B.Sc. I Year (PRACTICAL) Model Paper

Subject : BOTANY
Paper – I
(Microbial Diversity, Cryptogams and Gymnosperms)

[Effective from the academic year 2008-09]

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

Note: Answer **All** questions. Draw well labelled diagrams wherever necessary.

I. Identify the algal components (A,B,C) in the given mixture. Draw labelled diagrams, classify and identify giving important characters [Diagrams – 1; classification – 1; characters – 2] **(3x4=12 Marks)**

II. Describe the procedure of bacterial staining and identify the given Bacterium (D) [Procedure – 2;Description – 1;Identification – 1] **(4)**

III. Prepare T.S. of the diseased material as a temporary mount (E). Identify the pathogen giving reasons and describe with the help of diagrams.
(Preparation – 2; Identification – 1; Diagram – 1; Description – 1; Classification- 1) **(6)**

IV. Prepare T.S. of the given material – Pteridophyte/Gymnosperm (F) as a single stain temporary mount and identify with diagnostic features and provide suitable diagrams.
(Slide Preparation – 2; Classification – 1; Diagram – 2; Description – 3) **(8)**

V. Identify giving reasons the specimens and slides (G,H,I,J,K and L)
(Viruses/Fungi – 1;Bryophtya – 2;Pteridophyta&Gymnosperms – 3) **(6x2½=15)**

VI. Record **(5)**

FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : BOTANY (NEW SYLLABUS)

Paper – I
(Microbial Diversity, Cryptogams and Gymnosperms)

QUESTION BANK
[Effective from the Academic year 2008-2009]

Time : 3 Hours} **{Max. Marks: 50**

Note : Answer **All** questions. Draw well labeled diagrams wherever necessary.

I. Identify the algal components (A,B,C) in the given mixture. Draw labeled diagrams, classify and identify giving important characters [Diagrams – I: classification – 1; characters – 2] (3x4=12 marks)

1. Oscillatoria
2. Nostoc
3. Volvox
4. Oedogonium
5. coleochaete
6. Chara
7. Ectocarpus
8. Polysiphonia

II. Describe the procedure of bacterial staining and identify the given Bacterium (D) [Procedure – 2 ; Description – 1 Identification – 1] (4)

9. Gram + Bacteria
10. Gram – Bacteria

III. Prepare T.S. of the diseased material as a temporary mount (E). Identify the pathogen giving reasons and describe with the help of diagrams.
(Preparation – 2; Identification – 1; Diagram – 1; Description – 1; Classification – 1) (6)

11. White rust on crucifers
12. Rust on sorghum
13. Tikka disease of groundnut

IV. Prepare T.S. of the given material – Pteridophyte / Gymnosperm (F) as a single stain temporary mount and identify with diagnostic features and provide suitable diagrams.
(Slide Preparation – 2; Classification – 1; Diagram – 2; Description – 3) (8)

14. Lycopodium stem
15. Equisetum stem
16. Marsilea Petiole / Rhizome
17. Pinus needle
18. Gnetum stem
19. Gnetum leaf

V. Identify giving reasons the specimens and slides (G, H, I, J, K and L) (viruses /Fungi – 1; Bryophtya – 2; Pteridophyta / Gymnosperms – 3) (6x2½=15)

SPECIMENS :

20. Tobacco Mosaic virus
21. Bhendi Yellow Vein clearing
22. Papaya leaf curl
23. Ergot of Bajra
24. *Puccinia* rust on wheat
25. *Puccinia* rust on Barberry
26. Head smut of sorghum
27. Whip smut of sugarcane
28. Tikka disease of Groundnut
29. Brown leaf spot of rice
30. Blast of Rice (Paddy)
31. crustose lichen
32. Foliose lichen
33. Fruticose lichen
34. Marchantia thallus with Gemma cups
35. Marchantia thallus with Antheridiopshore
36. Marchantia thallus with Archegonionphore
37. Anthoceros Thallus
38. Anthoceros with Sporophyte
39. Polytrichium with Sporophyte
40. Lycopodium with cone
41. Equisetum with cone
42. Marsilea with sporocarp
43. Pinus male cone
44. Pinus female cone
45. Gnetum twig
46. Gnetum male cone
47. Gnetum female cone

SLIDES:

48. Albugo conidia
49. Albugo oospores
50. Saccharomyces vegetative / budding
51. Penicillium conidia
52. Pencillium ascocarp
53. Puccinia uredial stage
54. Puccinia telial stage
55. Puccinia pycnial stage
56. Puccinia aecial stage
57. Alternaria conidia
58. Marchantia thallus V.S.
59. Marchantia thallus with Gemma cups
60. Marchantia antheridiophore L.S.
61. Marchantia archegoniophre L.S.
62. Marchantia sporophyte V.S.
63. Anthoceros thallus V.S.
64. Anthoceros thallus with antheridia
65. anthoceros thallus with archegonia
66. Anthoceros sporophyte L.S.
67. Anthoceros sporophyte T.S.
68. Polytrichum leaf T.S.
69. Polytrichum stem T.S.
70. Polytrichum antheridial branch
71. Polytrichum archegonial branch

..3..

