to determine surface tension of a liquid. State some applications of surface tension.

c) Derive the Poiseuille's formula for coefficient of viscosity of liquids.

[20]

Q3) Attempt any four of the following:

a) With a neat diagram, describe Kater's pendulum.

b) Explain the terms gravitational field and gravitational potential.

c) Derive an expression for the bending moment.

d) What is the effect of temperature and pressure on viscosity of liquid.

e) Derive an expression for gravitational potential at a point outside soli sphere.

f) A bar 80 cm long, having breadth and depth 0.5cm is supported at i ends. The depression produced at the middle by a load of 200 gm is mm. Calculate Young's modulus of the material of the bar.

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Total No. of Pages : 4

B.Sc. (Part - I) (Semester - I) Examination, April - 2016
PHYSICS
Oscillations, Waves and Optics (Paper - II)
Sub. Code : 59675

Day and Date : Friday, 1-04-2016
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of log table/calcaulator is allowed.**
4) **Neat diagrams must be drawn wherver necessary.**

Q1) Select the correct alternatives from the following: **[10]**

a) Flat resonance occurs when the damping force is _____.

i) zero
ii) very high
iii) moderately high
iv) high

b) Group velocity u = _____.

i) $v - \lambda \frac{\partial v}{\partial \lambda}$
ii) v
iii) $v - \lambda$
iv) $v - \frac{\partial v}{\partial \lambda}$

c) Ultrasonic waves can be reflected from very tiny objects because _____.

i) very small wavelength
ii) very high wavelength
iii) zero wavelength
iv) very high velocity

P.T.O.

d) Spherical aberration is a defect of image formation due to spherical lenses or mirrors of _____.

i) small curvature

ii) small aperture

iii) large aperture

iv) large curvature

e) Entrance-pupil is the effective area of the _____.

i) objective

ii) eye-lens

iii) field lens for bright image

iv) eye-ring

f) The centre of Newton's ring-pattern by reflected light is _____.

i) bright

ii) dark

iii) partially bright

iv) very bright

g) In fraunhofer type of diffraction the use of lenses is _____.

i) very necessary

ii) not necessary

iii) some times necessary

iv) partially used

h) The human audible range is _____.

i) 20 Hz to 20 KHz

ii) 2 Hz to 2 KHz

iii) 20 KHz and above

iv) 1Hz to 2KHz

i) In Newton's ring experiment expression for wavelength $\lambda =$ _____.

i) $\frac{D_m^2 - D_n^2}{4}$

ii) $\frac{D_m^2}{4(m-n)}$

iii) $\frac{D_m^2 - D_n^2}{R}$

iv) $\frac{D_m^2 - D_n^2}{4(m-n)R}$

j) In Huygen's eyepiece both the lenses are ____lenses.

i) Planoconcave

ii) convex

iii) planoconvex

iv) concave

Q2) Attempt any two of the following: **[20]**

a) What is meant by damped oscillatory motion of a body? Obtain differential equation of damped oscillatory motion and hence obtain expression for the displacement of the body at time t.

b) Derive the expression $V = \sqrt{k/\delta}$ for a longitudinal wave propagating through a fluid.

c) Derive an expression for the longitudinal chromatic aberration for a lens.

[20]

Q3) Attempt any four of the following:

a) State various methods of detection of ultrasonic waves and explain one method in brief.

b) With neat ray diagram explain construction and working of Ramsden's eyepiece.

c) With a neat diagram describe the experimental setup for obtaining Newton's rings.

d) State characteristics of Freshnel type and Fraunhofer type of diffraction.

e) Explain any two methods of minimising spherical aberration in case of lenses and mirrors.

f) Two thin plano-convex lenses in Ramsden's eye-piece are separated from each other by 2 cm. Calculate the equivalent focal length.

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Total No. of Pages : 3

Seat No.	

