FyBSc – Physics – Paper I Nov/Dec 100 marks
Semester – I 23/11/2017

Q.P. Code:24982

[Time : Three Hours] [Marks : 100]

Please check whether you have received the right question paper.

N.B.: 1. Figures to the right indicate full marks.
2. Use of non-programmable calculator is permitted.

Q. 1 A) **Select correct option.** 12

i) The coefficient of static friction in terms of normal reaction N and limiting force of friction f acting on a mass m is given by
a) $\frac{N}{f}$ b) $\frac{f}{N}$ c) $f \times N$ d) $\sqrt{f \times N}$

ii) Airplane's dynamic lift is based on
a) Bernoulli's principle b) Fermat's principle
c) Archimedes principle d) Pascal's law

iii) Two lenses with focal lengths 10cm and 20cm and made of same material are placed coaxially separated by distance d. The value of d such that the system is achromatic is
a) 20 cm b) 30 cm c) 10 cm d) 15 cm

iv) Radius of n^{th} Newton's ring seen with light of wavelength λ is proportional to
a) wavelength of light b) thickness of the air film
c) square root of wavelength d) radius of curvature of lens

v) The dimensions of the constants b in Vander Waals' gas equation are that of
a) volume b) $\frac{volume}{pressure}$ c) $\frac{pressure}{volume}$ d) Temperature

vi) Which of the following is a path function?
a) Work done by the system b) Internal energy
c) Heat absorbed by the system d) Both a and c

B) **Answer in one sentence.** 3

i) Define Young's modulus.
ii) State any one method of reducing spherical aberration.
iii) State the reason for volume correction by Van der Waal in ideal gas equation.

C) **Fill in the blanks.** 5

i) The working of venturimeter is based on the _____ principle
ii) Poise is the unit of _____
iii) In _____ eyepiece, cross-wires are not used.
iv) The centre of the Newton's rings pattern in reflected light appears _____
v) The amount of work done in an isochoric process is _____

Q. 2 A) Attempt **ANY ONE.** 8

i) A body of mass m is suspended by two strings making angles α and β with the horizontal. Find the expression for tensions in the strings. If m=1 kg, $\alpha=30^o$ $\beta=60^o$. Find magnitudes of tensions T_1 and T_2 in the two strings.

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ii) Define Modulus of Rigidity and Poisson's Ratio. Consider a unit cube of homogenous, isotropic material and show that $Y = 2\eta(1+\sigma)$ where symbols have their usual meanings.

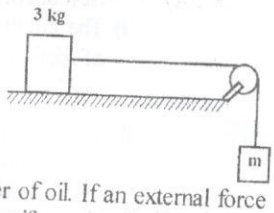
B) Attempt **ANY ONE.** 8

i) Establish relation $Y = 3K(1-2\sigma)$ between elastic constants considering a unit cube of a homogenous and isotropic material.

ii) Derive Bernoulli's theorem for streamline flow.

C) Attempt **ANY ONE.** 4

i) The coefficient of static friction between the block of 3 kg and the table is 0.3. What should be the limiting value of mass 'm' so that the block remains at rest? The string and pulley are light and smooth. Take g= 10 m/s^2



ii) A metal plate of area 10 cm^2 rests on 2 mm thick layer of oil. If an external force of 0.5 N applied on the plate keeps it moving with a uniform speed of 1.5 cm/s, find the coefficient of viscosity of oil.

Q. 3 A) Attempt **ANY ONE.** 8

i) With the help of a diagram, explain chromatic aberration and hence obtain the expression for longitudinal chromatic aberration when the object is placed at infinity.

ii) With the help of diagrams, explain the principal and focal points of a thick lens. Also, explain their importance.

B) Attempt any **ONE** 8

i) What are Newton's rings? Derive expressions for the radii of dark and bright rings.

ii) What is an eyepiece? Explain the construction of Ramsden's eyepiece and draw a diagram representing positions of its cardinal points. Can we use cross-wires with this eyepiece?

C) Attempt **ANY ONE** 4

i) An achromatic doublet of focal length 10cm has two lenses made of materials having dispersive powers in the ratio 3:4. What may the focal lengths of the two lenses?

ii) A wedge-shaped film having wedge angle of 30 seconds of an arc is formed by introducing a drop of liquid of refractive index 1.5 between two glass plates. If light of 6000 A^0 is used, find the distance between successive bright fringes viewed in reflected light.

Q. 4 A) Attempt **ANY ONE** 8

i) Derive an expression for the work done by an ideal gas in an adiabatic process.

ii) Explain the behaviour of gases at high pressure and hence obtain the expression for the Boyle's temperature.

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B) Attempt **ANY ONE** 8

i) Show that, for an ideal gas, the relation between specific heats is $C_p - C_v = R$; where, the symbols have their usual meanings

ii) State the ideal gas equation. Discuss the Van der Waals' corrections to the pressure and volume terms of this equation.

C) Attempt **ANY ONE** 4

i) One mole of a perfect gas at 127 ^{O}C undergoes isothermal expansion till the volume is doubled. Calculate the work done by gas and the heat absorbed. Given:- R = 8.3 J/mol ^{0}K

ii) The air in a motor car's tyre-tube has a pressure of 3 atm, at the room temperature of 27 ^{0}C. If the tyre suddenly bursts, determine the resulting temperature.

Q. 5 Attempt **ANY FOUR** 20

i) A block slides down an incline of inclination angle 30° with an acceleration $\frac{g}{4}$. Find the coefficient of kinetic friction.

ii) For an incompressible fluid flowing with velocity v through a pipe having area of cross-section A show that Av=constant.

iii) Write a note on spherical aberration.

iv) Explain how Newton's rings can be used to measure the refractive index of a liquid.

v) Derive expression for work done by perfect gas in an isothermal transformation.

vi) Comment on the limitations of the Van der Waals' equation

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F.Y. B.Sc : Semester - I

Physics - Paper - II 28/11/2017

Q. P. Code: 12202

Duration 3 hrs Max Marks 100

N:B: 1. All questions are *compulsory.*
2. Figures to the right indicate *full marks.*
3. Use of *non-programmable calculator* is permitted.

Q.1 A) Select the correct option. (12)

i) If *M* is the atomic mass, *A* is mass number, then *(M-A)/A* is called

a) packing fraction
b) mass defect
c) Fermi energy
d) binding energy.

ii)The radioactivity of an element becomes $1/32^{th}$ of its original value in 60 second. The half value period is

a) 30s
b) 12s
c) 10s
d) None of the above

iii) The values of X and Y in the reaction ${}^{16}_{8}O + {}^{2}_{1}H \rightarrow {}^{X}_{8}O + {}^{3}_{Y}H$ are:

a) X=16 ,Y= 1 b) X=15 ,Y= 2 c) X=15 ,Y= 1 d) None of the above

iv) In case of Geiger counter which of the following is correct?

a) Radiation exposes photographic film.
b) Radiation ionizes atoms and molecules.
c) Radiation causes the temperature of water to increase.
d) More than one correct response.

v) Dual nature of light means

a) light behaves like particles but not waves
b) light behaves like waves but not particles
c) light behaves like neither particles nor waves
d) light behaves like both particles and waves

(vi) In Davisson and Germer experiment $\varphi=50^0$ and lattice constant $D=2.15A^0$ then λ is.....
a)$2.30A^0$ b)$1.65A^0$ c) $1.1\ A^0$ d) None of these.

B) Answer in one statement. (3)

i) What is the ratio of nuclear densities near the center of the two nuclei having mass number in the ratio 1:5?

ii) What are stripping reactions?

iii) State Bragg's law?

