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P—69—2015

FACULTY OF ARTS/COMMERCE/SCIENCE

B.A./B.Com./B.Sc. (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

ENGLISH (Compulsory)

(MCQ + Theory)

(Thursday, 19-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

MCQ

1. Answer the following questions choosing from the options that follows : 10

(*i*) Shakespeare was also known as :

(*a*) True poet

(*b*) Bard at Eton

(*c*) Bard of Avon

(*d*) Bard of Stratford

(*ii*) The schoolboy is part of this book :

(*a*) Songs of Innocence

(*b*) Songs of Experience

(*c*) Gates of Paradise

(*d*) Song of Heavens

P.T.O.

(*iii*) The English Romantic Movement was ushered in with the publication of :

(*a*) Ancient Mariner

(*b*) The Prelude

(*c*) The Education of Nature

(*d*) Lyrical Ballads

(*iv*) Alfred Tennyson became Alfred Lord Tennyson in this year :

(*a*) 1842

(*b*) 1850

(*c*) 1884

(*d*) 1892

(*v*) Maya Angelou's I know why the Caged Bird Sings is a :

(*a*) Novel

(*b*) Book of Poems

(*c*) Autobiography

(*d*) One-act play

(*vi*) Jennings was linked the group of poets known as :

(*a*) Modernists

(*b*) Transcendentalists

(*c*) The Movement

(*d*) Traditionalist Movement

(*vii*) Tagore believed the ultimate form of freedom is :

(*a*) Freedom from poverty

(*b*) Spiritual freedom

(*c*) Freedom from discrimination of any kind

(*d*) Freedom from monetary constraints

(*vii*) Why were the children's bellies blown ?

(*a*) It was a typical physical feature of tiny African Children

(*b*) The children's stomachs were filled with food

(*c*) The children were fat

(*d*) It was a physical feature of refugee children which was a result of very limited food

(*ix*) Who is 'I' the speaker in The Schoolboy ?

(*a*) The poet

(*b*) The poet as a child

(*c*) A young boy

(*d*) A school going boy

(*x*) The theme of All Things Will Die is :

(*a*) Beauty of Nature

(*b*) Youth

(*c*) Old age

(*d*) Death comes to all things

Theory **30**

2. Explain with reference to the context any *one* of the following : 4

   (*a*) For all things must die.

   All things must die.

   (*b*) If this be error, and upon me proved,

   I never writ, nor no man ever loved.

3. Write an answer to the following questions in **200** words (any *one*) : 8

   What, according to Shakespeare is True love ?

   Or

   What does the poet Rabindranath Tagore pray to God ?

4. Write short answer to the following questions (any *two*) : 8

   (*a*) What is the central idea of the poem 'Still I Rise' ?

   (*b*) Why does Elizabeth Jennings refuse to go with her grandmother ?

   (*c*) What dreams do Tagore have for India ?

5. Write short notes on any *two* of the following : 10

   (*a*) What are the characteristics of a good reader ?

   (*b*) What are the subskills of listening ?

   (*c*) Define the different types of Non-verbal communication.

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AD—57—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

MATHEMATICS

Paper IV

(Geometry)

(MCQ and Theory)

(Tuesday, 27-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory and carry equal marks.

(*ii*) First 30 minutes for Q. No. 1 and remaining time for other questions.

(*iii*) Figures to the right indicate full marks.

(*iv*) Use black point pen to darken the circle on OMR sheet for Q. No. 1.

(*v*) Negative marking system is applicable for Question No. 1 (MCQ).

P.T.O.

(MCQ)

1. Choose the correct alternative for each of the following : 1 each

(*i*) The direction cosines of the Y-axis are ..... .

(A) 1, 1, 1

(B) 1, 0, 0

(C) 0, 1, 0

(D) 0, 0, 1

(*ii*) The equation to a plane in normal form is ..... .

(A) $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$

(B) $\frac{x}{l} + \frac{y}{m} + \frac{z}{n} = 1$

(C) $ax + by + cz = p$

(D) $lx + my + nz = p$

(*iii*) The intercept on the X-axis of the plane $x + y + z = 1$ is ..... .

(A) 4

(B) 2

(C) 3

(D) 1

(*iv*) Any point on the line

$$\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$$

is given by :

(A) (α, β, γ)

(B) $(l\alpha, m\beta, n\gamma)$

(C) $(\alpha + lr, \beta + mr, \gamma + nr)$

(D) None of the above

(*v*) The value of k so that the lines

$$\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2},$$

$$\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$$

are perpendicular to each other is ..... .

(A) –10/7

(B) –8/7

(C) –6/7

(D) 1

(*vi*) The lines :

$$\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3} \text{ and } \frac{x}{2} = \frac{y+2}{2} = \frac{z-3}{-2}$$

are ..... .

(A) Parallel

(B) Skew

(C) Intersecting

(D) At right angles

(*vii*) The angle between the line

$$\frac{x+1}{3} = \frac{y-1}{2} = \frac{z-2}{4}$$

and the plane $2x + y - 3z - 4 = 0$ is ..... .

(A) $\cos^{-1}(-4/\sqrt{406})$

(B) $\sin^{-1}(-4/\sqrt{406})$

(C) $30°$

(D) None of the above

(*viii*) The two spheres

$$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$$

and $x^2 + y^2 + z^2 + 2u'x + 2v'y + 2w'z + d' = 0$

are orthogonal if ..... .

(A) $2(uu' + vv' + ww') = d + d'$

(B) $uu' + vv' + ww = d + d'$

(C) $uu' + vv' + ww' = 2(d + d')$

(D) None of the above

(*ix*) Equation $ax^2 + by^2 + cz^2 + 2ux + 2vy + 2wz + d = 0$ represents a cone if ..... .

(A) $au^2 + bv^2 + cw^2 + d = 0$

(B) $\frac{u^2}{a} + \frac{v^2}{b} + \frac{w^2}{c} = d$

(C) $\frac{u^2}{a} + \frac{v^2}{b} + \frac{w^2}{c} = 0$

(D) None of the above

(*x*) The line which generates the surface of the cylinder is called ..... .

(A) Axis

(B) Guiding line

(C) Generator

(D) None of the above

(Theory)

2. Attempt any *two* of the following : 5 each

(*a*) Prove that :

$$l^2 + m^2 + n^2 = 1$$

where l, m, n are direction cosines of a line.

(*b*) Find the perpendicular distance of the point $p(x_1, y_1, z_1)$ from the plane :

$$lx + my + nz = p .$$

(*c*) Obtain the equation of the plane through the intersection of the planes :

$$x + 2y + 3z + 4 = 0 \text{ and } 4x + 3y + 2z + 1 = 0$$

and the origin.

3. Attempt any *two* of the following : 5 each

(*a*) Transform the equations :

$$ax + by + cz + d = 0\,,$$

$$a_1x + b_1y + c_1z + d_1 = 0\,,$$

of a line to the symmetrical form.

(*b*) Show that the shortest distance between two lines lies along the line meeting them both at right angles.