B.Sc.(Part-I) (Semester-II) Examination, April-2016

PHYSICS

Kinetic Theory of Gases, Heat & Thermodynamics (Paper-III)

Sub. Code : 59682

Day and Date : Tuesday, 12-04-2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

Instructions : 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of Calculator/Logarithmic table is allowed.**

Q1) Select the correct alternative: **[10]**

a) The value of critical pressure in terms of VanderWaal's constant is P_c = _____.

i) $a/27b^2$ ii) $a^2/27b^2$

iii) $a/27b$ iv) $a/27b^3$

b) A scientific device used to measure the temperature of a body is called as _____.

i) Ammeter ii) Thermometer

iii) Calorimeter iv) Potentiometer

c) Thermal conductivity in gases is due to _____.

i) difference in molecular concentration

ii) difference in velocity of molecules

iii) difference in temperature

iv) difference in pressure of gas

P.T.O.

d) Chemical equilibrium refers the uniformity of _____.

i) Temperature ii) Pressure

iii) Entropy iv) Volume

e) The relation between 'P' and 'V' for adiabatic process is _____

i) $P \cdot V^{\gamma} = \text{constant}$ ii) $P^{\gamma} \cdot V^{\gamma} = \text{constant}$

iii) $P^{\gamma} \cdot V = \text{constant}$ iv) $P \cdot V^{\gamma-1} = \text{constant}$

f) The efficiency of Carnot's heat engine 'η' = _____.

i) $\frac{T_1 - T_2}{T_2}$ ii) $\frac{T_1 - T_2}{T_1}$

iii) $\frac{T_1 - T_2}{T_1^2}$ iv) $\frac{(T_1 - T_2)^2}{T_1}$

g) Entropy is a measure of _____.

i) Order ii) Energy

iii) Disorder iv) Composition

h) All natural processes are _____.

i) Isothermal ii) Adiabatic

iii) Reversible iv) Irreversible

i) Total internal energy of the system during isothermal change _____

i) Remains constant ii) Becomes zero

iii) Becomes minimum iv) Becomes maximum

j) Heat produced by a friction is _____ process.

i) Reversible ii) Irreversible

iii) Isothermal iv) Adiabatic

Q2) Attempt Any Two: **[20]**

a) Define critical constants for real gas. Obtain the values of critical constants in terms of VanderWaal's constants.

b) What is entropy? Give its physical significance. Show that entropy of the universe increases.

c) Describe Hg thermometer with principle, construction and different thermometric scales.

Q3) Attempt Any Four: **[20]**

a) Find the efficiency of the Carnot's engine working between the temperatures, 150°C and 50°C.

b) Derive an expression for work done during isothermal change.

c) Wrirte a note on thermodynamic system and thermodynamic state.

d) Give different statements of second law of thermodynamics.

e) Explain dependence of coefficient of viscosity of gas on temperature and pressure.

f) Explain kinetic interpretation of temperature.

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Seat No.	

Total No. of Pages : 3

B.Sc.(Part-I) (Semester-II) Examination, April-2016
PHYSICS
Electricity, Magnetism and Basic Electronics (Paper-IV)
Sub. Code : 59682

Day and Date : Wednesday, 13-04-2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Select the correct alternatives: **[10]**

a) For air the value of dielectric constant K is _____.

i) less than one ii) equal to one

iii) greater than one iv) equal to zero

b) The value of imaginary number 'j' is _____.

i) -1 ii) $\sqrt{-1}$

iii) $\sqrt{1}$ iv) $\sqrt{2}$

c) The unit of figure of merit of a ballistic galvanometer is _____.

i) mm/μA ii) μA^2/mm

iii) μA/mm iv) mm/μV

d) The magnetic moment per unit volume of the magnetic material is called as _____.

i) Magnetic susceptibility ii) Intensity of magnetisation

iii) Magnetic permeability iv) Magnetic induction

e) According to Norton's theorem the entire network can be replaced by a single current source I_N _____.

i) in series with a resistance R_{TH}

ii) in parallel with a resistance R_N

iii) in series with voltage source V

iv) in parallel with voltage source V

f) A circuit which removes the a.c. component of rectifier output is known as _____.

i) amplifier circuit ii) oscillator circuit

iii) filter circuit iv) feedback circuit

g) A transistor has _____ PN junctions.

i) three ii) four

iii) five iv) two

h) For pure a.c. resistive circuit the current and e.m.f should be _____.