72. Polytrichum capsule L.S.
73. Polytrichum protonema
74. Rhynia (Fossil slide)
75. Lycopodium strobiuls L.S.
76. Equisetum strobilus L.S.
77. Marsilea sporocarp V.S.
78. Cycadeoidea (Fossil Slide)
79. Pinus male cone V.S.
80. Pinus pollen grains
81. Pinus female cone V.S.
82. Pinus ovule V.S.
83. Gnetum male cone V.S.
84. Gnetum female cone V.S.
85. Gnetum ovule V.S.

VI. Record (5)

FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : CHEMISTRY (NEW SYLLABUS)

Paper – I

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

I. Write brief procedure along with group separation table for the identification of anions and cations in the following mixture. (6)

1.	SO_4^{-2} ;	Cl^- ;	Bi^{+3} ;	Al^{+3}
2.	S^{-2} ;	NO_3^-;	Cd^{+2} ;	Ca^{+2}
3.	CH_3COO^- ;	CO_3^{-2}	Ag^+ ;	NH_4^+
4.	S^{-2} ;	PO_4^{-3} ;	Cu^{+2} ;	Zn^{+2}
5.	NO_3^- ;	Cl^- ;	N_1^{+2} ;	Ba^{+2}
6.	SO_4^{-2} ;	Br^- ;	K^+ ;	Zn^{+2}
7.	CO_3^{-2} ;	SO_4^{-2};	Cr^{+3} ;	Sr^{+2}
8.	CH_3COO^- ;	SO_4^{-2} ;	Hg_2^{+2} ;	NH_4^+
9.	BO_2^- ;	Cl^- ;	Cd^{+2} ;	Al^{+3}
10.	I^- ;	CO_3^{-2} ;	Sn^{+2} ;	Mg^{+2}
11.	Br^- ;	NO^-_3 ;	Sb^{+3} ;	Ca^{+2}
12.	CO_3^{-2} ;	SO_4^{-2} ;	Hg^{+2} ;	NH_4^+
13.	I^- ;	PO_4^{-3} ;	Fe^{+3} ;	Mg^{+2}

II. Analyse the given mixture using semi-micro qualitative technique systematically and report two anions and two cations present in it . (34)

1.	$(NH_4)_3PO_4 + CdAC_2$	2.	$Al_2(SO_4)_3 + ZnCl_2$
3.	$Al\ Cl_3 + Ba(NO_3)_2$	4.	$Al\ Cl_3 + Ca\ (NO_3)_2$
5.	$Al\ Cl_3 + Sr(NO_3)_2$	6.	$CaCO_3 + Mg\ (NO_3)_2$
7.	$Sr(NO_3)_2 + Mg\ CO_3$	8.	$Sr(NO_3)_2 + Cd\ AC_2$
9.	$Mg\ SO_4 + NH_4\ I$	10.	$Fe\ SO_4 + NH_4\ Cl$
11.	$Pb(NO_3)_2 + NH_4AC$	12.	$Bi(NO_3)_3 + (NH_4)_3PO_4$
13.	$Zn\ Cl_2 + Ba\ AC_2$	14.	$Sr\ (NO_3)_2 + NH_4Cl$
15.	$Ca\ CO_3 + NH_4\ Br$	16.	$Ba\ (NO_3)_2 + MgI_2$
17.	$Ba\ CO_3 + NH_4\ AC$	18.	$Mg\ SO_4 + NH_4Br$
19.	$Cd\ Cl_2 + (NH_4)_3\ PO_4$	20.	$Pb\ AC_2 + NH_4NO_3$
21.	$Ca\ CO_3 + NH_4\ Br$	22.	$Mg\ SO_4 + (NH_4)_2\ CO_3$
23.	$Zn\ Cl_2 + NH_4\ Ac$	24.	$Al_2\ (SO_4)_3 + (NH_4)_2\ CO_3$
25.	$Ba(NO_3)_2 + NH_4\ Ac$		

OR

II.(a) Analyse the given mixture using semi-micro qualitative technique systematically and report only <u>two cations</u> present in it. (24)

(b) Following the given procedure, prepare a crude sample of one of the following in-organic compounds. (10)

1. Tetrammine copper (II) sulphate
2. Potash Alum. $KAl\ (SO_4)_2\ 12H_2O$
3. Hexamine cobalt (III) Chloride

Subject : Chemistry

Paper – I
(Scheme of Valuation)

I. Procedure – 6 marks

II.(a) Solubility – 3 marks

(b) Flame test – 3 marks

(c) 2 anions – 2 x 5 = 10 marks
(Identification and confirmation)

(d) 2 cations – 2 x 8 = 16 marks
(Identification and confirmation)

(e) Report of Ions in the given mixture 2 marks

OR

II.(a)1. Solubility – 3 marks

2. Flame test – 3 marks

3. 2 cations – 2 x 8 = 16 marks
(Identification and confirmation)

4. Report of cations in the given mixture – 2 marks

(b) Preparation of in-organic compound – 10 marks

III. Record – 5 marks

IV. Vivavoce – 5 marks

FACULTY OF SCIENCE

B.Sc. I Year (PRACTICAL) Examination 2008-2009

Subject: Electronics [New Syllabus] Paper – I

QUESTION BANK

Time : 3 Hours Max. Marks : 50

N. B. : Candidate may be asked to strike off any one question (among the allotted EIGHT experiments for the batch) which he/she doesn't wish to attempt. ***ANY ONE EXPERIMENT MAY BE ALLOTTED FROM THE REST OF THE SEVEN EXPERIMENTS.***