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Q2 A) Attempt any ONE (8)

i) Describe Rutherford alpha particle scattering experiment to give an idea about the size and density of nucleus.

ii) Draw the graph showing the variation of binding energy per nucleon with the mass number .What are the main inferences from the graph? Explain with the help of this plot the release of energy in the processes of nuclear fission and fusion .

B) Attempt any ONE (8)

i) Explain the process of carbon dating. How the age of a geological sample is determined?

ii) Discuss 'radioactive equilibrium' and the conditions under which the secular and transient equilibrium are obtained.

C) Attempt any ONE (4)

i) Compute the (B/A) binding energy per nucleon of $_5B^{11}$ if m (p) = 1.0081437 amu, m(n)= 1.008983 amu and m $_5B^{11}$ =11amu. 1 amu = 931 MeV

ii) Calculate the B.E. and packing fraction for Helium. The atomic masses of proton, neutron and helium are 1.00814 u, 1.00898u & 4.00387u respectively.

Q 3 A) Attempt any ONE of the following. (8)

i) With the help of neat diagram, explain the construction and working of Geiger - Mueller counter.

ii) Explain the interaction between particles and matter giving appropriate examples.

B) Attempt any ONE of the following. (8)

i) Define Q - value of the nuclear reaction. Obtain Q - equation.

ii) Write Q value equation and discuss general solution of the Q - equation .Comment on its solution.

C) Attempt any ONE of the following (4)

i) Find the quantity of energy released in kilowatt hour by 1m gm of Uranium, if one atom of ^{235}U releases the energy of 200 MeV in nuclear fission reaction

ii) Calculate the Q value of the reaction in MeV $^{10}_5B(\alpha,p)^{13}_6C$.

Given : Atomic masses : Boron = 10.013534 a.m.u., Carbon = 13.003354 a.m.u., Helium = 4.002603 a.m.u., Proton = 1.007825

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4. **(A) Attempt any one:-** **(8)**

i) What is Compton effect? Derive an expression for Compton shift in wavelength of the photon.

ii) Describe the Coolidge tube for X-Ray production. Enlist some properties of X-Ray.

(B) Attempt any one:- **(8)**

i) Define gravitational red shift and find expression for it.

(ii) Discuss the distribution of energy in the spectrum of black body radiation.

(C)Attempt any one:-

(i) Calculate the wavelength of scattered photon at 30^0 by X-ray of wavelength 6×10^{-7} m in carbon atom. (4)

(ii) Calculate the critical voltage required to stimulate the emission of characteristics lines of K-series in tungsten, if K absorption edge $1A^0$.

Q.5 : A) Attempt any FOUR **(20)**

i) Explain the terms: (i) Disintegration constant (ii) Half life (iii) Mean life of a radioactive element and write relation between them.

ii) What activity in dis/min. gm. would be expected for carbon sample from bones that are said to be 200 years old. Activity of C^{14} in living plant =15dis/min. gm. T= 5570 yrs.

iii) Write short note on Bremsstrahlung process.

iv) Distinguish between the ionization chamber and GM counter.

v) What are matter waves? Write properties of matter waves.

vi) Describe G.P.Thomson experiment to verify dual nature of particle.

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F4 BSC

S0121 / S1640 CHEMISTRY : PAPER I 21/11/2017

Q.P. Code : 12156

[Time: Three Hours] [Marks: 100]

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Answer to the same question must be written together.
3. Figures to the right indicate full marks.
4. Use of non-programmable calculator is allowed.

Q.1 A) Select the correct option and complete the following sentences: 12

i) For exothermic reaction enthalpy change is _____
a) negative b) positive c) zero

ii) The normality of 1M H_2SO_4 is _____
a) 0.5 b) 2.0 c) 1.0

iii) State functions are _____
a) path dependent b) inexact differentials c) path independent

iv) Enthalpy is _____
a) extensive property b) intensive property c) colligative property

v) The azimuthal quantum number of 3P electron is _____
a) 0 b) 1 c) 2

vi) The number of radial nodes for 3S orbital is _____
a) 1 b) 2 c) 3

vii) Ionisation enthalpy of elements _____ across the period.
a) remains same b) increases c) decreases

viii) De Broglie wavelength of an electron is given by equation _____
a) $\lambda = \frac{h}{2\pi}$ b) $\lambda = \frac{h}{mv}$ c) $\lambda = \frac{c}{v}$

ix) The group _____ exhibits +I effect
a) $-C_2H_5$ b) –CN c) -Cl

x) Benzyl Carbocation is _____
a) primary b) secondary c) tertiary

xi) Carbon-Carbon bond length is maximum in _____ bond
a) triple b) double c) single

xii) _____ are electron deficient species.
a) electrophiles b) nucleophiles c) bases

B) State whether the following statements are True or False: 03

i) Number of millimoles is equal to volume in cm^3 multiplied by molarity.
ii) No two electrons can have all four quantumn number same in a given atom.
iii) Helerolytic fission results in formation of free radicals.

Q.P. Code : 12156

C) Match the following columns: 05

Column A	Column B
i. 20 ppm	a. R-OH
ii. Isobaric process	b. 32
iii. Groups in the periodic table	c. $\Delta p = 0$
iv. Number of elements in VIth period	d. 18
v. Alcohol	e. 20mg per dm^3
	f. 0.2mg per dm^3

Q.2 A) i) Explain the terms
a) Enthalpy of Formation
b) Enthalpy of Combustion 05

ii) Define heat capacity at constant volume. Calculate the value of ΔE on heating 3 moles of oxygen from 0°C to 100°C. Given Cv = 20.92 $J.K^{-1}$ mol^{-1}. 03

OR

A) i) What is standard state?
The heat of a certain reaction
$A_2+3B_2 \rightarrow 2AB_3$
Is -92000 J at 300 K. What will be its value at 333 K? Given ΔCp = -39.4 J
ii) State the first law of thermodynamics. State its any one limitation. 03

B) i) Calculate the amount of heat necessary to raise the temperature of 180 g water from 20°C to 110°C. 05
Molar heat capacity of water is 75.3 $J\ K^{-1}$ mol^{-1}
At.Wt. of H = 1, O = 16.
ii) Calculate the weight of the following substances that will be required to prepare 03
a) 500cm^3 of 0.1N $H_2C_2O_4.2H_2O$ solution
b) 600cm^3 of 0.15N Na_2CO_3 solution
c) 700cm^3 of 0.1N $KHCO_3$ solution
Equivalent weight $H_2C_2O_4.2H_2O$ = 63
Equivalent weight Na_2CO_3 = 53
Equivalent weight $KHCO_3$ = 100

OR

B) i) Define work.
Calculate q, w and ΔE when two moles of monoatomic gas expand adiabatically against constant external pressure of 2 atm from a volume of 2dm^3 to 14dm^3 at 303 K. 05
Given: 1dm^3.atm = 101.325 Joules
ii) 14g of KOH is dissolved in 1dm^3 of solution. Calculate molarity of solution K = 39, O = 16, H = 1

C) i) Define
a) open system b) heat. 02
ii) Define the terms
a) milliequivalent b) Molality 02

OR

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Q.P. Code : 12156

C) i) Define
a) closed system b) Isolated system
ii) Differentiate between ppm & ppb 02

Q.3 A) i) Explain Rutherford's model of atom based on alpha particle scattering experiment. 02
ii) What are hydrogenic species? Give two examples. Explain their significance in developing quatum models. 05

OR

A) i) Plot and explain radial probability distribution curve of 2S electron. 03
ii) Explain any two drawbacks of Bohr's atomic model. 05