i) in phase ii) out of phase

iii) leads by $\pi/2$ iv) lags by $\pi/2$

i) The M.I of coil of B.G is _____.

i) small ii) large

iii) zero iv) very small but not zero

j) Negative feedback _____ the gain of an amplifier.

i) increases ii) keeps constant

iii) decreases iv) makes zero

Q2) Attempt Any Two: [20]

a) Define the three electric vectors. Obtain the relation between these vectors.

b) Obtain an expression for instantaneous current and impedance of LCR circuit in which a.c e.m.f $E = E_o \sin \omega t$ is applied.

c) Give the statement of Thevenin's theorem. With suitable circuit explain the method of calculating V_{Th} and R_{Th}.

Q3) Attempt Any Four: [20]

a) Damping in ballistic galvanometer.

b) Obtain an expression for hysteresis loss.

c) Write a note on

i) Forward biasing ii) Reverse biasing

d) What are positive and negative feedbacks in an amplifier.

e) Resistance of 50Ω, an inductance of 10H and capacitance of 2μF are all connected in series with 220V and 50 Hz supply. Find the current in the circuit.

f) What is dielectrics? Explain it on atomic view.

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Seat No.	

Total No. of Pages : 3

B.Sc. (Biot -Entire) (Part - I) (Semester - II) Examination, April - 2016

PHYSICS - II (Paper - XI)

Sub. Code : 59726

Day and Date : Saturday, 16 - 04 - 2016 **Total Marks : 50**

Time : 12.00 noon to 02.00 p.m.

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

Q1) Select correct alternative from the following : **[10]**

a) Transmission grating is made on a _____.

i) plane glass plate ii) polished metal surface

iii) card board iv) quartz crystal

b) If A & B are inputs of AND gate then, output of this gate Y= _____.

i) A+B ii) A×B

iii) A/B iv) A–B

c) Electrocardiogram (ECG) is the recording of electrical activity of _____.

i) brain ii) heart

iii) ear iv) muscle

d) In hydrogen spectra the Bracket series are observed in _____ region.

i) visible ii) infrared

iii) near infrared iv) ultraviolet

e) Optocoupler is the combination of _____.

i) LED & zener diode

ii) LED & photo diode

iii) LED & Solar cell

iv) LED & transistor.

f) 0 to 9 digits are displayed in _____ device.

i) transistor ii) zener diode

iii) seven segment iv) capacitor

g) The decimal representation of binary 10100 is _____.

i) 60 ii) 55

iii) 20 iv) 100

h) Continuous X-ray spectrum is a type of _____ spectrum.

i) line ii) band

iii) bremsstrahlung iv) line as well as band

i) Dextro-rotatory produce the rotation the plane of polarization of the light towards _____.

i) left ii) right

iii) up iv) down

j) The principal quantum-number is denoted by letter _____.

i) s ii) m

iii) n iv) p

Q2) Attempt any two of the following : [20]

a) With necessary gates state and prove the Demorgan's first and second theorem.

b) State the principle of laser and explain its properties.

c) Describe in details the polarization and depolarization of a cell.

Q3) Attempt any four of the following : [20]

a) Explain the OR gate.

b) Explain the liquid drop model.

c) Describe the construction of the solar cell.

d) Define polarized, unpolarized and partially polarized light.

e) Convert decimal number $(49)_{10}$ to its binary equivalent.

f) Explain how the grating is constructed.

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Total No. of Pages : 3

B.Sc. (Part - I) (Semester - I) Examination, April - 2016
ELECTRONICS (Paper - I)
(Basic Electronics)
Sub. Code : 59666

Day and Date : Wednesday, 6 - 4 - 2016 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Select most correct alternatives: **[10]**

a) Ceramic capacitor is the _____capacitor.

i) Polar ii) Non-polar

iii) Variable iv) None of these

b) Varistor is _____type of resistor.

i) Fixed ii) Linear

iii) Non-linear iv) All of these

c) Which of the following is a passive component_____.

i) Transistor ii) Photodiode

iii) LED iv) Capacitor

d) In case of inductive circuit, current is_____ voltage.

i) Leads ii) Lags behind

iii) In phase with iv) None of these

e) Mesh analysis is based on_____.