1. Using the cathode ray oscilloscope, determine the peak voltage and frequency of a sine, square and triangular signal.
2. By observing the different wave shapes on a CRO screen, determine all the possible parameters of the wave shapes.
3. By proper adjustments to the CRO, obtain Lissajous figures of various shapes to determine the frequency and phase angles between the waveforms.
4. Verify Thevenin's theorem for given three different dc circuits.
5. Verify Norton's theorem for given three different dc circuits.
6. Verify the Maximum Power Transfer theorem for three different sources.
7. Design and construct a low pass RC circuit and study its frequency response, also verify the cutoff frequency both theoretically and experimentally at least for two different RC combinations.
8. Design and construct a high pass RC circuit and study its frequency response, also verify the cutoff frequency both theoretically and experimentally for two different RC combinations.
9. Design and construct two different low pass RL circuits and study their frequency response, also verify the cutoff frequencies both theoretically and experimentally.
10. For a high pass RL circuit, find the cutoff frequency experimentally by plotting its frequency response and repeat the same for different R and L values. Compare these values with theoretically calculated cutoff frequencies.
11. Using a differentiating circuit which is constructed with R and C components, study the response to an applied square wave and measure the time constant of the output signal.
12. Design and construct an RC integrator circuit and observe the output for different input waveforms and verify the time constant of the output signals.

Contd. -2-

13. Design and construct two RL integrator circuits and calculate their time constants for the combinations from their response for a square input.

14. By constructing a differentiator circuit with R and L components, study its response to a square wave input and determine the circuit time constant. Repeat the same for second R and L combination.

15. Construct an LCR series resonance circuit to determine its resonance frequency, bandwidth and quality factor by plotting the frequency response. Repeat the same for another LCR series combination.

16. For an LCR series resonance circuit, plot a graph between frequency and current in the circuit. From this graph determine the resonance frequency, bandwidth and quality factor. Repeat the same for another LCR series combination.

17. Construct LCR series resonance circuits for Q values of 10 and 20 and determine their resonance frequency and bandwidth by plotting the frequency response.

18. Draw the voltage-current characteristics of a Junction diode in both forward and reverse bias conditions. From the characteristics determine cut-in voltage, forward resistance and reverse resistance.

19. Determine the Zener breakdown voltage of a given Zener diode by plotting its voltage-current characteristics.

20. Design and construct a Zener voltage regulator with given specifications.

21. Determine the h-parameters of a bipolar junction transistor by plotting input and output characteristics in its CE configuration.

22. Obtain the FET parameters from its voltage-current characteristics in its CS configuration.

23. Mark the negative resistance region on UJT voltage-current characteristics and determine its various parameters.

24. Construct a relaxation oscillator using a UJT and determine its frequency.

25. Plot the voltage-current characteristics of a silicon controlled rectifier and represent various parameters of the device on the graph.

26. Plot the characteristics of LDR and solar cell.

27. Plot the characteristics of Photodiode and LDR.

28. Plot the characteristics of Phototransistor and solar cell.

29. Plot the characteristics of Solar cell and photodiode.

30. Plot the characteristics of photodiode and phototransistor.

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FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : COMPUTER SCIENCE (NEW SYLLABUS)

Paper – I
PC SOFTWARE AND C

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

Two programs are to be asked in the Examination one in Part A and the other in Part B.

PART – A (MS – OFFICE)

MS-Word :

(1)(a) Design a visiting card for managing Director of a company with the following specification.

(i) Size of visiting card is 3.5" x 2"
(ii) Name of a company with big font using water mark.
(iii) Phone number, Fax number and e-mail address with appropriate symbols.
(iv) Office and residence address separated by line

(b) Create your class time table using Table option.

(2)(a) Create a letter head of a company with following using Template.
(i) Name of the company on the top of a page with big font and good style
(ii) Phone No. Fax No... and e-mail address with appropriate symbols.
(iii) Slogans if any should be specified in bold at the bottom.

(b) For given text add picture, add heading using word art and format the picture.

(3) Write a macro to format a document as below :-
(i) Line spacing 2
(ii) Justification formatting style
(iii) Courier new font of 12 pt size
(iv) Left and right margins to be 1.5"

(4) For given text, Apply the following :
(i) Page number and name of the college one each and every page
(ii) Change font size and colour
(iii) Add bullets and numbers
(iv) Add border to pages

(5) Use the mail merge option to write letters to your friends for inviting them to attend Annual Day Celebrations of your college.

MS-Excel :

(6) Create a suitable examination data base and find Total, Avg marks of each student and respective class secured by the students rules :-

Distinction if average	> = 75
First class if average	> = 60 but < 75
Second class if average	> = 50 but < 60
Third class if average	≥ 35 but < 50
Fail if marks in any subject is	< 35

(7) Solve the following using functions :

(i) concatcrate two Texts
(ii) Length of the text
(iii) Text in uppercase and lowercase

(8) Prepare the following worksheet :

Year	Product-1	Product-2	Product-3	Product-4	Prepare
2003	1000	800	900	1000	for graph, line
2004	800	80	500	900	
2005	1200	190	400	800	graph, pie chart
2006	400	200	300	1000	
2007	1800	400	400	1200	and 3D chart

(9) Create worksheet with the following columns :

Employee code, Name, Age, Department, Salary and give title as

Employee Information and Apply following format.