B) i) What is Pauling's definition of electronegativity? Explain variation in electronegativity of elements across the period and down the group. 03
ii) Calculate the effective nuclear charge felt by 2P electron in oxygen atom (Atomic number 8) 05

OR

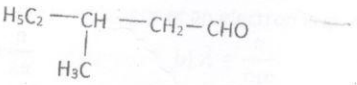
B) i) What is meant by atomic radius? Explain its variation across the period and down the group. 03
ii) State modern periodic law. What are the types of elements in the long form of periodic table? 05

C) Distinguish between Ψ and Ψ^2 03

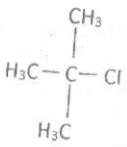
OR

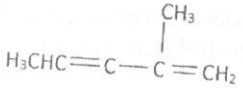
C) Explain Lyman and Balmer series of spectral lines observed in atomic spectrum of hydrogen. In which spectral regions are the lines observed? 04

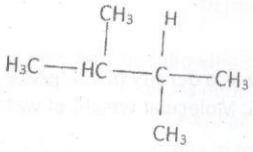
Q.4 A) i) Give IUPAC names of the following compounds:- 04

i) 

ii) 

iii) 

iv) 

v) 

ii) Explain orbital structure of ethane. 05

OR

03

Q.P. Code : 12156

A) i) Write the structures of the following:- 05
   a) Ethoxy ethane
   b) Butan-2-one
   c) Nitroethane
   d) Propyne
   e) Petanoic acid

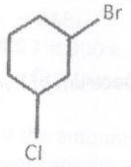
   ii) Indicate the type of hybridization of C, N, O atoms in CH_3CONH_2 03

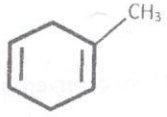
B) i) Explain lewis concept of acids and bases with a suitable example for each. 05
   ii) Name three types of organic reactions and give one example for each. 03

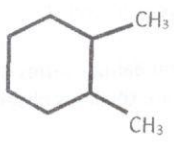
OR

B) i) Give structure with geometry, bond angle and hybridization of carbocation. 05
   ii) Explain the terms-electrophile and nucleophile with a suitable example for each. 03

C) Give IUPAC names of the following compounds:- 04

i) 

ii) 

iii) 

iv) 

OR

C) Draw structures for the following compounds:- 04
   i. 1,3-cyclopentadiene
   ii. Cyclopentanamine
   iii. Cyclohexane carboxylic acid
   iv. 3-methyl cycloheptanone

Q.5 Attempt any four of the following:

A) Explain the terms: 05
   i. Bond dissociation energy
   ii. Resonance energy.

B) A solution containing 13.0g of oxalic acid per $500cm^3$ of solution has a density of $1.07g/cm^3$. Calculate the mole fraction of oxalic acid. Molecular weight of oxalic acid = 126. Molecular weight of water = 18. 05

C) Draw and explain shapes of S and p orbitals. 05

D) Explain Heisenberg uncertainty principle, using its mathematical expression. 05

E) Explain inductive effect 05

F) What is sp^3 hybridisation? Explain sp^3 hybridization of carbon in methane. 05

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F.Y. B.Sc : Semester – I

Chemistry : Paper II

24/11/2017

Q.P. Code :12153

[Time: Three Hours] [Marks:100]

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. Answer to the same questions must be written together.
3. Figure to the right indicate full marks.
4. Use of Non-Programmable calculator is allowed.

Q.1 **Select the correct option and complete the following sentences:** (12)

i) The units of the role constant of a second order reaction with equal initial concentration of the reactants are _____.

a) $dm^3\ mol^{-1}\ s^{-1}$ b) mol. $dm^3\ s^{-1}$ c) time. mol^{-1}

ii) Units of surface tension is _____.

a) Nm^{-1} b) Nm^2 c) $N^{-1}m$

iii) The saponification of ethyl acetate is a reaction of_____order.

a)First b) Second c) third

iv) With increasing molecular mass of a liquid, the viscosity_____.

a) Increases b) Decreases c) No effect

v) Among the following _____ can cause global warming.

a) H_2 b) O_2 c) Co_2

vi) Among the following _____has valence electrons in the third shell.

a) Boron b) Oxygen c) Phosphorus

vii) _____element exhibits catenation property.

a) Sodium b) Calcium c) Carbon

viii) Bucky ball fullerene is an allotrope of _____

a) Carbon b) Phosphorus c) Sulfur

ix) The _____group from following have the lowest priority as per sequence rule

a) – Cl b) $-CH_3$ c) - OH

x) Absolute configuration of molecule is determined using _____technique

a) X-ray diffraction b) Polarography c) I.R. Spectroscopy

xi) Among following _____will exist as optical isomer

a)$(CH_3)_2$ C=CH_2 b) $CH_3 - CHClCH_3$ c) $CH_3\ CH(OH)CN$

xii) Racemic mixture rotates plane polarised light in _____.

a) anti clockwise direction b) neither direction c) clockwise direction

B **State whether the following statements are true or false:** (03)

i) Metallic character increases down the group in the periodic table.

ii) Half life time for a fist order reaction is a constant and independent of the initial concentration

iii) Meso isomer is optically inactive

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C **Match the following columns:** (05)

	A		B
i)	$N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$	a)	Represented by 'd'
ii)	Nematic mesophase	b)	Group 14
iii)	Dextro reotatory enantiomer	c)	Acidic
iv)	Germanium	d)	Unimolecular reaction
v)	Carbon dioxide	e)	Liquid crystal

Q.2 A i) A second order reaction with a=b is 30% complete in 80 minutes. Calculate the time taken for 90% completion of the reaction. (05)

ii) Explain =Acid catalysed inversion of a cane sugar (sucrose) as a pseudo unimolecular reaction (03)

OR

A i) A second order reaction with equal initial concentration of the reactants is 80% complete in 1Hr. Calculate how much amount will be left unreacted at the end of 2hrs. (05)

ii) Explain-Acid catalysed hydrolysis of methyl acetate. (03)

B i) What is coefficient of viscosity? At 293K, water with a viscosity of 0.0101 poise and density 0.997 gcm^{-3} takes 1.9 minutes to flow through a viscometer. Find the time required by an organic liquid to flow through the same viscometer, given its density to be 0.890 gcm^{-3} & its viscosity to be 0.0062 poise. (05)

ii) Explain the term Molar Refractivity. (03)

OR

B i) In a Stalagamometer experiment, the same volume of organic liquid and water formed 40 and 35 drops respectively. It the surface tension of water is 7.2×10^{-2} Nm^{-1}. Calculate the surface tension of organic liquid. The density of organic liquid is 0.84×10^3 kgm^{-3} and that of water is 1.0×10^3 kgm^{-3}. (05)

ii) What is refractive index? Explain the term 'Molar refraction'. (03)

C i) Define a) Molecularity of a reaction b) Rate of a reaction (02)

ii) Define a) Viscosity b) Liquid crystal (02)

OR

C i) Explain the Order of a reaction (02)

ii) Define a) Surface tension b) Specific refractivity (02)

Q.3 A i) How does beryllium differs from other group 2 elements? (04)

ii) Write the similarities shown by lithium and magnesium. (04)

OR

A i) Oxygen behaves differently with respect to the other elements in the same group; justify the statement. (04)

ii) Explain the diagonal relationship between boron and silicon. (04)

B i) How is calcium oxide prepared? What are its properties? (any two) (04)

ii) Outline the importance of sodium chloride (04)

OR

B i) State any four uses of sodium bicarbonate. (04)

ii) Write one method of preparation and two properties of calcium carbonate. (04)