i) Kirchhoff's voltage law ii) Kirchhoff's current law

iii) Both iv) None of these

f) An ideal Voltage source has_____internal resistance.

i) ∞ ii) 0

iii) Minimum iv) Maximum

g) In Kirchhoff's Current law, Current meeting the junction point are considered_____.

i) Negative ii) Positive

iii) Infinite iv) Zero

h) Transformer works on the principle of _____.

i) Self induction ii) Mutual induction

iii) Induction iv) None of these

i) Solenoid carrying current behaves as a_____.

i) Resistor ii) Bar magnet

iii) Inductor iv) None of these

j) Fleming's Left hand rule thumb represents direction of _____.

i) Force ii) Field

iii) Current iv) None of these

Q2) Attempt any two of the following: **[20]**

a) Give classification of Resistors. Explain construction and working of photoresistor. Give its application.

b) State and Prove maximum power transfer theorem. Give suitable example.

c) State Flemings Right hand rule, Obtain magnitude of induced e.m.f. in a Conductor placed in magnetic field.

Q3) Attempt any four of the following: **[20]**

a) Give the construction and working of paper capacitor. Where it is used.

b) In case of AC define following terms.

i) Time period.

ii) Frequency.

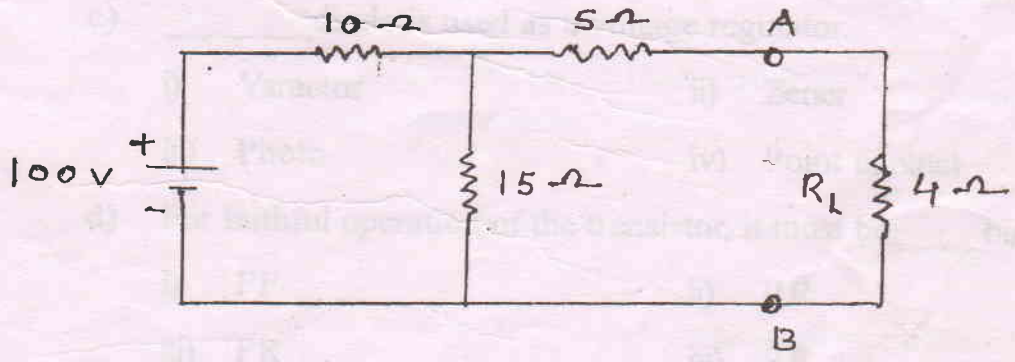
iii) Peak value

c) Explain nodal analysis method for DC resistive circuit.

d) Give construction and working of Lead-Acid battery.

e) Explain step- up and step - down transformer.

f) Using Thevenin's theorem to find current in 4Ω resistor in figure.



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Total No. of Pages : 3

B.Sc. (Part - I) (Semester - I) Examination, April - 2016
ELECTRONICS
Semiconductor Devices (Paper - II)
Sub. Code : 59666

Day and Date : Thursday, 7 - 4 - 2016 **Total Marks :50**

Time : 12.00 noon to 2.00 p.m.

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

Q1) Select most correct alternative for the following: **[10]**

a) Current flowing through the diode under forward bias condition is due to _____carriers.

i) majority ii) minority

iii) both majority & minority iv) none

b) LED emits light under_____condition.

i) Forward bias ii) Reverse bias

iii) Unbiased iv) Both (i) and (ii)

c) _____diode is used as a voltage regulator.

i) Varactor ii) Zener

iii) Photo iv) Point contact

d) For faithful operation of the transistor, it must be_____biased.

i) FF ii) RR

iii) FR iv) RF

P.T.O.

e) _____configuration of the transistor is widely used as an amplifier.

i) CB ii) CE

iii) CC iv) None of these

f) BJT is _____device.

i) Unipolar ii) Bipolar

iii) Multipolar iv) Non-polar

g) The relation between the FET parameters is_____.

i) $\mu = gm.\ rd$ ii) $gm = \mu\ .\ rd$

iii) $r_d = \mu\ .\ gm$ iv) $\mu = gm/rd$

h) SCR is _____layer device.

i) single ii) two

iii) three iv) four

i) The operating point is also known as_____point.

i) cut-off ii) saturation

iii) junction iv) quiescent

j) _____method is widely used for the transistor.

i) **Fixed** bias

ii) **Emitter** bias

iii) **Collector** to base bias

iv) **Voltage divider** bias

Attempt any 'Two' of the following: [20]

a) What is PN-junction? Explain in detail for ward and reverse biased PN-junction.

b) *With proper circuit diagram, explain C.B-configuration. Also explain olp* characteristics.

c) With neat circuit diagram. Explain the working of UJT.