(*c*) Find the perpendicular distance of $p\,(1, 2, 3)$ from the line :

$$\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}\,.$$

4. Attempt any *two* of the following : 5 each

(*a*) Find the pole of the plane

$$lx + my + nz = p$$

with respect to the sphere :

$$x^2 + y^2 + z^2 = a^2\,.$$

(*b*) Find the equation of the cylinder whose generators intersect the conic :

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0,\ z = 0$$

and are parallel to the line

$$\frac{x}{l} = \frac{y}{m} = \frac{z}{n}.$$

(*c*) Find the equation of a cone whose vertex is (α, β, γ) and base $y^2 = 4ax,\ z = 0$.

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AD—62—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

CHEMISTRY

Paper III

(Organic and Inorganic Chemistry)

(MCQ + Theory)

(Wednesday, 28-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

(*iii*) Use separate answer sheet (OMR sheet) for MCQ Question No. **1**.

P.T.O.

MCQ

1. Select the *correct* answer for each of the following multiple choice questions :

(*i*) The correct structure of benzene is given by :

(*a*) Hückel

(*b*) Kolbe

(*c*) Kekule

(*d*) Grignard

(*ii*) Benzene reacts with nitric acid and sulphuric acid to give nitrobenzene. This is ..... reaction.

(*a*) Electrophilic substitution

(*b*) Electrophilic addition

(*c*) Nucleophilic substitution

(*d*) Nucleophilic addition

(*iii*) Benzene contains ..... Pi-bonds.

(*a*) 12

(*b*) 9

(*c*) 6

(*d*) 3

(*iv*) ..... is meta directing group on benzene in electrophilic substitution reactions.

(*a*) $-NO_2$

(*b*) –OH

(*c*) $-CH_3$

(*d*) $-NH_2$

(*v*) PVC is prepared by polymerization of :

(*a*) Vinyl acetate

(*b*) Vinyl chloride

(*c*) Allyl chloride

(*d*) Alkyl chloride

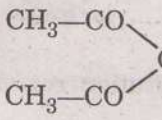
(*vi*) Conversion of benzene diazonium fluoroborate to fluorobenzene is ..... reaction.

(*a*) Hunsdiecker

(*b*) Gattermann-Koch

(*c*) Ullmann

(*d*) Balz-Schiemann

(*vii*) The IUPAC name of  is :

(*a*) Acetic anhydride

(*b*) Phthalic anhydride

(*c*) Ethanoic anhydride

(*d*) Butanoic anhydride

(*viii*) Which of the following group elements have the highest Electron Affinity (EA) values ?

(*a*) Alkali group

(*b*) Alkaline earth metals

(*c*) Halogen group

(*d*) Zero group

(*ix*) Cations are acids according to :

(*a*) Arrhenius theory

(*b*) Lewis concept

(*c*) Brönsted-Lowry concept

(*d*) None of the above

(x) According to Lux-Flood concept, CaO (Calcium Oxide) is :

(a) Salt

(b) Acid

(c) Base

(d) None of the above

Theory

Section 'A'

(Organic Chemistry)

2. Answer any *two* of the following :

(a) Explain resonance and molecular orbital structure of benzene.

(b) Discuss Reimer-Tiemann reaction of Phenol with mechanism.

(c) (i) How is allyl iodide prepared from :

(I) Allyl chloride

(II) Glycerol and HI ?

(ii) What happens when allyl chloride reacts with :

(I) NaOH

(II) NH_3 ?

(*d*) What is acid chloride ? Explain the following reactions of acetyl chloride :

(*i*) Hydrolysis

(*ii*) Reaction with ethyl alcohol

(*iii*) Reaction with ammonia

(*iv*) Reaction with sodium acetate.

3. Answer any *two* of the following :

(*a*) State Hückel's rule. Explain chlorination reaction of benzene with mechanism.

(*b*) What is Phenol ? Give its classification with suitable examples.

(*c*) Explain relative stability of alkyl halide *Vs.* Vinyl and aryl halides towards nucleophilic substitution reaction.

(*d*) How will you convert :

(*i*) Iodobenzene into biphenyl

(*ii*) Acetic anhydride into ethyl acetate

(*iii*) Ethyl acetate into ethanol

(*iv*) Ethyl acetate into sodium acetate

(*v*) Acetamide into acetic acid.

Section 'B'

(Inorganic Chemistry)

4. Answer any *two* of the following :

(*a*) Explain diagonal relationship of boron with silicon.

(*b*) (*i*) How will you compare electron affinity value of chlorine with fluorine ? Explain in detail.

(*ii*) Explain the effect of electronegativity on relative strength of acids and bases.

(*c*) Define acids and bases according to solvent system concept and Usanovich concept.

(*d*) Discuss the resonance effect on relative strengths of acids and bases.

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FACULTY OF ARTS/COM./SCIENCE

B.A./B.Com./B.Sc. (First Year) (Second Semester)

EXAMINATION

OCTOBER/NOVEMBER, 2015

SANSKRIT (S.L.)

Paper II

(सुभाषितसाहित्यम्)

(MCQ + Theory)

(Friday, 20-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

Text :— वैद्यकीय सुभाषितसाहित्यम्।

संस्कृत-मराठी ऋणानुबन्ध।

N.B. :— (*i*) या प्रश्नपत्रिकेत दोन विभाग आहेत.

(*ii*) 'A' विभागातील सर्व प्रश्नांना समान गुण असून सोडवणे अनिवार्य.

(*iii*) 'B' विभागातील सर्व प्रश्न सोडवा.

P.T.O.

MCQ

1. लहरी माणसाची ..... सुद्धा तापदायक ठरते.

   (A) लज्जा

   (B) प्रीति

   (C) विद्या

   (D) कृपा

2. खालीलपैकी **सत्य** विधान ओळखा :

   (A) ऊलखल म्हणजे उखळ

   (B) उलखल म्हणजे उखळ

   (C) उलूखल म्हणजे उखळ

   (D) उलखूल म्हणजे उखळ

3. पांचजन्य हा ..... चा शंख आहे, असे मानले जाते.

   (A) इंद्र

   (B) शिव

   (C) ब्रह्मा

   (D) विष्णू

4. जोड्या जुळवा आणि उचित पर्याय खाली दिलेल्या पर्याया मधून निवडा :

'अ' गट	'ब' गट
(*a*) आचार:	(*p*) लोचनम्
(*b*) वपु:	(*q*) श्रुतम्
(*c*) वचनम्	(*r*) भोजनम्
(*d*) स्नेहम्	(*s*) कुलम्

पर्याय –

(A) *ap, br, cq, ds*

(B) *as, br, cq, dp*

(C) *aq, br, cs, dp*

(D) *ar, bq, cs, dp*

5. गटात न बसणारा शब्द ओळखा :

(A) कळस

(B) अजागळ

(C) किंकर

(D) पसाय

P.T.O.

6. एकूण महाभूते किती ?