(i) Title in Arial font with size 16

(ii) Remaining text in Times new Roman font with 12

(iii) Employee code in bold and Italic

(iv) Employee Name fill with color

(v) Apply borders to columns

(vi) Salary with two decimal places

(10) Create emp worksheet with the following columns.

Emp No, Name, Basic salary, HRA (20% of Basic), DA(30% of Basic),

Gross (Basic + HRA + DA), PF (15% basic), NET (Gross-PF).

Find max & min / Net salaries

Find employees where names starts with letter 'S'

Find employees where salary ≥ 10,000

MS-ACCESS:

(11) Create a database using MS-Access with at lest 5 records

Table 1

Register No, Name. DoB. Gender. Class

Table 2

Register No, M1, M2, M3, M4, M5 & Total.

Maintain relationship between two tables with register number as primary key and answer following queries :

(i) show the list of students with register no. name, gender & total marks.
(ii) Find student name starts with 'a'
(iii) Find students where total > 500
(iv) Find student details where register no. = 301.

(12)(a) Create a table member with following fields :

Member no, member name, address, city, pin code, phone no, create form and enter data into the table through form.

(b) Create student table and form using table and form wizards with your own columns.

13. Create database using MS-Access with at least 5 records

Table 1

Employee code, emp-name, Age, Gender, DoB

Table 2

Emp code, Basic pay

Maintain relationship between two tables with Emp-code and generate following reports.

Report 1

Emp-code, emp-name, Age, gender, Gross-salary

Report 2

Employee code, emp-name, Basic pay, DA, HRA, Gross-Salary

MS-Power Point :

(14) make power point presentation on your strengths, weaknesses, hobbies, factors, that wrote your time.

(15) Create presentation consisting of slides with the following inform,

Name of College, Address of College, List of all Courses, Library & Lab facilities and apply transition effects.

(16) Make power point presentation of all the details of the books that you had studied in B.Sc. first year.

(17)(a) Create presentation by importing chart from Excel
(b) Create presentation consisting of an organization chart.

PART - B

C Programs :

Program for
- (i) sum of factors of a number
- (ii) sum of digits of a number.

Program to check whether given number is
- (i) prime or not
- (ii) perfect or not

Program using recursion for factorial of a given number

Program Using functions
- (i) with out parameters
- (ii) with parameters

Program for sorting an array

Program for matrix addition & subtraction
- (i) Program for reversing digits of a Number

Program for matrix multiplication

Program to demonstrate structures

Program sorting strings using pointers

Program to create file to store & retrieve strings using fputs( ) and fgets ( ).

Program to count no of words, lines in a text.

Program to create table of Triangular numbers.

Program to demonstrate
- (i) Unions
- (ii) Enumerate data types

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FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : PHYSICS (New Syllabus)

Paper – I

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

Note : Candidate may be asked to strike of any one question (Among the allotted 8 experiments for the batch which he does not want to attempt). Any one from the remaining may be allotted to the candidate :

1. Estimate the time period of simple pendulum using the theory of errors and calculate 'g' value.

2. Determine the moment of inertial of a 'Fly wheel'.

3. Determine the surface tension of water using Capillary rise method.

4. Determine the coefficient of viscosity of water by studying the flow through a capillary tube.

5. Determine 'Y' by uniform bending method.

6. Determine 'g' and 'k' using a compound pendulum.

7. Verify the perpendicular axes theorem using Bifilar pendulum.

8. Estimate the unknown frequency of the given tuning fork by volume resonator method, using the known frequency values of three tuning forks.

9. Using a Sonometer, determine the speed of waves on a stretched string.

10. Determine the coefficient of viscosity of a given liquid using Searle's viscometer.

11. Determine the Young's modulus of a spiral spring.

12. Study the damping of an oscillating disc in air and water using Logarithmic decrement method.

13. Determine 'Y' of a given material using non-uniform bending.

14. Determine the rigidity modulus of a spring by studying the oscillations of mass attached.

15. Using Bifiler pendulum method, determine the moment of inertia of given body about three perpendicular axes.

16. Find Poissons ratio of the material of the given spiral spring.

17. Verify the laws of stretched string using sonometer.

..2

18. Using compound pendulum determine the 'g' value.

19. Determine the frequency of a.c. using Melde's experiment.

20. Determine the rigidity modulus of the material of the given wire using torsional pendulum.

21. Find the frequency of a given signal by observing Lissajous figures using CRO.

22. Determine the coefficient of viscosity of water by Poiseuille's method.

23. Find the equivalent length of the simple pendulum of a given compound pendulum.

24. Estimate the error in time period of a simple pendulum by drawing a Gaussion distribution curve.

25. Determine the frequency of electrically maintained tuning fork for transverse mode.

26. Determine the frequency of electrically maintained tuning fork for longitudinal mode.

27. Verify the formula $V = (n + e) \lambda$ using volume resonator.

28. Determine the end-correction of the resonating air column.

29. Determine the surface tension of the given liquid using capillary rise method.

30. Determine the moment of inertia of a given fly wheel and verify it with the theoretical value.

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FACULTY OF SCIENCE

B.A. / B.Sc. I Year (Practical) Examination

Subject : MATHEMATICS (NEW SYLLABUS)

Paper – I
(Differential Equations and Solid Geometry)

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

Unit – I:

Differential equations of first order and first degree :