Attempt any 'FOUR' of the following: [20]

a) Write short note on varactor diode.

b) Define alpha (α) and beta (β) of the transistor and derive the relation between them.

c) Write short note on load line.

d) With neat circuit diagram, explain fixed bias method.

e) Explain the construction of JFET.

f) Write note on seven segment display.

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Total No. of Pages : 3

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B.Sc. (Part - I) (Semester - II) Examination, April - 2016
ELECTRONICS
Basic Digital Electronics (Paper - III)
Sub. Code : 59689

and Date : Thursday, 21 - 04 - 2016 **Total Marks : 50**

e : 12.00 noon to 2.00 p.m.

ructions :
1) **All questions are compulsory.**
2) **Figures to the right indicates full marks.**
3) **Draw neat diagrams wherever necessary.**
4) **Use of Log table and calculator is allowed.**

Select the correct alternatives for the following: **[10]**

a) The keyboard consists of electronic circuit called _____.

i) Counter ii) Register

iii) Encoder iv) Decoder

b) In 4 bit parallel binary adder _____ full adders are used.

i) One ii) Two

iii) Three iv) Four

c) IC 7432 contains four _____ gates

i) AND ii) OR

iii) NOT iv) NAND

P.T.O.

d) Boolean inversion is provided by _____ gate.

i) AND ii) NOT

iii) OR iv) NOR

e) In Boolean algebra $A+\bar{A}$ = _____.

i) 1 ii) B

iii) A iv) 0

f) In K map _____ eliminates three variables.

i) Pair ii) Quad

iii) Octate iv) None of these

g) Self Complementary property occurs in _____ code.

i) 8421 ii) ASCII

iii) Gray iv) Excess 3

h) _____ is the invalid octal number.

i) 125 ii) 256

iii) 528 iv) 525

i) The _____ gate has a high output when any or all inputs are high.

i) AND ii) OR

iii) NAND iv) NOT

j) In hexadecimal number system the number occurs after 1FH is _____

i) 10 ii) 20

iii) 2F iv) 1E

Q2) Attempt any two of the following: (10 Marks each) **[20]**

a) Explain the organization of computer System with suitable diagram.

b) State and explain De Morgans theorems with suitable diagram and truth table.

c) Explain the working of TTL NAND gate with suitable diagram and truth table.

Q3) Attempt any four of the following: (5 Marks each) **[20]**

a) Convert $9875_{(10)}$ into equivalent hexadecimal number.

b) What is Excess 3 code? Add 215_{10} and 528_{10} in Excess 3 code.

c) Explain Full adder circuit with suitable diagram.

d) Explain the K map for four variables with suitable example.

e) Explain hexadecimal number system in detail.

f) What are the various characteristics of digital computer?

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Total No. of Pages :2

B.Sc. (Part -I) (Semester -I) (New Course) Examination, April - 2016

BOTANY

Diversity in Non-Vascular Plants (Paper - I)

Sub. Code: 59677

Day and Date :Monday, 04 - 04 - 2016 **Total Marks : 50**

Time :12.00 noon to 2.00 p.m.