(A) 6

(B) 5

(C) 8

(D) 4

7. खालीलपैकी **असत्य** विधान ओळखा :

(A) नित्य स्नान करावे.

(B) स्वच्छ वस्त्र परिधान करावे.

(C) थंड पाण्याचे स्नान स्फूर्तिदायक ठरते.

(D) स्नानामुळे मन प्रसन्न होत नाही.

8. हंसोदक कोणते नाही ?

(A) अगस्ति ताऱ्याने शुद्ध झालेले

(B) सूर्यकिरणांनी तापलेले

(C) कालमानाने परिपक्व झालेले

(D) सरोवरात असलेले

9. जोड्या जुळवा :

'अ' गट	'ब' गट
(*a*) अजीर्णे	(*a*) अमृतं वारि।
(*b*) जीर्णे	(*q*) विषप्रदं वारि।
(*c*) भोजने	(*r*) भेषजं वारि।
(*d*) भोजनान्ते	(*s*) वारि बलप्रदम्।

पर्याय –

(A) *ar, bp, cq, ds*

(B) *ar, bs, cq, dp*

(C) *ar, bq, cp, ds*

(D) *ar, bs, cp, dq*

10. 'व्याधिः' या संस्कृत शब्दाचा अर्थ काय ?

(A) निरोग

(B) रोग

(C) भयंकर

(D) साप

Theory

1. अधोलिखितेषु **चतुर्णां** भाषान्तरं कुरुत : 10

खालीलपैकी **चार** श्लोकांचे अनुवाद करा :

(*i*) वायुरेव महाभूतं वदन्तु निखिला जनाः।
आयुरेवैष भूतानामिति मन्यामहे वयम्॥

(*ii*) दह्यन्ते ध्मायमानानां धातूनां हि यथा मलाः।
तथेन्द्रियाणां दह्यन्ते दोषाः प्राणस्य निग्रहात्॥

(*iii*) आपोहिष्ठादिभिर्मान्त्रं, मृदालम्भं च पार्थिवम्।
आग्नेयं भस्मना स्नानं, वायव्यं गोरजः स्मृतम्॥

(*iv*) प्रातः स्नानं, गवां सेवा, आरामः, पुष्पवाटिका।
मातापित्रोश्च शुश्रूषा शास्त्राय च सुखाय च॥

(*v*) शौचं तु द्विविधं प्रोक्तं बाह्यमभ्यन्तरं तथा।
मृज्जलाभ्यां स्मृतं बाह्यं मनः शुद्धिस्तथान्तरम्॥

2. **द्वयोः** ससन्दर्भं स्पष्टीकरणं कुरुत : 10

खालीलपैकी **दोहोंचे** संदर्भासह स्पष्टीकरण करा :

(*i*) अन्नं ब्रह्मेति व्यजानात्।

(*ii*) तस्मात्सर्वायुषमुच्यते।

(*iii*) स्नानमूलाः क्रियाः सर्वाः।

3. अन्नप्रकरणमनुसृत्य अन्नस्य महत्त्वं प्रतिपादयत। 10

अन्नप्रकरणास अनुसरून अन्नाचे महत्व प्रतिपादित करा.

अथवा

(किंवा)

'जलप्रकरणम्' वैद्यकीय सुभाषित साहित्यमनुसृत्य विशदयत।

'जलप्रकरण' वैद्यकीय सुभाषित साहित्यानुसार विशद करा.

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AD—50—2015

FACULTY OF ARTS/SCIENCE

B.A./B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

MATHEMATICS

Paper III

(Integral Calculus)

(MCQ + Theory)

(Monday, 26-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B.:— (*i*) Attempt *All* questions.

(*ii*) Figures to the right indicate full marks.

(*iii*) Negative marking system for MCQ is applicable.

(*iv*) Use black ball point pen to darken the circle of correct answer in OMR answer-sheet. Circle once darkened is final.

P.T.O.

(MCQ)

1. Choose the *correct* alternative for each of the following : 1 each

(*i*) The function which is integrated is called :

(*a*) Integration

(*b*) Integrand

(*c*) Differentiation

(*d*) None of the above

(*ii*) $\int \log x dx$ =

(*a*) $x \log (ex)$

(*b*) $x + \log x$

(*c*) $\log\left(\frac{x}{e}\right)$

(*d*) $x \log\left(\frac{x}{e}\right)$

(*iii*) The integral of the type $\int f(x, (ax + b)^{1/n}) dx$ can be evaluated by the substitution is :

(*a*) $t^n = (ax + b)^{1/n}$

(*b*) $t = (ax + b)^n$

(*c*) $t^n = (ax + b)$

(*d*) $t = ax + b$

(*iv*) $\int \frac{1}{(1+x^2)\tan^{-1}x}dx =$

(*a*) $\log \tan^{-1}x$

(*b*) $\log \cot^{-1}x$

(*c*) $\log \sec^{-1}x$

(*d*) $\log \operatorname{cosec}^{-1}x$

(*v*) $\int \tan^{-1}x dx =$

(*a*) $\frac{\tan^{-1}x}{n-1} + \int \tan^{n-2}x\,dx$

(*b*) $\frac{\tan^{-1}x}{n-1} - \int \tan^{n-2}x\,dx$

(*c*) $-\frac{\tan^{-1}x}{n-1} - \int \tan^{n-2}x\,dx$

(*d*) $\frac{\tan^{-1}x}{n+1} - \int \tan^{n-2}x\,dx$

(*vi*) $\int_0^{2a} f(x)dx = 2\int_0^{a} f(x)dx$ holds when :

(*a*) $f(x)$ is even

(*b*) $f(2a) = f(x)$

(*c*) $f(2a - x) = f(x)$

(*d*) $f(a - x) = f(x)$

P.T.O.

(*vii*) The area of a quadrant of the circle $x^2 + y^2 = 1$ is :

(*a*) π

(*b*) $\frac{\pi}{2}$

(*c*) $\frac{\pi}{3}$

(*d*) $\frac{\pi}{4}$

(*viii*) The area included between the cycloid $x = a(\theta - \sin\theta)$, $y = a(1 - \cos\theta)$ and its base is :

(*a*) $3\pi a^2$

(*b*) $2\pi a^2$

(*c*) πa^2

(*d*) $-\pi a^2$

(*ix*) $\int_1^a \int_1^b \frac{dxdy}{xy} =$

(*a*) log *a* log *b*

(*b*) log (*ab*)

(*c*) log (*a*/*b*)

(*d*) $\frac{\log a}{\log b}$

(*x*) If $x > 0$, then the gamma function is defined as :

(*a*) $\int_0^1 e^{-t}t^{x-1}dt$

(*b*) $\int_0^1 e^{-xt}t^{x-1}dt$

(*c*) $\int_0^\infty e^{-t}t^{n+1}dt$

(*d*) $\int_0^\infty e^{-t}t^{x-1}dt$

(Theory)

2. Attempt any *two* of the following : 5 ecah

(*a*) If $f(x)$ and $\phi(x)$ are integrable functions of x and then prove that :

$$\int f(x).\phi'(x)dx = f(x).\phi(x) - \int f'(x).\phi(x)dx$$

(*b*) Show that :

$$\int x^m(a + bx^n)^p dx = \frac{x^{m-n+1}(a+bx^n)^{p+1}}{b(np+m+1)}$$

$$- \frac{a(m-n+1)}{b(np+m+1)} \int x^{m-n}(a+bx^n)^p dx$$

P.T.O.