1. Solve $xy - \frac{dy}{dx} = y^3 e^{-x}$

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

3. Solve $(1 + e^{x/y})\, dx + e^{x/y}(1 - x/y)\, dy = 0$.

4. Solve $(xy \sin xy + \cos xy)\, y\, dx + (xy \sin xy - \cos xy)x\, dy = 0$.

5. Solve $(x^2 + y^2 + 2x)dx + 2ydy = 0$.

6. Solve $3e^x \tan y + (1 - e^x) \sec^2 y \frac{dy}{dx} = 0$.

7. Solve $(xy^3 + y)\, dx + 2(x^2 y^2 + x + y^4)\, dy = 0$.

8. Solve $x^2 ydx - (x^3 + y^3)\, dy = 0$.

Equations of the first order but not of the first degree :

9. Solve $p^3(x + 2y) + 3p^2(x + y) + (y + 2x)p = 0$.

10. Solve $x^2p^2 - 2xyp + (2y^2 - x^2) = 0$.

11. Solve $xp^2 - 2yp + ax = 0$.

12. Solve $y = 2px + \tan^{-1}(xp^2)$.

13. Solve $x^2 = a^2(1 + p^2)$.

14. Solve $y = 2p + 3p^2$.

15. Solve $(x - a)\, p^2 + (x - y)\, p - y = 0$.

16. Solve, $\sin px \cos y = \cos px \sin y + p$.

..2

Applications of first order differential equations :

17. Find the orthogonal trajectories of $x^2 + y^2 = cx$.

18. Find the orthogonal trajectories of $r = c_1(1 - \sin\theta)$.

19. Find the orthogonal trajectories of $y = c_1 e^{-x}$.

20. Find the orthogonal trajectories of $x^{1/3} + y^{1/2} = c_1$.

Unit – II

Higher order differential equations :

21. Solve $(D^2 + a^2)y = \tan ax$.

22. Solve $(D^2 + 1)y = e^{-x} + \cos x + x^3 + e^x \cos x$.

23. Solve $(D^2 + 1)(D^2 + 4)y = \cos\frac{x}{2}\cos\frac{3x}{2}$

24. Solve $(D^2 + 1)y = \cos x + xe^{2x} + e^x \sin x$.

Solve the following differential equations by the method of undetermined coefficients :

25. $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = \sin x$.

26. $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = x^2$.

27. $(D^2 - 2D - 8)y = 9xe^x + 10e^{-x}$

28. $(D^2 - 3D)y = 2e^{2x} \sin x$.

Solve the following differential equations using the method of variation of parameters.

29. $y'' + 3y' + 2y = 12\,e^x$

30. $y'' + 2y' + y = x^2 e^{-x}$

31. $y'' + y = 4x \sin x$.

32. $y'' - 2y' + y = e^x \log x$.

Use the reduction of order method to find the solution of the following equation ; One solution of the homogeneous equation is given

33. $y'' - \frac{2}{x}y' + \frac{2}{x^2}y = 0$ $y_1 = x$.

34. $(2x^2 + 1)y'' - 4xy' + 4y = 0$ $y_1 = x$

35. $y'' - \frac{2}{x}y' + \frac{2}{x^2}y = x \log x$, $y_1 = x$.

36. $x^2y'' + xy' - y = x^2 e^{-x}$. $y_1 = x$.

Solve the following differential equations:

37. $x^4 \frac{d^3y}{dx^3} + 2x^3 \frac{d^2y}{dx^2} - x^2 \frac{dy}{dx} + xy = 1.$

38. $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x.$

39. $(2x+3)^2 \frac{d^2y}{dx^2} - 2(2x+3) \frac{dy}{dx} - 12y = 6x.$

40. $(x+3)^2 \frac{d^2y}{dx^2} - 4(x+3) \frac{dy}{dx} + 6y = \log (x+3).$

Unit – III

Planes :

41. A variable plane is at a constant distance 3p from the origin and meets the axes in A, B and C. Show that the locus of the centroid of the triangle ABC is $x^{-2} + y^{-2} + z^{-2} = p^{-2}$.

42. A variable plane passes through a fixed point (a, b, c) and meets the co-ordinate axes in A, B, C. Show that the locus of the point common to the planes through A, B, C parallel to the co-ordinate planes is $a/x + b/y + c/z = 1$.

43. Show that the equation $12x^2 - 2y^2 - 6z^2 - 2xy + 7yz + 6zx = 0$ represents a pair of planes and also find the angle between them.

Right Line :

44. Find the coordinates of the foot of the perpendicular drawn from the origin to the plane $2x + 3y - 4z + 1 = 0$; also find the coordinates of the point which is the image of the origin in the plane.

45. Find the equation of the plane through the point (1, 1, 1) and perpendicular to the line $x - 2y + z = 2$, $4x + 3y - z + 1 = 0$.

46. A square ABCD of diagonal 2a is folded along the diagonal AC, so that plane DAC, BAC are at right angles. Show that the shortest distance between DC and A is then $2a / \sqrt{3}$.