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

Q1) Rewrite the following sentences by choosing correct alternatives: **[10]**

a) Spiral bacteria are called _____ bacteria.
   i) Coccus ii) Spirullum
   iii) Vibrios iv) Bacillus

b) Alga growing in salt takes are called _____ alga.
   i) epiphytic ii) Halophytic
   iii) epizoic iv) endozoic

c) _____ lichens grow on rocks and stones on firm substrum in cold regions.
   i) Saxicolous ii) Corticolous
   iii) Terricolous iv) Epiphytic

d) The closed fruiting body (ascocarp) is also called _____.
   i) Perithecium ii) Apothecium
   iii) Cleistothecium iv) Sclerotium

e) _____ is an example of floating bryophyte.
   i) Riccia fluitans ii) Anthoceros
   iii) Marchantia iv) Cryptothallus

P.T.O.

f) _____ is a parasitic red alga growing on the leaves of angiospermic plants.

i) Ectocarpus ii) Batrachospermum
iii) Gracilaria iv) Cephaleuros parasitica

g) _____ is green sulphur photosynthetic bacterium.

i) Chlorobium ii) Pseudomonas
iii) Xanthomonas iv) Rhizobium

h) _____ forms symbiotic association in coralloid roots of gymnosperm, → Cycas.

i) Nostoc ii) Ulothrix
iii) Oedogonium iv) Volvox

i) In _____, sporophyte remain embeded in the gametophytic thallus.

i) Funaria ii) Porella
iii) Anthoceros iv) Riccia

j) In _____ thallus, photosynthetic region is made up of assimilatory cells arranged in vertical rows.

i) Funaria ii) Poytrichum
iii) Pogonatum iv) Riccia

Q2) Attempt any two of the following: **[20]**

a) Describe the sexual reproduction → in Riccia.
b) Describe the structure of the mycelium and sexual reproduction in Mycor.
c) Describe the positive and negative economic importance of algae.

Q3) Attempt any four of the following: **[20]**

a) General characters of bryophytes.
b) General characters of fungi.
c) Positive economic importance of fungi.
d) Vegetative reproduction in Nostoc.
e) Asexual reproduction in cercospora.
f) Scalariform conjugation in spirogyra.

EEE

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Total No. of Pages :2

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B.Sc. (Part -I) (Semester -I) (New Course) Examination, April - 2016
BOTANY
Plant Biochemistry Physiology and Ecology (Paper - II)
Sub. Code: 59677

Day and Date :Tuesday, 05 - 04 - 2016 **Total Marks : 50**
Time :12.00 noon to 2.00 p.m.

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

Q1) Rewrite the following sentences by choosing correct alternatives: **[10]**

a) _____ is a fundamental, structural and functional unit of living organisms.

i) Organelle ii) Organ
iii) Tissue iv) Cell

b) At _____ temperature water has maximum density.

i) 10°C ii) 100°C
iii) 4°C iv) 105°C

c) For metabolic processes of the cell, energy is supplied by _____ molecules.

i) ADP ii) ATP
iii) AMP iv) NADP

d) The shrinkage of protoplasm due to loss of water is known as _____.

i) exosmosis ii) endosmosis
iii) plasmolysis iv) diffusion

e) Guttation occurs through _____.

i) Stomata ii) Lenticels
iii) Hydathodes iv) Salt glands

P.T.O.

f) Induced fit Hypothesis was proposed by _____.

i) Fischer ii) Summer

iii) Koshland iv) Kuhne

g) For formation of primary structure in proteins, _____ are responsible.

i) Covalent interactions ii) Non-covalent interactions

iii) Enzyme actions iv) Osmotic processes

h) The loss of water in the form of water vapour by aerial parts of plant is called _____.

i) Diffusion ii) Osmosis

iii) Guttation iv) Transpiration

i) The plants that tolerate extremely low temperature are called _____.

i) microtherms ii) megatherms

iii) Hekistotherms iv) mesotherms

j) The total amount of hygroscopic and capillary water present in soil is called _____.

i) diffusion ii) endosmosis

iii) exosmosis iv) water holding capacity

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

a) Define enzyme and explain the mechanism of enzyme action.

b) What is transpiration? Describe the starch-sugar hypothesis.

c) Describe edaphic factors.

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

a) Covalent interactions.

b) Properties of water molecule.

c) Ascent of sap.

d) Significance of transpiration.

e) Guttation.

f) Wind as a ecological factor.

EEE

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Total No. of Pages : 3

Seat No.	

B.Sc. (Part - I) (Semester -II) (New) Examination, April - 2016

BOTANY

Diversity In Vascular Plants (Paper -III)

Sub. Code:59684

Day and Date :Monday, 18-04-2016 **Total Marks :50**

Time :12.00 noon to 2.00 p.m.