(*c*) Evaluate :

$$\int \sin^6 x \, dx .$$

3. Attempt any *two* of the following : 5 each

(*a*) Show that :

$$\int \sin^m x \cos^n x \, dx =$$

$$\frac{\sin^{m+1} x \cos^{n-1} x}{m+n} + \frac{n-1}{m+n} \int \sin^m x \cos^{n-2} x \, dx$$

(*b*) Prove that :

$$\int_{-a}^{a} f(x)\, dx = 2\int_{0}^{a} f(x) dx ,$$

if $f(x)$ is an even function of x.

$= 0$, if $f(x)$ is an odd function of x.

(*c*) Evaluate :

$$\int_{0}^{\pi/2} \log \sin x \, dx .$$

4. Attempt any *two* of the following : 5 each

(*a*) Prove that :

$$\int_a^b f(x)dx \times \int_c^d g(y)dy = \int_a^b \int_c^d f(x)g(y)dx\,dy.$$

(*b*) Evaluate :

$$\int_0^3 \int_1^2 xy(1 + x + y)dx\,dy.$$

(*c*) Find the area included between the curve $xy^2 = 4a^2(2a - x)$ and its asymptote.

This question paper contains 4+1 printed pages]

AD—6—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

MICROBIOLOGY

Paper III

(Basic Microbiology and Biomolecules)

(MCQ + Theory)

(Monday, 19-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt MCQ on OMR answer sheet separately.

(*ii*) Attempt theory questions on answer-book.

(*iii*) Attempt *All* questions.

MCQ

1. Multiple choice questions : 10

(*i*) ..... is the major polymer present in cell wall of bacteria.

(*a*) Polypeptide

(*b*) Peptidoglycan

(*c*) Polynucleotide

(*d*) Polysaccharide

P.T.O.

(*ii*) The two subunits of the prokaryotic 70^s ribosomes are .....

(*a*) 50^s and 30^s

(*b*) 50^s and 20^s

(*c*) 45^s and 25^s

(*d*) 40^s and 30^s

(*iii*) ..... is used for locomotion in bacterial cell.

(*a*) Pilli

(*b*) Cillia

(*c*) Flagella

(*d*) Pseudopodia

(*iv*) HIV viruses are .....

(*a*) Petroviruses

(*b*) Bacteriophage

(*c*) Virion

(*d*) Provirus

(*v*) ..... are obligate intracellular parasites.

(*a*) Bacteria

(*b*) Fungi

(*c*) Protozoa

(*d*) Viruses

(*vi*) Viruses are known to infect .....

(*a*) Plants

(*b*) Bacteria

(*c*) Animal

(*d*) All of the above

(*vii*) Simple sugar of the blood is .....

(*a*) Sucrose

(*b*) Lactose

(*c*) Glucose

(*d*) Galactose

(*viii*) In nerve fibers the myelin sheath contains ..... which acts as electrical insulators.

(*a*) Carbohydrates

(*b*) Proteins

(*c*) Nucleic acids

(*d*) Lipids

(*ix*) The pyrimidines are ..... ring compounds.

(*a*) Triple

(*b*) Single

(*c*) Double

(*d*) None of the above

(*x*) ..... are proteins in combination with a prosthetic group that is a pigment.

(*a*) Chromoproteins

(*b*) Metalloproteins

(*c*) Glycoproteins

(*d*) Nucleoproteins

Theory

2. Describe in detail Gram Negative bacterial cell wall. 10

Or

(*a*) Write a note on Ribosome. 5

(*b*) Discuss the cell membrane. 5

3. Explain in detail lytic cycle of viruses. 10

Or

Write notes on :

(*a*) HIV viruses 5

(*b*) Watson and Crick model of DNA. 5

4. Define lipid. How they are classified ? 10

Or

Write notes on :

(*a*) Types of RNA 5

(*b*) Biological significance of carbohydrate. 5

This question paper contains 4+2 printed pages]

AD—14—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

MICROBIOLOGY

Paper IV

(Microbial Physiology)

(MCQ and Theory)

(Tuesday, 20-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

(*iii*) Draw well labelled diagrams wherever necessary.

(MCQ)

1. Multiple choice questions : 10

(*i*) The organisms requiring organic compounds as a sole source of carbon are termed as ..... .

(A) Autotrophs

(B) Heterotrophs

(C) Chemotrophs

(D) Phototrophs

P.T.O.

(*ii*) Bacteria growing in absence of oxygen are termed as ..... .

(A) Aerobes

(B) Anaerobes

(C) Facultative anaerobes

(D) None of the above

(*iii*) ..... act as growth factors.

(A) Purine

(B) Amino acid

(C) Vitamin

(D) All of the above

(*iv*) In ..... molecules are transported across the cell membrane with chemical modification.

(A) Facilitated diffusion

(B) Group translocation

(C) Passive diffusion

(D) None of the above

(*v*) The flow of solute against the concentration gradient occurs in ..... .

(A) Passive diffusion

(B) Active transport

(C) Both (A) and (B)

(D) None of the above

(*vi*) ..... is example of spherical shaped bacteria.

(A) Streptococci

(B) Staphylococci

(C) Diplococci

(D) All of the above

(*vii*) The total viable cell count of bacteria is determined by ..... .

(A) DMC

(B) SPC

(C) Spectrophotometer

(D) None of the above

(*viii*) The microorganisms requiring optimum growth temperature between 0°C to 20°C are called as ..... .

(A) Psychrophiles

(B) Mesophiles

(C) Thermophiles

(D) None of the above

(*ix*) ..... is the sporulating bacteria.

(A) *S.typhi*

(B) *E.coli*

(C) *B.anthracis*

(D) *V.cholerae*

(*x*) Under conditions of limited supply of ..... occurs sporulation.

(A) Carbon

(B) Nitrogen

(C) Phosphorus

(D) All of the above

(Theory)

2. Classify the microorganisms on the basis of carbon and energy source. 10

Or

Write notes on :

(*a*) Growth factors. 5

(*b*) Effect of temperature on the microbial growth. 5

3. Describe in detail different methods of growth determination. 10

Or

Write notes on :

(*a*) Synchronous culture. 5

(*b*) Facilitated diffusion. 5

4. Define endospore and write on germination of endospore. 10

Or

Write notes on :

(*a*) SASP (Small Acid Soluble Protein). 5

(*b*) Passive diffusion. 5

This question paper contains 7 printed pages]

AD—131—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

PHYSICS

Paper IV

(Electricity and Magnetism)

(MCQ + Theory)

(Wednesday, 18-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Non-programmable calculator and log table is allowed.