47. Find the magnitude and the equations of the line of shortest distance between the two lines :

$$\frac{x-3}{2} = \frac{y+15}{-7} \qquad \frac{z-9}{5} \quad \frac{x+1}{2} \qquad \frac{y-1}{1} = \frac{z-9}{-3}$$

48. Find the length and the equations of the shortest distance line between

$5x - y - z = 0$, $x - 2y + z + 3 = 0$;

$7x - 4y - 2z = 0$, $x - y + z - 3 = 0$;

49. Find the magnitude and the equations of the line of shortest distance between the lines.

$$\frac{x}{4} = \frac{y+1}{3} = \frac{z-2}{2} \; ; \; 5x - 2y - 3z + 6 = 0; \; x - 3y + 2z - 3 = 0.$$

50. Obtain the co-ordinates of the points where the shortest distance line between the lines.

$$\frac{x-23}{-6} = \frac{y-19}{-4} = \frac{z-25}{3} \qquad \frac{x-12}{-9} \qquad \frac{y-1}{4} \qquad \frac{z-5}{2}$$

Spheres:

51. A variable plane through a fixed point (a, b, c) cuts the co-ordinate axes in the point A,B, C show that the locus of the centres of the spheres O ABC is

$$\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$$

52. Find the equation of the sphere through the four the four points (0, 0, 0), (-a, b, c), (a, -b, c) , (a, b, -c) and determine its radius.

53. Obtain in the equation of the sphere which passes through the three points (1, 0, 0), (0, 1, 0), (0, 0,1), and has its radius as small as possible.

54. Find the center and the radius of the circle
$x^2 + y^2 + z^2 - 2y - 4z = 11, \; x + 2y + 2z = 15.$

55. Obtain the equation of the sphere having the circle.

$$x^2 + y^2 + z^2 + 10y - 4z - 8 = 0, \; x + y + z = 3 \text{ as the great circle.}$$

56. Show that the plane $2x - 2y + z + 12 = 0$ touches the sphere

$$x^2 + y^2 + z^2 - 2x - 4y + 2z = 3 \text{ and find the point of contact.}$$

57. Obtain the equations of the sphere which pass through the circle

$x^2 + y^2 + z^2 - 2x - 2y + 4z - 3 = 0, \; 2x + y + z = 4$ and touches the plane $3x + 4y = 14$.

58. Show that the polar line of $(x + 1)/ 2 = \frac{y-2}{3} = (z+3)$, with respect to the sphere $x^2 + y^2 + z^2 = 1$ is the line $\frac{7x+3}{11} = \frac{y-2}{5} = \frac{z}{-1}$

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

60. Find the limiting points of the co-axial system of spheres.
$x^2 + y^2 + z^2 - 20x + 30y - 40z + 29 + \lambda (2x - 3y - 4z) = 0.$

Unit – IV:

CONES AND CYLINDERS :

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

62. Find the equation of the cone with vertex at (1, 2, 3) and guiding curve

$$x^2 + y^2 + z^2 = 4, x + y + z = 1.$$

63. Find enveloping cone of the sphere $x^2 + y^2 + z^2 - 2x + 4z = 1$ with its vertex at (1, 1, 1).

64. Find the equation of the cone whose vertex is at the origin and the direction cosines of whose generators satisfy the relation $3\ell^2 - 4m^2 + 5n^2 = 0$.

65. Find the equation to the cone which passes through the three cc-ordinate axes as well as the two lines

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

66. Show that the equation
$x^2 - 2y^2 + 3z^2 - 4xy + 5yz - 6zx + 8x - 19y - 2z - 20 = 0$ represents a cone with vertex (1, -2, 3).

67. Find the angle between the lines of intersections of $x + y + z = 0$ and $x^2 + yz + xy - 3z^2 = 0$.

68. * If the planes $2x - y + cz = 0$ cuts the cone $yz + zx + xy = 0$ in perpendicular lines, find the values of c.

69. Find the equation of the lines in which the plane $2x + y - z = 0$ cuts the cone $4x^2 - y^2 + 3z^2 = 0$.

70. Show that the locus of mid-points of chords of the cone

$$ax^2 + by^2 + cz^2 + 2fyz + 2gx + 2hxy = 0.$$

drawn parellel to the line $x / \ell = y / m = z/n$ is the plane

$$x(a\ell + hm + gn) + y(h\ell + bm + fn) + z(gV + fm + cn) = 0.$$

71. Find the plane which touches the cone $x^2 + 2y^2 - 2yz - 5zx + 3xy = 0$ along the generator whose direction rations are 1, 1,1.

72. Prove that the cones $fyz + gzx + hxy = 0$; $\sqrt{fx} + \sqrt{gy} + \sqrt{hz} = 0$ are resiprocal. .

73. Find the equation of the right circular cone whose vertex is (1, -2, -1), axis the line

$$\frac{x-1}{3} = \frac{y+2}{4} = \frac{z+1}{5}$$ and semi-vertical angle 60°.

74. Find the equation to the cylinder whose generators are parallel to $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and guiding curve is $x^2 + y^2 = 16, z = 0$

75. Find the equation of the enveloping cylinder of the conicoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ generator are parallel to the line $\frac{x}{\ell} = \frac{y}{m} = \frac{z}{n}$

76. Obtain the equation of a cylinder whose generators touch the sphere $x^2 + y^2 + z^2 + 2uv + 2vy + 2wz + d = 0$.
whose generators are parallel to the line $\frac{x}{\ell} = \frac{y}{m} = \frac{z}{n}$

77. Obtain the equation of the right circular cylinder whose guiding curve is the circle through the points (1, 0, 0), (0, 1, 0), (0, 0, 1).