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

Q1) Rewrite the following sentences by choosing correct alternatives. **[10]**

a) In general orchids like vanda are called as _____.

i) Parasites ii) Epiphytes

iii) Hydrophytes iv) Symbiotic

b) _____ are called higher vascular plants.

i) Bryophytes ii) Gymnosperms

iii) Angiosperms iv) Pteridophytes

c) Heterospary is usually observed in _____.

i) Equisetum ii) Pteris

iii) Psilotum iv) Selaginella

P.T.O.

d) Selaginella are commonly called _____ moss.

i) Spike or club ii) Horsetail

iii) Thalloid iv) Lycopod

e) In selaginella stem radially arranged endoderm cells are called _____.

i) Trabaculae ii) Airspaces

iii) Hypodermis iv) pericycle

f) _____ seeds are naked.

i) Gymnosperms ii) Angiosperms

iii) Pteridophytes iv) Bryophytes

g) Monoxylic wood is a characteristic of _____.

i) Coniferales ii) Gnetales

iii) Cycadales iv) Selaginellales

h) Normal root of cycas usually shows _____ type of xylem.

i) Triarch ii) Tetrach

iii) Polyarch iv) Diarch

i) _____ are responsible for increase the girth of the plant body.

i) Intercalary meristem ii) Apical meristem

iii) Lateral meristem iv) Apical & intercalary meristem

j) In solanaceae members _____ vascular bundles are present in stem.

i) Collateral ii) Bicollateral

iii) Radial iv) Amphivesal

Attempt any two of the following: [20]

a) Describe the morphology of typical stem and leaf.

b) Describe the types of tissues in plants.

c) Describe the structure of megasporophyll in cycas.

Attempt any four of the following: [20]

a) Strobilus of selaginella.

b) Special tissues.

c) Concentric vascular bundle.

d) Functions of taxonomy.

e) Megasporophyll of cycas.

f) Diversity in Angiosperms with respect to ecological role.

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Total No. of Pages : 3

Seat No. |

B.Sc. (Part - I) (Semester - II) (New) Examination, April - 2016

BOTANY

Cytology, Genetics and Utilization of Plants (Paper - IV)

Sub. Code : 59684

Day and Date : Wednesday, 20 - 04 - 2016 Total Marks : 50

Time : 12.00 noon to 2.00 p.m.

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

Q1) Rewrite the following sentences by choosing correct alternatives: [10]

a) DNA doubles during _____.

i) interphase ii) anaphase

iii) prophase iv) telophase

b) Mitosis is _____ cell division.

i) equational ii) reductional

iii) rotational iv) doubbling

c) An organism with two unlike genes of a trait is called _____.

i) homozygous ii) heterogyous

iii) monozygous iv) hermaphrodite

P.T.O.

d) The genes of different pairs may interact was first observed by _____.

i) Bateson ii) Punnett

iii) Bateson and Punnett iv) Mendel

e) The cereals belong to family _____.

i) Poaceae ii) Rubiaceae

iii) Anacardiaceae iv) Rutaceae

f) Sonalika is high yielding veriety of _____.

i) Rice ii) Wheat

iii) Jowar iv) Bajara

g) Botanical name of Ground nut is _____.

i) Zea mays ii) Cajanus cajan

iii) Archis hypogea iv) Sorghum bicolor

h) Legumes are rich in _____.

i) Proteins ii) Carbohydrates

iii) Vitamins iv) Minerals

i) Ornamental plant Quisqualis indica is _____.

i) Shrub ii) Tree

iii) Climber iv) Aroid

j) Father of Genetics is _____.

i) Darwin ii) Mendel

iii) Morgan iv) Bateson

Q2) Attempt any TWO of the following: [20]

a) What is apoptosis? Give mechanism of apoptosis.

b) What is gene interaction? Explain with suitable example complementary gene interaction.

c) What are ornamental plants? Give botanical name, morphology of orgamental plants that you have studied.

Q3) Attempt any four of the following: [20]

a) Cytokinesis.

b) Morphology of Red gram.

c) Economic importance of Jowar.

d) Structure of prokaryotic cell.

e) Epistatic gene.

f) Significance of meiosis.