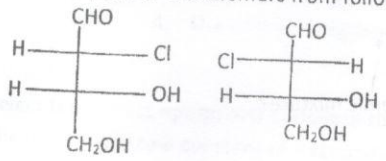
C Summarise the characteristics of nitrides of alkali and alkaline earth metals. (04)

OR

C What are the different types of oxides formed by alkali metals? Explain each with a suitable example. (04)

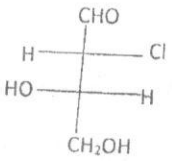
Q.4 A i) Write a short note on various conformations of n-butane. (04)

ii) Enlist two pairs of enantiomers from following (04)

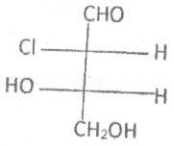


(I)

(II)



(III)

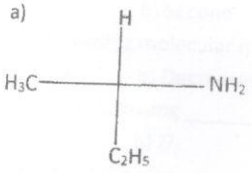


(IV)

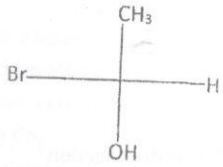
OR

A i) Assign 'R' or 'S' descriptors to the following molecules using sequence rule. (04)

a)



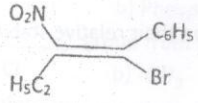
b)



ii) Define geometric isomerism. Explain geometric isomerism in olefins and cyclic compounds. (04)

B i) Using sequence rule decide priority order of the substituents and assign 'E' or 'Z' descriptors to following molecules. (04)

a)



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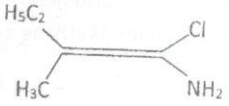


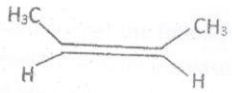
ii) Identify the compound containing chiral carbon from following (04)

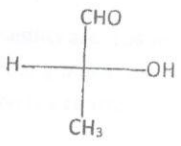
a) OHC-$CHNH_2$-CH_2OH b) CH_3CHBr_2

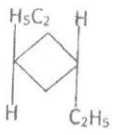
c) CH_3-CHCl-C_2H_5 d) HOOC-CHOH-CH_3

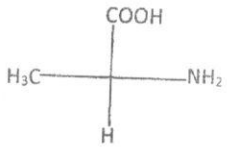
OR

B i) Assign 'D' or 'L' OR 'cis' or 'trans' notations, whichever applicable to the following compounds:- (04)



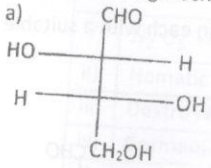




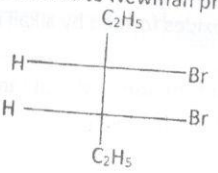


ii) Convert following Fischer projection formulae to Newman projection formulae (04)

a)



b)

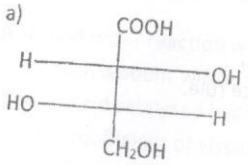


C What is racemic mixture? What is resolution of racemic mixture? (04)

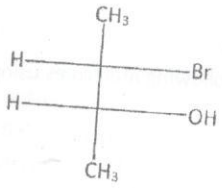
OR

C Lable the following structures with Erythro and Threo notations (04)

a)



b)



Q.5 **Attempt any four of the following**

A Explain the kinetic characteristics of a first order reaction (05)

B i) Explain Integration method of determination of order of a reaction. (05)

ii) Draw a neat labelled diagram of stalagmometer. (03)

C Write a note on photo chemical smog (02)

D Explain the control techniques used for the emission of oxides of carbon. (05)

E Distinguish between enantiomers and diastereoisomers. (05)

F What is conformation? Explain conformations of ethane and comment on their relative stabilities. (05)

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FyBsc – Mathematics – I Semester – I
22/011/2017

Q.P.Code : 12086

(3 Hours) [Total Marks : 100

N.B.: 1. All questions are compulsory.
2. Figures to the right indicate full marks.

Q.1 Choose correct alternative in each of the following: (20)

i. Multiplicative inverse of a real number
(a) Exists and is unique
(b) Does not exist
(c) If exists then is unique
(d) None of these

ii. If $A = (2, 5]$ then
(a) $Inf\ A \in A$ (b) $Inf\ A \in A$, $sup\ A \in A$
(c) $Sup\ A \in A$ (d) None of these

iii. If $0 < x < 1$ then
(a) $x^2 > x$ (b) $x^2 > 1$
(c) $x^2 < x$ (d) None of these

iv. The sequence (x_n) where $x_n = n^3$, $\forall n \in \mathbb{N}$ is
(a) Convergent (b) Bounded
(c) Divergent (d) None of these

v. Every constant sequence in $\mathbb{R}$ is
(a) Convergent (b) Bounded but not convergent
(c) Never Cauchy (d) None of these

vi. $\lim_{x \to -1} \frac{3x^2-5x-8}{x+1}$ equals
(a) -11 (b) 11
(c) 2 (d) None of these

vii. $\lim_{x \to \infty} \frac{8x^2-5x+4}{4x^2+1}$ equals
(a) 2 (b) 4
(c) 0 (d) None of these

viii. If (x_n) of real numbers satisfies, $\frac{1}{n} \leq x_n \leq \frac{1}{\sqrt{n}}$, $\forall n \in \mathbb{N}$ then (x_n)
(a) Converges to 0 (b) Diverges
(c) Converges to 1 (d) None of these

[P.T.O.]

ix. The inequality $|x+y| \leq |x| + |y|, \forall x, y \in \mathbb{R}$ is
(a) AM-GM inequality
(b) Cauchy Schwarz inequality
(c) Triangle inequality
(d) None of these

x. The function $f(x) = e^x$ is continuous
(a) Only if $x > 0$ (b) Only if $x < 0$
(c) For each $x \in \mathbb{R}$ (d) None of these

Q.2 a) Attempt any ONE question from the following: (08)

i. State any four properties of $\mathbb{R}$ under addition. Further prove that additive inverse of a real number is unique.

ii. If $x, y \in \mathbb{R}$ such that $x < y$, then prove that there exists $r \in \mathbb{Q}$ such that $x < r < y$.

b) Attempt any TWO questions from the following: (12)

i. Prove the following: For $x \in \mathbb{R}$ and $r > 0$, $|x| < r$ if and only if $-r < x < r$.

ii. Let A be any non-empty, bounded above subset of $\mathbb{R}$. Let $k > 0$. Prove that $\sup(kA) = k \sup A$.

iii. Show that if $x \in \mathbb{R}$ then there exists $n \in \mathbb{N}$ such that $x < n$.

iv. State and prove Hausdorff property of $\mathbb{R}$.

Q.3 a) Attempt any ONE question from the following: (08)

i. Let (x_n) and (y_n) be two sequences converging to p and q respectively. Prove that $(x_n + y_n)$ converges to $p + q$ and (cx_n) converges to cp where $c \in \mathbb{R}$.

ii. Prove that every Cauchy sequence of real numbers is convergent.

b) Attempt any TWO questions from the following: (12)

i. Let $x_n = b^n$, $\forall n \in \mathbb{N}$ where $0 < b < 1$. Show that (x_n) converges to 0.

ii. Let $x_n = 3 - \frac{2}{n}$, $\forall n \in \mathbb{N}$. Show that (x_n) is monotonic increasing and bounded above. Is (x_n) convergent?

iii. Prove that every convergent sequence of real numbers is bounded.

iv. Show that the sequence $\left(\cos\frac{n\pi}{2}\right)$ is divergent.