(*iii*) Symbols have their usual meanings.

P.T.O.

MCQ

1. Choose the *correct* alternatives of the following : 10

(*i*) The true power 'P' in an a.c. circuit is :

(*a*) $E_{rms} \times I_{rms}$

(*b*) $E_{rms} \times I_{rms} \times \cos\phi$

(*c*) $E_{rms} \times I_{rms} \times \sin\phi$

(*d*) $E_{rms}^2 \times I_{rms}^2 \times \cos^2\phi$

(*ii*) The resonance frequency of series resonant circuit is :

(*a*) $f_0 = \frac{1}{2\pi}\sqrt{\frac{1}{LC}}$

(*b*) $f_0 = \frac{1}{2\pi\sqrt{LC}}$

(*c*) $f_0 = \sqrt{\frac{1}{LC}}$

(*d*) $f_0 = \frac{1}{LC}$

(*iii*) The word Hysteresis in the cycle of magnetization, means to .....

(*a*) Lead ahead

(*b*) Lag behind

(*c*) Remain saturated

(*d*) Retaintivity of the material

(*iv*) The S.I. unit of magnetic flux is :

(*a*) Henry

(*b*) Farad

(*c*) Amp/sec

(*d*) Weber

(*v*) The magnetic induction due to a current carrying straight conductor is given by :

(*a*) $B = \frac{\mu_0 2I}{4\pi R}$

(*b*) $B = \frac{\mu_0 nI}{2a}$

(*c*) $B = \frac{\mu_0 I}{2\pi R}$

(*d*) $B = \frac{\mu_0 nI}{4a}$

(*vi*) The intensity of magnetization at a given pt. inside the magnetic material is given by J = ...

(*a*) $\frac{V}{M}$

(*b*) M – V

(*c*) M + V

(*d*) M/V

(*vii*) The magnetic permeability is given by :

(*a*) $\mu = BH$

(*b*) $\mu = \frac{B}{H}$

(*c*) $\mu = \frac{H}{B}$

(*d*) $\mu = \frac{I}{H}$

(*viii*) For a number of moving source charges if both electric field and magnetic field are applied, then the total force on the moving charge is given by $F = q(E + V \times B)$ and it is called as :

(*a*) Coulombian force

(*b*) Lorentz force

(*c*) Gravitational force

(*d*) Upthrust force

(*ix*) In Biot and Savart's law 'B' is inversely proportional to :

(*a*) Square of the distance point from the centre of conductor

(*b*) Square root of the distance point from the centre of conductor

(*c*) Square of the distance point from the end of conductor

(*d*) Square root of distance point from end of conductor

(*x*) An electrical device used for transferring electrial power from one circuit to another at the same frequency is called as :

(*a*) Transistor

(*b*) Field effect transistor

(*c*) Transformer

(*d*) Transducer

Theory

2. Attempt any *five* of the following : 10

(*i*) Define mutual inductance.

(*ii*) If N_1 = 200 turns

N_2 = 50 turns

E_1 = 120 volts, then find 'E_2'.

(*iii*) Define Faraday's law of electromagnetic induction.

(*iv*) Draw the circuit dia. of Owen's bridge and give its balance condition.

(*v*) Establish the relation between permeability and susceptibility.

(*vi*) Define magnetic dipole moment.

(*vii*) State Ampere's circuital law.

3. Attempt the following : 10

(*a*) Explain the logarithmic decrement. Obtain an expression of logarithmic decrement in terms of

$$\lambda = \frac{2.303}{10} \log_{10}\left(\frac{\theta_1}{\theta_{11}}\right).$$

Or

What is mutual induction ? Explain mutual induction of a pair of coil.

(*b*) Explain damping correction. Obtain an expression for corrected throw.

Or

Explain workdone in establishing current in an inductance.

4. Attempt any *one* of the following : 10

(*i*) State and explain Biot-Savart law. Apply it to find the magnetic induction due to current carrying straight conductor.

(*ii*) Obtain the frequency of L-C-R series resonance circuit and show the variation of resistance, inductive reactance (LW) and capacitive reactance $\left(\frac{1}{CW}\right)$ with variation of frequency series resonance circuit.

This question paper contains 4+2 printed pages]

AD—114—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

ZOOLOGY

Paper III

[Life and Diversity of Animals—II (Chordates)]

(MCQ + Theory)

(Tuesday, 17-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Use separate answer-sheet (OMR) for Question No. 1.

(*ii*) *One* mark to each correctly answered MCQ.

(*iii*) Negative marking system is applicable.

(*iv*) Use black point pen to darken the circle of correct choice in OMR answer-sheet.

(*v*) Darken only one circle for the answer of an MCQ.

(*vi*) Draw a well labelled diagram, wherever necessary for Q. Nos. 2, 3 and 4.

P.T.O.

MCQ

1. Choose the *correct* answer : 10

(*i*) Chordates are also called as .....

(*a*) Vertebrates

(*b*) Non-vertebrates

(*c*) Cephalochordates

(*d*) All of the above

(*ii*) In Cephalochordata notochord is present in ..... region.

(*a*) Tail

(*b*) Head

(*c*) Digestive System

(*d*) All of the above

(*iii*) Tail of Scoliodon is .....

(*a*) Homocercal

(*b*) Heterocercal

(*c*) Hypocercal

(*d*) Hypercercal

(*iv*) Heart in fishes is ..... chambered.

(*a*) 2

(*b*) 3

(*c*) 4

(*d*) 5

(*v*) King Cobra is ..... snake.

(*a*) Poisonous

(*b*) Non-poisonous

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(*vi*) Birds migrates for .....

(*a*) Food

(*b*) Shelter

(*c*) Mate

(*d*) All of the above

(*vii*) Eye of rat contain .....

(*a*) Rods

(*b*) Cones

(*c*) Both (*a*) and (*b*)

(*d*) All of the above

(*viii*) Heart of Rat is ..... chambered.

(*a*) 2

(*b*) 3

(*c*) 4

(*d*) 5

(*ix*) Example of Marsupilia is .....

(*a*) Horse

(*b*) Rabbit

(*c*) Elephant

(*d*) Kangaroo

(x) Lateral line system is found in .....

(a) All vertebrates

(b) All chordates

(c) Fishes

(d) Amphibians

Theory

2. What is metamorphosis ? Explain the retrogressive metamorphosis. 10

Or

(a) General characters of Chordates.

(b) Explain mechanism of respiration in Rat.

3. Describe the nervous system of Scoliodon. 10

Or

(a) Give general characters of fishes.

(b) Structure of Ear of Rat.

4. Define migration. Explain in detail migration in birds. 10

Or

(*a*) Characteristics of Reptiles.

(*b*) Heart of Rat.

This question paper contains 4+2 printed pages]

AD—132—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

ZOOLOGY

Paper IV

(Developmental Biology)

(MCQ + Theory)

(Wednesday, 18-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Use separate answer-sheet (OMR) for Question No. **1**.