78. Find the equation of the right circular cylinder of radius 2 whose axis is the line $(x - 1) / 2 = (y - 2) / 2 = (z - 2) / 2$.

79. Find the equation of the right circular whose axis is $\frac{x-2}{2} = \frac{y-1}{1} = \frac{z}{3}$ and passes through (0, 0, 3).

80. Prove that the right circular cylinder whose one section is the circle.

$x^2 + y^2 + z^2 - x - y - z = 0, x + y + z = 1$, is

$x^2 + y^2 + z^2 - yz - zx - xy = 1$.

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FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : MICROBIOLOGY (NEW SYLLABUS)

Paper – I

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

Note : Each candidate has to perform one major experiment, one minor experiment and five spotters.

I. Major Experiment Questions : **(20 marks each)**

1. A light compound microscope, stage micrometer and ocular micrometer are provided to you. Calibrate the microscope for its measurements in 10 x (low power) and 45 x (high power). Repeat the calibrated values in each magnification.

2. A calibrated microscope fitted with ocular micrometer is provided to you. Prepare a slide of microscopic object (fungal spore or pollen grain) and measure the size of the microscopic object with the help of calibrated ocular micrometer in low power and high power. Report the result. Demonstrate at least one observation to the examiner.

   (Note : Internal examiner concerned is required to pre-calibrate the microscope and give the calibrated values in consultation with the co-examiner).

3. A Bacterial pure culture is provided to you. Prepare smear of the same and stain by differential (Grams) staining method. Observe the microscopic characteristics of stained culture and report the microscopic morphology, arrangement and staining nature. Demonstrate your observation.

4. Stain the given bacterial culture by Endospore staining and report your observation by demonstrating your observed field.

5. An actively growing Bacterial culture is provided to you. Prepare a smear for capsular staining, perform the staining and report the presence or absence of capsule. Demonstrate your observations.

6. Test the sugars present in the given sample and identify at least two sugars and report (The examiner to provide the known and unknown sugar samples to each student along with, necessary reagents for testing).

7. Test and identify at least two amino acids in the given sample by qualitative analysis (The examiner should provide known and unknown amino acid samples and reagents for testing to each student).

8. Plot a standard graph of glucose by calorimetry and report the quantity of glucose present in the given sample. (The examiner to provide sample and reagents to each student).

II. **Minor Experiment Questions :** **(10 marks each)**

9. Demonstrate the spread plate technique for isolation of bacterial culture.

10. Demonstrate the streak plate technique for isolation of bacterial culture.

11. Demonstrate 10 fold serial dilution to obtain a dilution of 10^{-3} of the given sample.

12. A microscopic object is focused under a precalibrated microscope fitted with ocular micrometer. Find out the sizes of the object and report. (Note : Internal examiner is required to calibrate and focus the specimen and give the calibrated value of the given microscopic).

13. A bacterial culture is provided to you. Prepare a smear of the same, perform the simple staining and observe the microscopic characters. Report your observations by demonstrating to the examiner.

14. A bacterial culture is provided to you, perform the negative staining as per the standard protocol practiced by you. Report your microscopic observation by demonstrating to the Examiner.

15. Find out the presence or absence of glucose in the given sample by qualitative testing.

16. Find out the presence or absence of amino acid in the given sample by Ninhydrin test.

III. **Specimen for Spotting :** **(5 spotters 3x5=15)**

17. Microscope

18. Nutrient agar slants

19. Nutrient agar plates with streaking for colony isolation

20. Nutrient agar plate with isolated colnies obtained by dilution plating (pour plate or spread plate)

21. Potato dextrose agar with labeling (plate or slant)

22. Auto clave (Specimen)

23. Hot air oven (Specimen)

24. Incubator (Specimen)

25. Colorimeter (Specimen)

26. Inoculating loop / needle (Specimen)

27. Gram positive Bacilli (Slide Microscopic focusing)

28. Gram positive Cocci (Slide Microscopic focusing)

29. Gram negative Bacilli (Slide Microscopic focusing)

30. Nostoc (Slide Microscopic focusing)

31. Spirulina (Slide focused)
32. Scenedesmus (Slide focused)
33. Diatoms (Slide focused)
34. Saccharomyces or yeast (Slide focused)
35. Rhizopus (Slide focused)
36. Aspergillus (Slide focused)
37. Penicillium (Slide focused)
38. Fusarium (Slide focused)
39. TMV (photo / sketch without labeling)
40. HIV (photo / sketch without labeling)
41. T_4 phage (photo / sketch without labeling)
42. Adenovirus (photo / sketch without labeling)

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FACULTY OF SCIENCE

B.Sc. I Year (Practical) Examination

Subject : ZOOLOGY (New Syllabus)

Paper – I

QUESTION BANK

Time : 3 Hours} **{Max. Marks: 50**

Note : Handover the diagrams before commencement of the dissection for Q I and II.

I. Major Dissection : (12 marks)

Dissect and display the ....system.... and draw a neat labelled diagram.

Diag : 2 marks
Disst: 10 marks

1. Reproductive and excretory system of Leech.
2. Nervous system of Prawn.
3. Nervous system of Pila / Unio

II. Minor Dissection / Experiments: (8 marks)

Dissect and display / prepare a glycerine mount of ..... Draw a lebelled diagram .