Q.4 a) Attempt any ONE question from the following: (08)

i. State and prove Sandwich theorem for limit of a function.

ii. Let $f, g: \mathbb{R} \to \mathbb{R}$ be two functions and let $a \in \mathbb{R}$. If $\lim_{x \to a} f(x) = l$ and $\lim_{x \to a} g(x) = m$, then prove that $\lim_{x \to a} (5f + 6g)(x) = 5l + 6m$, using $\epsilon - \delta$ definition.

b) Attempt any TWO questions from the following: (12)

i. Prove that $f(x) = 2x + 12$ is continuous at $x = 2$, using $\epsilon - \delta$ definition.

ii. Draw graph of a function $f(x) = \log_e x$ for $x \in (0, \infty)$.

iii. Let $f: \mathbb{R} \to \mathbb{R}$ be a function and let $l \in \mathbb{R}$. Give definition of $\lim_{x \to \infty} f(x) = l$ and also find $\lim_{x \to \infty} \frac{x^4 - 5}{2x^4 + 3}$.

iv. Let $f: \mathbb{R} \to \mathbb{R}$ be a function and $a \in \mathbb{R}$. Prove that $\lim_{x \to a} |f(x)| = 0$ if and only if $\lim_{x \to a} f(x) = 0$.

Q.5 Attempt any FOUR questions from the following: (20)

a) If A, B are non-empty, bounded subsets of $\mathbb{R}$, then show that the set $A \cap B$ is bounded.

b) State and prove the Arithmetic-Geometric Mean inequality for $a, b \in \mathbb{R}$.

c) Give an example of two divergent sequences (x_n) and (y_n) such that their product $(x_n y_n)$ is convergent.

d) State and prove Sandwich theorem for sequences of real numbers.

e) Discuss the continuity of the following function at $x = 4, 8$

where $f(x) = \begin{cases} 5x + 12 & if\ x < 4 \\ 3x - 2 & if\ 4 \le x < 8 \\ 2x + 6 & if\ x \ge 8 \end{cases}$

f) Prove that $f(x) = \begin{cases} -2 & if\ x \in \mathbb{Q} \\ 2 & if\ x \in \mathbb{R} \setminus \mathbb{Q} \end{cases}$ is discontinuous at $x = 2$ by using sequential definition of continuity.

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FyBSc – Maths – Paper II
Semester – I
27/11/2017

Q. P. Code : 00601

(3 Hours) **(Total Marks : 100**

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

1. Choose correct alternative in each of the following: (20)

i. The coefficient of x^7y^2 in the expansion of $(x+y)^9$ is
(a) 45
(b) 72
(c) 36
(d) 14

ii. If the g.c.d. of two positive integers is 21 and l.c.m. of those two integers is 420 then their product is
(a) 2940
(b) 1260
(c) 8820
(d) 4410

iii. Which of the following statement is not true?
(a) All prime numbers are rational numbers
(b) Every even integer greater than 2 can be written as sum of two primes
(c) If p is a prime number then $2^p - 1$ is also prime
(d) There are infinitely many prime numbers

iv. The value of $\phi(52)$(where ϕ is the Euler's phi function) is
(a) 20
(b) 22
(c) 24
(d) 23

v. Let $f : A \to B$ and $g : B \to C$ be functions.If gof is surjective function then
(a) f is surjective function
(b) f is bijective function
(c) g is surjective function
(d) g is bijective function

vi. Let $f : \mathbb{N} \to \mathbb{N}$ be defined as $f(x) = 2x - 1$. Then f is
(a) bijective
(b) surjective but not injective
(c) injective but not surjective
(d) neither injective nor surjective

vii. Let $A = \{1, 2, 3, 4\}$. Which of the following is not a partition of A?
(a) $P = \{\{1\}, \{2\}, \{3\}, \{4\}\}$
(b) $P = \{\{1\}, \{2, 3, 4\}\}$
(c) $P = \{\{1, 3\}, \{4\}\}$
(d) $P = \{\{1, 2\}, \{3, 4\}\}$

TURN OVER

viii. The sum of all five, fifth roots of unity is .....
(a) 5
(b) -5
(c) 5i
(d) 0

ix. If $f(x) = 5x^3+2x-3$ and $g(x) = 4x^2+2x-3$ then $\deg(f(x)g(x)) =$ .....
(a) 9
(b) 20
(c) 5
(d) None of the above

x. If r_1, r_2, r_3 are roots of polynomial $18x^3 - 27x^2 + 13x - 2$ then .....
(a) $r_1r_2r_3 = -\frac{2}{3}$
(b) $r_1r_2r_3 = \frac{2}{3}$
(c) $r_1r_2r_3 = -\frac{1}{9}$
(d) $r_1r_2r_3 = \frac{1}{9}$

2. (a) Attempt any **ONE** question from the following: (8)
i. State and prove Division algorithm for integers.
ii. State the second principle of finite induction. Given any integer $n > 1$, prove that there is a prime p such that $p|n$.

(b) Attempt any **TWO** questions from the following: (12)
i. If real number $x > -1$ then prove that $(1 + x)^n \geq (1 + nx)\ \forall\ n \in \mathbb{N}$.
ii. Find integers a, b if their sum is 24, their greatest common divisor is 1 and their least common multiple is 143.
iii. Prove that a positive integer n is divisible by 9 if and only if the sum of digits in the decimal representation of n is divisible by 9.
iv. Show that 17 divides $16! + 3^{16}$ by clearly stating results used.

3. (a) Attempt any **ONE** question from the following: (8)
i. Show that a function $f : X \to Y$ is invertible if and only if it is bijective.
ii. Define an equivalence relation on a non empty set. Prove that every equivalence relation on a non-empty set induces a partition of the set.

(b) Attempt any **TWO** questions from the following: (12)
i. Check whether the binary operation defined as $a * b = a^2 + b^2, \forall a, b \in \mathbb{Z}$ is commutative, associative. Find the identity element and inverse of an element if they exist.
ii. If $f, g : \mathbb{Q} \to \mathbb{Q}$ are two functions defined as $f(x) = 3(x - 1) + 1$ and $g(y) = \frac{y+3}{3}$ then find the composites $f \circ g$ and $g \circ f$.
iii. Define the following terms:
(i) Inverse image of a set under a function, (ii) Direct image of a set under a function, (iii) Range of a function.
iv. If $f : \mathbb{Z} \to \mathbb{Z}$ is defined as $f(x) = x - 1$ then find (a)$f(\{1, -1, 2, -2\})$ (b)$f^{-1}(\{1, -1, 2, -2\})$ (c)$f(\mathbb{N})$.

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4. (a) Attempt any **ONE** question from the following: (8)

   i. Let $\alpha \in \mathbb{C}$ be a root of $f(x) \in \mathbb{R}[x]$. Then show that the complex conjugate of α is also a root of $f(x)$. Also state Division Algorithm in $\mathbb{R}[x]$.

   ii. Let $f(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots\cdots + a_1 x + a_0$ polynomial with integer coefficients.If rational number $\frac{p}{q}$ where p and q are integers with $(p, q) = 1$ is a root of $f(x)$, then prove that $q|a_n$ and $p|a_0$.

   (b) Attempt any **TWO** questions from the following: (12)

   i. Find the multiplicity of each root of polynomial $f(x) = x^4 - 5x^3 + 9x^2 - 7x + 2$.

   ii. Find all roots of $f(x) = x^3 - 8x^2 + 20x - 16$, if sum of its two roots is third root.

   iii. If r_1, r_2 and r_3 are roots of $f(x) = x^3 + 6x^2 + 11x + k$, such that $r_1 + r_2 = -3$, then find k.

   iv. Find the G.C.D. of $x^4 - x^2 + x + 1$ and $x^5 + x^4 - x^3 - x^2 + x + 1$ in $\mathbb{R}[x]$.