(*ii*) *One* mark to each correctly answered MCQ.

(*iii*) Negative marking system is applicable.

(*iv*) Use black point pen to darken the circle of correct choice in OMR answer-sheet.

(*v*) Darken only one circle for the answer of an MCQ.

(*vi*) Draw a well labelled diagram, wherever necessary for Q. Nos. **2**, **3** and **4**.

P.T.O.

MCQ

1. Select the *correct* answer for each of the following MCQs : 10

(*i*) The production of gametes is called .....

(*a*) Gametogenesis

(*b*) Spermatogenesis

(*c*) Oogenesis

(*d*) Mitosis

(*ii*) The yolk material is totally absent in ..... eggs.

(*a*) Megalecithal egg

(*b*) Alecithal egg

(*c*) Homolecithal egg

(*d*) Telolecithal egg

(*iii*) Sperm has a cap or arrow like structure on its head is called .....

(*a*) Nucleus

(*b*) Neuron

(*c*) Nephron

(*d*) Acrosome

(*iv*) In first cleavage, the division of zygote into two cellular units is called .....

(*a*) Micromeres

(*b*) Macromeres

(*c*) Blastomeres

(*d*) Both (*a*) and (*b*)

(*v*) The main function of Allantois is .....

(*a*) Nutrition

(*b*) Digestion

(*c*) Respiration

(*d*) Excretion

(*vi*) In Pig, which type of placenta is found ?

(*a*) Zonal

(*b*) Diffuse

(*c*) Metadiscoidal

(*d*) Coteledonary

(*vii*) The failure or inability to conceive is called .....

(*a*) Infertility

(*b*) Fertility

(*c*) Blastulation

(*d*) Morulation

(*viii*) ..... was first devised the test tube baby technique.

(*a*) Punnet and Square

(*b*) Darwin

(*c*) Steptoe and Edwards

(*d*) Aristotle

(*ix*) ..... animal shows super power of regeneration.

(*a*) Frog

(*b*) Planaria

(*c*) Fish

(*d*) Reptiles

(x) Complete parthenogenesis is found in .....

(a) Birds

(b) Mammals

(c) Lizards

(d) Fishes

Theory

2. Describe the process of spermatogenesis. 10

Or

Write notes on :

(a) On the basis of distribution of yolk

(b) Test tube baby.

3. Describe the process of fertilization in frog. 10

Or

Write notes on :

(a) Structure of sperm of Frog

(b) Embryonic stem cells.

4. Describe the placentation in mammals on the basis of mode of origin. 10

Or

Write notes on :

(*a*) Structure of chorion

(*b*) Incomplete parthenogenesis.

This question paper contains 4+2 printed pages]

AD—49—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

BOTANY

Paper III

(Diversity of Cryptogams)

(MCQ + Theory)

(Monday, 26-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B.:— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

(*iii*) Use separate answer-sheet for MCQ (OMR Sheet) and descriptive questions.

(*iv*) Time allotted to MCQ is 30 minutes and to descriptive questions is 2.00 hours.

(*v*) Draw well-labelled diagram wherever necessary.

P.T.O.

(MCQ)

1. Choose the correct answers of the following questions :

(*i*) The study of algae is called :

(*a*) Mycology

(*b*) Phycology

(*c*) Bacteriology

(*d*) Virology

(*ii*) .....is a marine alga.

(*a*) Batrachospermum

(*b*) Oedogonium

(*c*) Ectocarpus

(*d*) Chara

(*iii*) Male sex organ of Chara is :

(*a*) Globule

(*b*) Nucule

(*c*) Antherozoid

(*d*) None of the above

(*iv*) Cystocarps are found in :

(*a*) Ectocarpus

(*b*) Oedogonium

(*c*) Chara

(*d*) Batrachospermum

(*v*) The ventral canal cell and neck canal cells are present in :

(*a*) Globule

(*b*) Oogonium

(*c*) Archegonium

(*d*) Antheridium

(*vi*) Funaria belongs to class :

(*a*) Hepaticopsida

(*b*) Bryopsida

(*c*) Anthocerotopsida

(*d*) None of the above

(*vii*) The members of Hepaticopsida are called as :

(*a*) Liverworts

(*b*) Hornworts

(*c*) Mosses

(*d*) None of the above

(*viii*) Ridges and furrows are present on the stem of :

(*a*) Funaria

(*b*) Lycopodium

(*c*) Equisetum

(*d*) None of the above

(*ix*) Elators are present on spores of :

(*a*) Marsilea

(*b*) Lycopodium

(*c*) Equisetum

(*d*) None of the above

(x) In Marsilea, the petiole bears asexual reproductive bodies just above the base are called :

(a) Cone

(b) Sporocarp

(c) Sporophyll

(d) Sporangium

(Theory)

2. Write systematic position and describe thallus structure of Ectocarpus.

Or

Write in brief :

(i) Nannandrium of Oedogonium

(ii) Economic importance of algae

3. Describe external and internal structure of thallus of Riccia.

Or

Write in short :

(a) Archegonium of Riccia

(b) Male branch of Funaria

4. Give systematic position and describe external features of sporophyte of Equisetum.

Or

Describe in brief :

(*a*) General characters of Pteridophytes;

(*b*) External features of sporocarp of Marsilea.

This question paper contains 4+2 printed pages]

AD—56—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

BOTANY

Paper IV

(Genetics and Plant Breeding)

(MCQ + Theory)

(Tuesday, 27-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

(*iii*) Use separate answer-sheets for MCQ (OMR sheets) and descriptive question.

(*iv*) Draw well labelled diagrams wherever necessary.

P.T.O.

MCQ

1. Choose the *correct* answers :

(*i*) ..... is regarded as father of genetics.

(*a*) Clarence McClung

(*b*) T.H. Morgan

(*c*) Gregor Mendel

(*d*) Nettie Stevenson

(*ii*) Mendel's work was rediscovered in 1900 by .....

(*a*) Hugo de Vries

(*b*) Carl Correns

(*c*) Eric Von Tschermark

(*d*) All of the above

(*iii*) When two homozygous (pure) parents of contrasting forms of one character are crossed, the form of character which appears in F_1 is called ..... character.

(*a*) Recessive

(*b*) Dominant

(*c*) Co-dominant

(*d*) None of the above

(*iv*) Sex chromosomes are also called as :

(*a*) Autosomes

(*b*) Allosomes

(*c*) Polysomes

(*d*) Ribosomes

(*v*) Bleeder's disease is .....

(*a*) Haemophilia

(*b*) Colour blindness

(*c*) Hypertrichosis

(*d*) Albinism

(*vi*) While working on Drosophila melanogaster, the concept of sex linkage was first introduced by .....

(*a*) Clarence McClung

(*b*) T.H. Morgan

(*c*) Gregor Mendel

(*d*) Nettie Stevenson

(*vii*) An organism with more than two genomes is called a .....