Diag : 2 marks
Disst: 6 marks

1. Nephridium of Leecfh / Jaw of Leech.
2. Cephalic appendages of Prawn.
3. Thoracic appendages of Prawn.
4. Statocyst of Prawn.
5. Radula of Pila.
6. Any two stages of Mitosis or Meiosis (2x4=8 marks)
   Diag : 1 each slide
   Points : 3 each slide
7. Squash preparation of onion/ garlic root tip for mitotic chromosomes (2+6=8 marks)
   Proc : 2
   Description : 6
8. Qualitative identification of Amino acids (2+6=8 marks)
   Proc : 2
   Expt : 6

III. **Identify, classify and give the reasons for identification: (5x4=20)**

Note : Break up of marks
Marks for identification 1 mark for classification (1mark)
Marks for diagram and description . (2 marks)
If classification not applicable 2 marks for identification and 2 marks for diagram and description.

Museum Specimens and Slides :

1. Elphidium
2. Monocystis
3. Paramecium
4. Binary fission of paramecium
5. Conjugation of paramecium
6. Spongilla
7. euspongia
8. Physalia
9. Velella
10. Corallium
11. Gorgonia
12. Aurelia
13. Pennatula
14. Obelia colony
15. Medusa
16. Planaria
17. Miracidium
18. Redia
19. Cercaria
20. Echinococcus granuloses
21. Schistosoma
22. Ancylostoma
23. Nereis
24. Aphrodite
25. Hirudo
26. Trochophore
27. Sacculina
28. Limulus
29. Julus
30. Scolopendra
31. Anopheles mouth parts of male
32. Anopheles mouth parts of female
33. Peripatus
34. Chiton
35. Unio
36. Teredo
37. Sepia
38. Octopus
39. Nautilus
40. Glochidium larva
41. Ophiothrix
42. Echinus
43. Clypeaster
44. Cucumaria
45. Antedon
46. Bipinnaria larva
47. Balanoglossus
48. Tornaria larva

IV. Record.

Zoology

PRACTICAL PAPER – I

90 hrs
(3 hrs/week)

BIOLOGY OF INVERTEBRATES
(Note use minimal numbers of individuals, and discourage killing of animals)

1. Observation of the following slides / specimens / models:

Protozoa – *Elphidium, Monocystis, Paramoecium* – binary fission and conjugation.

Porifera – *Spongilla, Euspongia,*

Coelenterata – *Physalia, Vetella, Corallium, Gorgonia, Aurelia, Pennatula, Obelia* colony, Medusa.

Platyhelminthes and Nemathelminthes – *Planaria, Larval stages of Fasciola, Mirachidium, Redia, Cercaria, Echinococcus granulosus, Schistosoma haematobium, Ancylostoma duodenale.*

Annelida – *Nereis, Aphrodite, Hirudo,* Trochophore larva.

Arthropoda– *Sacculina, Limulus, Julus, Scolopendra, Anopheles* mouthparts (male and female), *Peripatus.*

Mollusca – *Chiton, Unio, Pteredo, Sepia, Octopus, Nautilus,* Glochidum larva.

Echinodermata – *Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva.

Hemichordata – *Balanoglossus, Tornaria larva.*

2. Dissections:

(Note use minimal numbers of individuals, and discourage killing of animals)

1. Nervous system of prawn.
2. Mounting of statocyst and study of appendages of prawn.

CELL BIOLOGY

1. Identification of stages from permanent slides showing mitosis and meiosis.
2. Squash preparation of onion/garlic root tip for mitotic chromosomes.
3. Squash preparation of albino micetestis for meiotic chromosomes.
4. Identification of salivary gland chromosomes and polytene chromosomes (using photographs or figures).
5. Qualitative tests for identification of amino acids.

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3. 'Invertebrate Zoology' by E. L. Jordan and P.S. Verma., S. Chand and Company.
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5. 'Invertebrate structure and Function' by Barrington. E. J. W., ELBS.
6. 'A student text book of Zoology' by Sedgwick, A., Vol-I, II and III – Central Book Depot, Allahabad.
7. 'A text book of Zoology' by Parker, T. J. and Haswell, W. A., Mac Millan Co. London.
8. 'Textbook of Invertebrates' by Kavita Juneja and H. S. Bhamrah.

Cell Biology:

1. 'Molecular Cell Biology' by Lodish, Berk, Kaiser, Scott. – Scientific American Books.
2. 'Cell and Molecular Biology' by De Robertis & De Robertis : Saunders College.
3. 'Cell Biology, Genetic Evolution an Ecology' by P.S. Varma and V. K. Agrawal; S. Chand and Company.
4. 'Molecular Biology' by Mohan P. Arror., Himalaya Publishing House Pvt. Ltd.
5. 'Manual of Laboratory Experiments in Cell Biology' – Edward Gasque: (W.C. Brouh Publishers.)
6. 'Biomolecules' by Mohan P. Arora., Himalaya Publishing House Pvt. Ltd.
7. 'Cell and Molecular Biology' – P. K. Gupta.
8. Concepts of Cell Biology' - P.S. Verma and V. K. Agarwal.
9. Biochemistry – U. Sathyanarayana and U. Chakrapani.
10. Biology – Campbell and Reece.
11. Molecular biology of the cell – Alberts et., al
12. 'Cell Biology' by S. C. Rastogi
13. 'Cell Biology by C. B. Powar, Himalayan Publications.