5. Attempt any **FOUR** questions from the following: (20)

   (a) If a, b, q, r are integers such that $a = bq + r$ and $b \neq 0$, then prove that the greatest common divisor of a and b is equal to the greatest common divisor of b and r.

   (b) Let p be prime and integers a, b are such that $p|ab$, then prove that either $p|a$ or $p|b$.

   (c) Define a relation R on $\mathbb{N} \times \mathbb{N}$ as $(a, b)R(c, d)$ iff $a + d = b + c$. Check whether R is (i)reflexive (ii)symmetric (iii)transitive.

   (d) List down any 5 partitions of $A = \{a, b, c, d\}$.

   (e) Find all fifth roots of unity.

   (f) Find the quotient and remainder when $f(x)$ is divided by $g(x)$ in $\mathbb{R}[x]$ where $f(x) = x^4 - 7x^3 + 3x^2 + 5x - 2$ and $g(x) = x^2 - 3$.

FyBSc – Botany – I Sem I

22/11/2017

Q.P. Code :12031

[Time: Three Hours] [Marks:100]

Please check whether you have got the right question paper.

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

Q.1 A. Choose the **correct option** from the following: 10

(a) The chloroplast in *Spirogyra* is _____.

(i) Disc shaped (ii) Spiral (iii) Stellate (iv) Peltate

(b) *Spirogyra* belongs to Division _____.

(i) Chlorophyta (ii) Phaeophyta (iii) Rhodophyta (iv) Cyanophyta

(c) _____reproduction is absent in *Nostoc*.

(i) Vegetative (ii) Sexual (iii) Asexual (iv) None of the above

(d) Reserve food material in Chlorophyta is _____.

(i) oil and proteins (ii) starch and pyrenoids (iii) protein and starch (iv) protein and fats

(e) Mass of delicate , white cottony threads in fungi is known as _____.

(i) mycelium (ii) spore (iii) columella (iv) rhizoids

(f) Cytoplasm in the hyphae of *Rhizopus* contains _____.

(i) One nucleus (ii) numerous chloroplasts (iii) numerous minute nuclei (iv) few vacuoles

(g) *Rhizopus* belongs to order _____.

(i) Mucorales (ii) Erysiphales (iii) Aspergillales (iv) Pucciniales

(h) _____ is a Liverwort.

(i) *Funaria* (ii) *Anthoceros* (iii) *Polytrichum* (iv) *Riccia*

(i) Vegetative thallus of *Riccia* is a _____.

(i) gametophyte (ii) sporophyte (iii) sporophyte on gametophyte

(iv) gametophyte on sporophyte

(j) The ventral surface of *Riccia* thallus possesses_____.

(i) scales (ii) smooth walled rhizoids (iii) tuberculated rhizoids (iv) All of the above

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B. Answer the following in **one sentence**: 10

(a) What is heterocyst?

(b) Define conjugation in Algae.

(c) Name the female sex organ in *Aspergillus*.

(d) Name the asexual reproducing body in *Rhizopus*.

(e) Give the functions of scales in *Riccia*.

Q.2 Answer **any two** from the following: 20

(a) Write a detailed note on range of thallus in Chlorophyta.

(b) Explain methods of vegetative and sexual reproduction in *Nostoc*.

(c) Describe the types of conjugation in *Spirogyra*.

(d) Give a detailed account of economic importance of Algae.

Q.3 Answer **any two** from the following: 20

(a) Describe asexual reproduction in *Rhizopus*. Add a note on its systematic position.

(b) Discuss sexual reproduction in *Aspergillus*.

(c) Give economic importance of Fungi.

(d) Describe the modes of nutrition in Fungi.

Q.4 Answer **any two** from the following: 20

(a) With the help of neat, labelled diagram, explain the alternation of generations in *Riccia*.

(b) Give a detailed account of the V.S. of *Riccia* thallus.

(c) Describe the external morphology of *Riccia*. Add a note on its systematic position.

(d) Discuss the sporophytic generation in *Riccia*.

Q.5 Write short notes **(any four)** 20

a) Structure of *Nostoc* filament

b) Vegetative cell of *Spirogyra*

c) Ascocarp of *Aspergillus*

d) Fungi as food

e) Structure of antheridia and male gamete in *Riccia*

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F.Y. B.Sc – Semester – I
Botany – Paper – II 27/11/2017

Q.P. Code :19328

[Time: 3 Hours] **[Marks:100]**

Please check whether you have got the right question paper.

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

Q.1 A) Choose the **correct option** from the following: (10)

a) In prokaryotic cell, nuclear membrane is _____.
i) single layered ii) double layered
iii) absent iv) present

b) Plasmodesmata _____ two adjacent cells in plants.
i) connect ii) separate iii) multiply iv) degrade

c) Secondary cell wall is made up of _____.
i) cellulose, hemicellulose and lignin ii) cellulose and pectin
iii) only hemicellulose iv) cellulose and glycoprotein

d) Middle lamella of plant cell wall is mainly composed of _____.
i) cellulose ii) pectin iii) lignin iv) hemicellulose

e) Energy flow in an ecosystem is _____.
i) unidirectional ii) bidirectional
iii) multidirectional iv) none of the above

f) The first trophic level in energy pyramid is _____.
i) primary consumer ii) producers
iii) carnivores iv) omnivores

g) The term ecosystem was coined by _____ in 1935.
i) Tansley ii) Odum iii) Earnst Haeckel iv) Philipson

h) _____cross would best illustrate Mendel's law of segregation.
i) TT x tt ii) Hh x hh iii) Bb x Bb iv) rr x rr

i) In recessive epistasis, Mendel's dihybrid ratio of 9:3:3:1 is modified to _____.
i) 9:3:4 ii) 15:1 iii) 9:7 iv) 9:6:1

j) A cross between two individuals with one pair of contrasting characters is called _____.
i) Test cross ii) monohybrid cross iii) Dihybrid cross
iv) Back cross

Q.1 B) Answer the following in **one sentence**: (10)

a) Write the types of endoplasmic reticulum.
b) What is phagocytosis?
c) Define Eutrophication
d) What are decomposers?
e) What is a back cross?

Q.2 Answer **Any Two** of the following: (20)

a) Write a note on various proteins and lipids associated with plasma membrane.
b) What is cell? Differentiate between prokaryotic and eukaryotic cell.
c) Describe the ultrastructure of plant cell wall. Add a note on its functions.
d) Give an account of the ultrastructure and functions of chloroplast.

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Q.3 Answer **Any Two** of the following: (20)

a) What is ecosystem? Describe one aquatic and one terrestrial ecosystem.
b) Explain the simplified energy flow model in detail.
c) What is food chain? Explain different types of food chain.
d) Describe the structure and function of an ecosystem.

Q.4 Answer **Any Two** of the following: (20)

a) What is epistasis? Explain dominant epistasis citing suitable example.
b) Explain gene interaction with reference to comb pattern in domestic fowl.
c) What are multiple alleles? Explain the same with reference to inheritance of blood groups in man.
d) In mice there are two genes A and C. The phenotype "agouti" is expressed as AA or Aa, the phenotype "black" is expressed as aa. Both these genes are hypostatic to another gene C when it is in homozygous recessive from (cc) and express only when at least one dominant allele of gene C is present. The gene c in homozygous recessive from (cc) produces albino mice. What will be the phenotype and genotype of the parents and progeny of the following crosses? Also give the phenotypic ratio.
   i) AaCc x aacc
   ii) AACC x AaCC

Q.5 Write short notes **(Any Four)** (20)

a) Cell membrane and its functions
b) Functions of Endoplasmic reticulum
c) Abiotic components
d) Forest ecosystem
e) Test cross and Back cross
f) Law of dominance

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F/BSc - Zoology - I Sem I

22/11/2017

Q.P. Code :00029

[Time: Three Hours] [Marks:100]

Please check whether you have got the right question paper.