(*a*) Monoploid

(*b*) Diploid

(*c*) Polyploid

(*d*) None of the above

(*viii*) ..... arise when the additional sets of chromosome originate from the same species.

(*a*) Autopolyploidy

(*b*) Allopolyploidy

(*c*) Monoploidy

(*d*) None of the above

(*ix*) Breeding for disease resistance requires .....

(*a*) A good source of resistance

(*b*) Planned hybridization

(*c*) Disease test

(*d*) All of the above

(x) Polyploidy is induced through .....

(a) Irradiation

(b) Mutagens

(c) Ethylene

(d) Colchicine

Theory

2. Describe complementary gene action (9 : 7) with suitable example.

Or

Write short notes on :

(i) Test cross and back cross

(ii) Plant introduction.

3. Describe sex linked inheritance in man with suitable example.

Or

Write short notes on :

(i) Down's syndrome

(ii) Acclimatization.

4. Describe clonal selection in detail.

Or

Write short notes on :

(*i*) Emasculation

(*ii*) Cytoplasmic male sterility.

This question paper contains 4+2 printed pages]

AD—113—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

PHYSICS

Paper III

(Kinetic Theory, Heat and Thermodynamics)

(MCQ + Theory)

(Tuesday, 17-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Q. No. 1 is MCQ type. Answer MCQs on OMR sheet only.

(*iii*) Q. No. 2, Q. No. 3 and Q. No. 4 are descriptive type questions.

(*iv*) Use separate answer-book/sheet for MCQ type questions.

(*v*) Negative marking system is applicable to MCQ examination.

P.T.O.

MCQ

1. Attempt *all* Multiple Choice Questions : 10

(*i*) The expression for mean free path given by Boltzmann is :

(*a*) $\lambda = \frac{1}{\sqrt{2}\,\pi d^2 n}$

(*b*) $\lambda = \frac{1}{\pi d^2 \rho}$

(*c*) $\lambda = \frac{3}{4\pi d^2 n}$

(*d*) $\lambda = \frac{3}{2\pi d^2 n}$

(*ii*) The liquefaction of carbon dioxide occur in Andrew's experiment below the temperature :

(*a*) 13.1°C

(*b*) 31.1°C

(*c*) 23.1°C

(*d*) 48.1°C

(*iii*) Critical volume is given by the relation :

(*a*) $V_C = 2b$

(*b*) $V_C = 4b$

(*c*) $V_C = b$

(*d*) $V_C = 3b$

(*iv*) The temperature of inversion is given by the value :

(*a*) $\frac{a}{Rb}$

(*b*) $\frac{2a}{Rb}$

(*c*) $\frac{3a}{Rb}$

(*d*) $\frac{27Rb}{8a}$

(*v*) In an adiabatic process, the first law of Thermodynamics becomes :

(*a*) $dU - \frac{PdV}{J} = 0$

(*b*) $dU + \frac{dV}{J} = 0$

(*c*) $dU + \frac{PdV}{J} = 0$

(*d*) $\frac{PdV}{J} = \frac{dU}{J}$

(*vi*) Work done during an adiabatic process is given by the expression :

(*a*) $W = \frac{1}{1-\gamma}\left[RT_2 - RT_1\right]$

(*b*) $W = \frac{\gamma - 1}{2}\left[T_2 - T_1\right]R$

(*c*) $W = \frac{1}{\gamma - 1}\left[T_1 - T_2\right]R$

(*d*) $W = \frac{1}{\gamma - 1}\left[RT_1 - RT_2\right]$

P.T.O.

(*vii*) For an ideal gas undergoing isothermal process, the change in internal energy is :

(*a*) 0

(*b*) 1

(*c*) –1

(*d*) ∞

(*viii*) If T_1 is the temperature of source and T_2 is the temperature of sink then efficiency of Carnot's engine increases for :

(*a*) $T_1 = T_2$

(*b*) $T_1 > T_2$

(*c*) $T_1 < T_2$

(*d*) $T_1 = 2T_2$

(*ix*) The Gibbs' function is given by :

(*a*) $G = U - PV + TS$

(*b*) $G = U + PV + TS$

(*c*) $G = U - PV - TS$

(*d*) $G = U + PV - TS$

(x) Maxwell's thermodynamical relation is :

(a) $\left(\frac{\partial S}{\partial T}\right)_T = \left(\frac{\partial P}{\partial V}\right)_T$

(b) $\left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial P}{\partial S}\right)_V$

(c) $\left(\frac{\partial T}{\partial V}\right)_V = -\left(\frac{\partial P}{\partial S}\right)_S$

(d) $\left(\frac{\partial S}{\partial T}\right)_P = \left(\frac{\partial P}{\partial V}\right)_P$

Theory

2. Attempt any *five* of the following questions : 10

(i) Obtain the relation between coefficient of viscosity and coefficient of diffusion.

(ii) Define critical temperature of a gas.

(iii) What are the properties of matter near critical point ?

(iv) State the first law of thermodynamics.

(v) Define isothermal process.

(vi) State Gibbs' function of a system.

(vii) Obtain Maxwell's thermodynamical relation for the variable $x = T$ and $y = V$.

3. Attempt any *two* of the following questions : 10

(*i*) Derive an expression for mean free path on the basis of Kinetic theory of gases.

(*ii*) Describe Amagat's experiment and its result.

(*iii*) Explain change in entropy in a reversible process using Carnot's cycle.

(*iv*) Obtain an expression for Clausius-Clapeyron's latent heat equation using Maxwell's thermodynamical relations.

4. Attempt any *one* of the following questions : 10

(*i*) Derive an expression for coefficient of viscosity of a gas in terms of mean free path of its molecules.

(*ii*) Describe Carnot's cycle. Obtain an expression for efficiency of Carnot engine.

This question paper contains 4+2 printed pages]

AD—215—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

COMPUTER SCIENCE

Paper III

(Programming in C)

(MCQ + Theory)

(Tuesday, 24-11-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Figures to the right indicate full marks.

(*iii*) Assume suitable data if necessary.

P.T.O.

MCQ

1. Attempt the following : 10

(*i*) ..... is an input statement.

(*a*) scanf

(*b*) if

(*c*) for

(*d*) while

(*ii*) ..... is unconditional statement in C.

(*a*) for

(*b*) goto

(*c*) while

(*d*) do_while

(*iii*) * is used in declaring ..... .

(*a*) pointer

(*b*) array

(*c*) for

(*d*) if

(*iv*) Structure is used to combine ..... data types.

(*a*) same

(*b*) common

(*c*) different

(*d*) none of the above

(*v*) ..... is not a storage class.

(*a*) if

(*b*) static

(*c*) register

(*d*) automatic

(*vi*) ..... function is used to find length of string.

(*a*) strcpy( )

(*b*) strcmp( )

(*c*) strstr( )

(*d*) strlen( )

(*vii*) ..... is a logical operator in C.

(*a*) &&

(*b*) <>

(*c*) >=

(*d*) ++

(*viii*) ..... is a newline escapesequence character.