N.B:
1. **All** Question are **compulsory.**
2. **All** questions carry **equal marks**
3. Draw neat & **labelled diagrams**. Wherever necessary.

Q.1 A) Fill in blanks by choosing the correct option given in the bracket (05)

a) The major species of pearl culture in Japan is _____.
(*Pinctada albino / Pinctada fucata / Pinctada maxima*)

b) The longest known migratory journey is performed by the_____.
(arctic tern / Siberian crane / flamingoes)

c) The term 'Biological diversity' was used by _____ in 1968.
(Roald Amundsen / Raymond F. Dasmann / Archie Carr)

d) Anna Hazare started a novel concept of _____ to provide food security to the needy.
(Grain bank / Seed bank / Gene bank)

e) _____ Indian American biochemist shared the 1968 Nobel prize for physiology with Marshal W. and Nirenberg W. Holley.
(S. Chandrasekhar / C.V. Raman / Dr. Hargobind Khorana)

Q.2 B) Match the columns I and II and rewrite: (05)

I	II
a. Gadre fishery.	i) Uttarakhand.
b. Anandvan.	ii) Surimi.
c. Corbett national park.	iii) Baba Amte.
d. Anamalai wildlife sanctury.	iv) Anglerfish.
e. *Vibrio* bacteria.	v) Tamil Nadu.

Q.1 C) State whether True or False . (05)

a) The pacific islands are the example of barrier reef.

b) The first Zoo in India was established in 1800 at Barrackpore.

c) In Midwife toad female exhibits parental care.

d) Kiran Muzumdar Shaw was awarded Padma Shri and Padma Bhusan for her pioneering efforts in Industrial biotechnology.

e) Anna Hazare joined the Indian Army in 1963 during the Indo-China war.

Q.P. Code :00029

Q.1 D) Answer in **one** sentence only. (05)

a) What is regeneration?

b) Define the concept of biodiversity hotspot.

c) What is Ex- situ conservation?

d) Name the project started by Baba Amte for the Madia – Gond tribe.

e) Who was the father of White revolution?

Q.2 A) What is migration and describe different types of migration in birds. (10)

OR

B) Describe coral formation and elaborate upon types of coral reefs.

B) Write a short note on **any two.** (10)

a. Echolocation in bat.
b. Brood parasitism.
c. Uses of bioluminescence.
d. Mechanism of pearl formation.

Q.3 A) Describe 'Direct and Indirect values of biodiversity. (10)

OR

A) What are biodiversity hotspots. Give an account of Western Ghats as a hotspot.

B) Write a short note on **any two.** (10)

a. Significance of biodiversity.
b. Species diversity.
c. Threats to biodiversity.
d. Indian Wild Life (protection) act 1972.

Q.4 A) Answer **any two** of the following. (20)

a) Give an account of work and achievements of Dr. Salim Ali in the field of ornithology.

b) Describe life sketch of Mr. Deepak Gadre and his contribution in development of Gadre fishery.

c) Write an account on the life sketch of Baba Amte.

d) Elaborate the role of Kiran Mujumdar Shaw in establishment of BIOCON.

Q.5 Write short note on **any four**. (20)

a. Parental care in Platypus.
b. Adaptive features of Camel to avoid heat.
c. Ex- situ conservation.
d. Significance of Biosphere reserve.
e. Awards won by Dr.Hargobind Khorana.
f. Concept of Gram Sabha.

FyBSc - Semester - I
Zoology - Paper II 27/11/2017

Q.P. Code : 12102

[Time: Three Hours] **[Marks: 100]**

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory.
2. All questions carry equal marks.
3. Draw neat and labelled diagrams wherever necessary.

Q.1 A) Fill in the blanks choosing correct option from the bracket: 05

a) Chemical substance which enter in the trachea or lungs directly through nasal or oral openings lead to _____ hazards. (Aspiration, radioactive, teratogenic)
b) The term Biotechnology was coined by _____. (John.B.Gurdon, Dr. T.J.Pandian, Karl Ereky)
c) DNA Fingerprinting is based on the use of _____ DNA. (minisatellite, microsatellite, lambda)
d) _____ is the structural and functional unit of life. (Tissue, cell, DNA)
e) The Russian Botanist _____ coined the term chromatography. (Mikhail Tswett, Plank, Robert Hook)

Q.1 B) Match the column I with II and rewrite: 05

I	II
a. Vaccines	i. Resolving power
b. Microscope	ii. Red color absorbed by matter
c. Fahrenheit scale	iii. Insulin
d. Beta cells of islets of Langerhans	iv. Temperature
e. 800nm wave length	v. Hepatitis B virus

Q.1 C) State whether **True** or **False**: 05

a) Volatile and inflammable chemicals should not be kept near fire source.
b) The mean is calculated by multiplying sum of all observations by the total number of observation.
c) When absorbance is zero then transmittance is 100%
d) French Anderson is known as the Father of genetics.
e) Chromatography is a technique used for separating different components from mixture by applying an electric charge.

Q.1 D) Answer in **one** sentence: 05

a) Define Histogram
b) Explain Normality
c) Name one industrial application of Biotechnology
d) Define In vivo gene therapy.
e) On which law the colorimetric technique works

TURN OVER

Q.2 **A)** Explain different types of non-probability sampling methods. 10

OR

A) Describe any ten safe laboratory measures to be adopted by the students.

Q.2 **B)** Explain the following any **two**: 10

a) Sub divided bar diagram with example.
b) Mode and its type.
c) Normality.
d) Goals of metric system.

Q.3 **A)** Explain the process of transgenesic using embryonic stem cell. 10

OR

A) Comment on DNA Fingerprinting technique and its use in crime detection.

Q.3 **B)** Write short notes on **any two**: 10

a) Gene therapy for SCID.
b) Any two achievements of biotechnology in the field of Fishery.
c) Cloning.
d) Insulin production.

Q.4 Answer the following **any two**: 20

a) Explain the components of compound microscope and its application.
b) Explain the principle and application of pH meter.
c) Describe principle and application of Spectroscopy.
d) Explain the types of Chromatography.

Q.5 Write short notes on **any four**: 20

a) Toxic and corrosive chemicals.
b) Merits and demerits of median.
c) Green Fluorescent protein.
d) Application of biotechnology in Animal husbandry.
e) Electrophoresis.
f) Application of Colorimetry.

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F.Y. B.Sc : Semester - I

Zoology - Paper - II

28/11/2017

Q.P. Code : 00038

[Time: Three Hours] [Marks:100]

Please check whether you have got the right question paper.

N.B:
1. **All** questions are **compulsory**.
2. **All** questions carry **equal marks**.
3. Draw neat labelled **diagrams** wherever necessary.

Q.1 **A.** Fill in the blanks by choosing the correct option given in the bracket. 05

a. Mid-point of class interval is called _____
(Class limit, Class mark, Class length)

b. A solution is a _____ mixture.
(homogenous, heterogenous, amorphous)

c. Best tasting cheese is produced by addition of enzyme _____.
(Pepsin, Renin, trypsin)

d. _____ deficiency causes SCID.
(CFTR, ADA, LASN)

e. The ratio of log (I_o/I_t) is called _____
(transmittance, absorbance, absorbance)

B. Match the columns and rewrite:

I	II
a) French Anderson	I) Centrifuge
b) Dr. Lalji Singh	ii) pH meter
c) NGCMA	iii) Gene therapy
d) Gustaf de Laval	iv) GLP Certification
e) Nernst equation	v) CDFD

C. State Whether **True or False** :

a. Merck received FDA approval of Gardasil. 05

b. Mode is not affected by values which are too large or too small.

c. Chimeric DNA is made up of genetic material that belongs to two different species.

d. One nanogram is 10^9 g.

e. Wave number is the linear distance between successive troughs or crests.