(*a*) \n

(*b*) \f

(*c*) \%

(*d*) \\\

(*ix*) ..... is a derived data type.

(*a*) int

(*b*) array

(*c*) structure

(*d*) union

(x) ..... format specifier is used for character value.

(a) %f

(b) %b

(c) %ld

(d) %c

Theory

2. (a) Explain do_while statement in C. 5

(b) Discuss static storage class. 5

Or

(c) Explain strlen( ) and strcmp( ) functions. 5

(d) Write a program to reverse the digits of a number. 5

3. (a) Explain concept of union in detail. 5

(b) Discuss I/O statement in C. 5

Or

(c) What is Array ? Explain types of Array. 5

(d) Write a program to search an element in Array. 5

4. (a) Explain concept of structure within structure with suitable program. 10

Or

(b) Write a program in C for substraction of two 3 × 3 matrix. 10

This question paper contains 4+1 printed pages]

AD—219—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2015

COMPUTER SCIENCE

Paper IV

(Data Structure)

(MCQ + Theory)

(Wednesday, 2-12-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Assume suitable data if necessary.

MCQ

1. Choose the *correct* answer : 10

(*i*) Array is ..... collection of elements.

(*a*) homogenous

(*b*) heterogenous

(*c*) different

(*d*) one

P.T.O.

(*ii*) For ..... search technique array should be sorted.

(*a*) linear

(*b*) binary

(*c*) tree

(*d*) none of the above

(*iii*) ..... is a term related with stack.

(*a*) Stack-top

(*b*) Stack middle

(*c*) Stack tree

(*d*) None of the above

(*iv*) To insert element on stacks ..... operation is used.

(*a*) pop

(*b*) push

(*c*) dell

(*d*) remove

(*v*) The first element in tree data structure is ..... .

(*a*) root

(*b*) leaf

(*c*) stem

(*d*) none of the above

(*vi*) ..... data structure is non-linear type.

(*a*) Tree

(*b*) Graph

(*c*) Stack

(*d*) Queue

(*vii*) The number of comparisons done by sequential search are ..... .

(*a*) (N + 1)/2

(*b*) N

(*c*) N + 1

(*d*) N/2

(*viii*) Generally collection of nodes is called as ..... .

(*a*) Stack

(*b*) Pointer

(*c*) Heap

(*d*) Linked list

(*ix*) ..... is not a type of linked list.

(*a*) Doubly linked list

(*b*) Singly linked list

(*c*) Hybrid linked list

(*d*) Circular linked list

(*x*) ..... is a pile in which items are added at one end and removed at another end.

(*a*) Stack

(*b*) List

(*c*) Array

(*d*) Queue

Theory

2. (*a*) What are the different data structure operations ? 5

(*b*) Explain quick sort technique. 5

Or

(*c*) Explain the concept of linked list. 5

(*d*) Write an algorithm to insert element into linked list. 5

3. (*a*) Explain tree data structure in detail. 5

(*b*) Explain the concept of heap. 5

Or

(*c*) Explain how tree is represented in memory. 5

(*d*) Write an algorithm to insert an element in a queue. 5

4. (*a*) What is Sorting ? Explain different sorting techniques. 10

Or

(*b*) Write an algorithm for inserting a node in binary tree. 10

This question paper contains 7 printed pages]

AD—67—2015

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2015

CHEMISTRY

Paper IV

(Physical and Inorganic Chemistry)

(MCQ + Theory)

(Thursday, 29-10-2015) **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) *All* questions carry equal marks.

(*iii*) Use separate answer sheet (OMR sheet) for Question No. 1.

P.T.O.

MCQ

1. Select the *correct* answer for each of the following multiple choice questions :

(*i*) 'Paschen Series' in hydrogen spectrum lies in :

(*a*) Ultraviolet region

(*b*) Visible region

(*c*) Infrared region

(*d*) None of the above

(*ii*) The distribution of electrons among the orbitals of a subshell is given by :

(*a*) Hund's rule

(*b*) Aufbau principle

(*c*) Pauli's exclusion principle

(*d*) None of the above

(*iii*) "The molar volume of a liquid at a temperature, when its surface tension is unity" is called as :

(*a*) Molar surface tension

(*b*) Parachor

(*c*) Molar volume

(*d*) Molar viscosity

(*iv*) The blue colour of the sky is due to :

(*a*) Tyndall effect

(*b*) Brownian movement

(*c*) Electrophoresis

(*d*) Electro-osmosis

(*v*) In colloidal solution, the diameter of dispersed particles is in the range of :

(*a*) 10 Å to 100 Å

(*b*) 10 Å to 500 Å

(*c*) 10 Å to 1000 Å

(*d*) 10 Å to 2000 Å

(*vi*) In synthesis of ammonia by 'Haber's Process', the substance which acts as catalytic poison is :

(*a*) As_2O_3

(*b*) H_2S

(*c*) Iron

(*d*) Platinum

(*vii*) An example of Autocatalysis is :

(*a*) Inversion of cane sugar

(*b*) Keto-enol tautomerism

(*c*) Decomposition of nitramide

(*d*) All of the above

(*viii*) Intermolecular hydrogen bonding is observed in :

(*a*) O-nitrophenol

(*b*) Hf molecule

(*c*) O-chlorophenol

(*d*) None of the above

(*ix*) The covalent bond is formed between :

(*a*) Metals

(*b*) Non-metals

(*c*) Metals-Non-metals

(*d*) None of the above

(x) IF_7 molecule has ..... Geometry.

(a) Square planar

(b) Octahedral

(c) Tetrahedral

(d) Pentagonal Bipyramid

Theory

Section 'A'

(Physical Chemistry)

2. Answer any *two* of the following :

(a) Derive an expression for energy of an electron in *n*th Bohr's orbit of an atom.

(b) Explain the determination of viscosity of liquid by Ostwald's viscometer method.

(c) Explain :

(i) Electrophoresis

(ii) Electro-osmosis.

(d) State and explain enzyme catalysis with examples.

3. Answer any *two* of the following :

(a) State and explain Pauli's exclusion principle.

(b) Give applications of colloids.

(c) Explain auto-catalysis with examples.

(d) (i) Calculate the radius of first Bohr's orbit of H-atom.

(ii) In the determination of surface tension of a liquid by the drop number method, it gives 60 drops while water gives 30 drops for the same volume. The densities of liquid and water are 0.996 and 0.800 g cm^{-3} respectively. Find surface tension of the liquid, if that of water is 72 dynes/cm.

Section 'B'

(Inorganic Chemistry)

4. Answer any *two* of the following :

(*a*) What is Metallic Bonding ? Explain the free electron theory of Metallic bond.

(*b*) What are van der Waals' forces ? Explain in detail.

(*c*) (*i*) Among NaCl and AgCl which one is more Ionic ? Explain with reason.

(*ii*) Draw molecular energy level diagram of N_2 molecule and determine its Bond order.

(*d*) Explain dsp^2 hybridisation with suitable example.