D. Answer the following in one sentence. 05

a) Aspiration hazards
b) AquAdvantage Salmon
c) cluster sampling
d) Adsorption chromatography
e) Bkm DNA

Q.2 A. What is a median? Explain its formula for ungrouped and grouped data. 10

OR

A. Explain in detail the concepts of Normality, Molarity and Molality. 10

B. Explain **any two** of the following. 10

a) Histogram

b) Simple random sampling

c) Flammable chemicals

d) Celsius and Kelvin scale

Q.3 A. What is in-vivo gene therapy? Explain its application in treatment of CF. 10

OR

A. Describe in detail the technique of cloning of Dolly. 10

B. Explain **any two** of the following :- 10

a) GFP

b) Ethical issues of transgenesis

c) Retroviral vector method of transgenesis

d) Application of biotechnology in animal husbandry

Q.4 Answer **any two** of the following :- 20

a. Principle and applications of colorimetry.

b. What is chromatography? Explain its principle with reference to paper chromatography.

c. Explain the principle of compound microscope and add a note on its applications.

d. Explain Sorenson's pH scale and add a note on ionic product of water.

Q.5 Write short notes on **any four.** 20

a) Recombinant DNA in medicine

b) Preparation of percent solution

c) Principle of gel electrophoresis

d) Anti-freeze protein

e) Scope of biostatistics

f) Combined glass electrode

FyBsc : Zoology - Paper - I

Semester - I 23/11/2017

Q.P. Code : 00033

[Time: Three Hours] [Marks:100]

Please check whether you have got the right question paper.

N.B:
1. All questions are compulsory
2. All questions carry equal marks.
3. Draw neat and labelled diagrams wherever necessary.

Q. 1

(A) Fill in the blanks by choosing the correct option given in the bracket. (05)

a) In Tilapia _____ exhibit parental care.
(male, female, male and female both)

b) _____ is a typical desert animal.
(lizard, snake, Phyranosoma)

c) Madhumalai wild life sanctuary is located in _____.
(Kerala, Karnataka, Tamil nadu)

d) Anna Hazare was awarded the _____ prize.
(Nobel, Magsaysay, Padma Bhushan)

e) _____ is the largest biotech company In Asia.
(BIOCON, AMUL, DHARA)

(B) Match the column I and II and rewrite (05)

I	II
a) Wall lizard	i) Poppy plant
b) Morphine	II) Autonomy
c) Digoxin	iii) Surimi
d) Baba Amte	iv) Heart Problem
e) Deepak Gadre	v) Hemalkasa

(C) State whether **True** or **False** . (05)

a)Camel is a desert reptile.
b) Pearl is formed by secretion of mantle tissue.
c) Firefly is a carnivorous beetle.
d) Malabar Gaint squirrel is endemic to Indo Burma hot spot.
e) Amul ice cream was launched by Kiran Muzumdar shaw.

(D) Answer in **one** sentence only. (05)

a) Name any two types of coral reefs.
b) Give one desert adaptation.
c) Give full form of UNEP.
d) Define hot spot.
e) Name any two surimi based fish products.

Q. 2 (A) Describe mechanism of bioluminescence with suitable examples.

OR

(A) Explain the types of migration in birds.

(B) Write short notes on (any two) (10)

a) Regeneration in lizard.
b) Echolocation in Cetaceans.
c) Brood parasitism.
d) Batesian mimicry.

Q. 3 (A) Describe various methods used in Ex-situ conservation of biodiversity (10)

OR

(A) Give a detailed account of threats to biodiversity

Q. 3 (B) Write short notes on any two.

a) Ecosystem diversity
b) Effect of habitat loss
c) Economic significance of biodiversity
d) NBAP

Q. 4 Answer any two of the following (20)

a) Give a detailed account of contribution of Dr Salim Ali in the field of ornithology.
b) Describe the water conservation work done by Anna Hazare in Ralegan Siddhi.
c) Give an account of work done and achievements of Dr Varghese Kurian.
d) Describe the role of Kiran Muzumdar Shaw in developing BIOCON.

Q. 5 Write short notes on (any four) (20)

a) Parental care in Platypus.
b) Pearl Formation.
c) Medicinal uses of biodiversity.
d) Biosphere reserve.
e) Work done by Hargobind Kharana.
f) Lok Biradari Prakalp.

F-YBS(~~F-YBCOM~~) Sem I

C0141 / C0537 FOUNDATION COURSE I 20/11/2017

Q. P. Code:-24691

NB: (1) All questions are compulsory **Total marks: 75**

(2) Figures to the right indicate full marks **Time: 2 ½ hours**

1(A) Choose the correct alternative **(any 8)** **(08)**

1. The Indian languages belong to --- language families.
   (3, 2, 4)
2. Scheduled castes are not found in ------.
   (Punjab, Mizoram. Uttar Pradesh)
3. The Indian Constitution makes provision for positive discrimination via Art ------- .
   (15, 14, 17)
4. One of the characteristics of urban centres is all places with a population of at least -- ------. (2000, 5000, 4000)
5. Gender is a ----- concept. (Sociological, Economic, Biological)
6. Mongoloids, Negritoes and Austroloids are examples of Indian ---- groups.
   (Rural, Tribal, Linguistic)
7. There are -------- schedules in the Indian Constitution.
   (12, 13, 14)
8. India is a ----- of states.
   (Union, Federation, Confederation)
9. India has a ----- Party System.
   (Multi, Dual, Single)
10. The 73rd amendment to the Indian Constitution regarding Panchayati Raj was passed in -----.
    (1990, 1991, 1992)

(B) State whether the following statements are true or false. **(Any 7)** **(07)**

1. English is the secondary official language of the Indian Union.
2. A Secular State is that in which religions are treated unequally.
3. Sikhism is a monotheistic religion.
4. The sex ratio in India has always remained unfavourable to women.
5. Each tribal group of India has a language of its own.
6. Children's education is every parent's Fundamental Duty according to Indian Constitution.
7. Caste is an endogamous group in the Indian society.
8. The Indian Constitution is a completely original work of the Constituent Assembly.
9. There are 10 Fundamental Duties enshrined in the Indian Constitution.
10. The Shiromani Akali Dal and the Asom Gan Parishad are examples of regional parties in India.

Q. P. Code:-24691

2 a. Clarify the term violence against women and comment on the various manifestations of violence against them in contemporary India. (15)

OR

2 b. Explain the manifold problems faced by the disabled in the country.

3 a. Examine the various causes of regionalism in India with suitable examples. (15)

OR

3 b. Explain the term Caste. What are the inequalities caused by the Caste system in India?

4 a. Examine the importance of the Fundamental Duties in the Indian Constitution. (15)

OR

4 b. Explain the following features of the Constitution

a. Fundamental Rights
b. Federal System
c. Independence of the Judiciary

5. a Explain the various socio-economic and cultural obstacles in the effective participation of women in Indian politics.

OR

5. b Write short notes on **any three.** (15)

a. Any two aspects of diversity in the Indian culture
b. The rural urban divide in India
c. Shortcomings of the party system in India.
d. Major features of the 74th amendment
e. Representation of women by the Indian media

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