

SHIVAJI UNIVERSITY KOLHAPUR
Faculty: Science and Technology- Course: B. Sc. I Semester II Examination (NEP)
March/April 2023(Held in June 2023)
Mathematics Paper III DSC-B5
Multivariable Calculus
Subject code - 90222

Day & Date: Saturday, 13/04/2024

Time: 2:00 to 4:00 pm

Marks: 40

Center: MatoshriBayabaiShripatraoKadamKanyaMahavidyalaya, Kadegaon

Q.1 Choose the correct alternative

(08)

- 1) If $u = f(y + z, z + x, x + y)$ then value of $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$ is
- a) 0 b) 3 c) $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} + \frac{\partial f}{\partial z}$ d) None of these
- 2) A function $f(x)$ has maximum value at $x = c$ if
- a) $f'(c) = 0$ and $f''(c) > 0$ b) $f'(c) = 0$ and $f''(c) < 0$
c) $f'(c) = 0$ and $f''(c) \neq 0$ d) $f'(c) \neq 0$ and $f''(c) < 0$
- 3) $\lim_{h \rightarrow 0} \frac{f(x+h,y) - f(x,y)}{h}$ if exists is called the partial derivative of f with respect to ---
- a) x at (a, b) b) x at (x, y) c) y at (a, b) d) y at (x, y)
- 4) The maximum value of $\cos(\cos(\sin x))$ is At $x = 0$
- a) $\cos 1$ b) $\cos(\cos 1)$ c) 1 d) 0
- 5) The maximum value of $\sin x + \cos x$ is
- a) 2 b) $\sqrt{2}$ c) 1 d) $1 + \sqrt{2}$
- 6) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$ then $(\partial/\partial x + \partial/\partial y + \partial/\partial z)^2 u =$
- a) 9 b) -9 c) 3 d) -3
- 7) $\frac{\partial(u,v)}{\partial(x,y)} \times \frac{\partial(x,y)}{\partial(u,v)} =$
- a) 1 b) -1 c) 0 d) ∞

8) If each of u, v, w is function of the variable x, y, z then the Jacobian $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ is determinant of order –

- a) 9 b) 3 c) 1 d) n

Q.2 Attempt any two of the following **(16)**

1) Obtain Taylors formula for $f(x, y) = \cos(x + y)$, $n = 3$ at $(0,0)$

2) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$ then show that

a) $(\partial/\partial x + \partial/\partial y + \partial/\partial z)^2 u = \frac{-9}{(x+y+z)^2}$

b) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = \frac{-3}{(x+y+z)^2}$

3) Discuss the maximum or minimum value of u given by $u = x^3 y^2 (1 - x - y)$

Q.3 Attempt any four of the following **(16)**

1) If $u = \log(\tan x + \tan y + \tan z)$ show that $\sin 2x \frac{\partial u}{\partial x} + \sin 2y \frac{\partial u}{\partial y} + \sin 2z \frac{\partial u}{\partial z} = 2$

2) Prove that if $y^3 - 3ax^2 + x^3 = 0$ then $\frac{\partial^2 y}{\partial x^2} + \frac{2a^2 x^2}{y^5} = 0$

3) Find the maximum and minimum value of function $f(x) = 3x^4 - 2x^3 - 6x^2 + 6x + 1$ in the interval $[0, 2]$

4) If $u = f(y - z, z - x, x - y)$ then prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$

5) If $x = r \cos \theta$, $y = r \sin \theta$ then find $\frac{\partial(x,y)}{\partial(r,\theta)}$ and $\frac{\partial(r,\theta)}{\partial(x,y)}$

SHIVAJI UNIVERSITY KOLHAPUR
Faculty: Science and Technology- Course: B. Sc. I Semester II Examination (NEP)
March/April 2023(Held in June 2023)
Mathematics Paper IV DSC-B6
Basic Algebra
Subject code - 90222

Day & Date: Monday, 15/04/2024

Time: 2:00 to 4:00 pm

Marks: 40

Center: MatoshriBayabaiShripatraoKadamKanyaMahavidyalaya, Kadegaon

Q.1 Choose the correct alternative

(08)

1) What is the GCD of 306 and 657?

- a) 6 b) 9 c) 19 d) 13

2 The value of i^{128} is

- a) 1 b) -1 c) id $-i$

3) $\cosh^2 x + \sinh^2 x =$

- a) $-\cosh(2x)$ b) $\sinh(2x)$ c) $\tanh(2x)$ d) $\cosh(2x)$

4) If ϕ is Euler phi function then $\phi(101)$ is

- a) 30 b) 31 c) 100 d) 0

5) If a/b and b/c with $\gcd(a,b) = 1$ then -----

- a) ab/c b) c/ab c) c/a d) c/b

6) What is the cardinality of the set of even positive integer less than 10?

- a) 10 b) 5 c) 3 d) 20

7) The range of function $f(x) = \frac{4+x}{4-x}$, $x \neq 4$ is

- a) \mathbb{R} b) $\mathbb{R}-\{1\}$ c) $\mathbb{R}-\{-1\}$ d) $\mathbb{R}-\{4\}$

8) Let $R = \{(3,3), (6,6), (9,9), (12,12), (6,12), (3,9), (3,12), (3,6)\}$ be a relation on the set $A = \{3,6,9,12\}$. The relation is

a) reflexive and transitive

d) reflexive only

c) an equivalence relation

d) reflexive and symmetric

Q.2 Attempt any two of the following

(16)

1) For given integer a & b with $b > 0$, there exist unique integers q and r satisfying

$$a = qb + r$$

$$0 \leq r < b$$

2) If $A = \{1,2,3,4\}$, $B = \{3,4,5,6\}$, $X = \{1,2,3,4,5,6,7,8,9,10\}$ then verify the following

$$a) (A \cup B)' = A' \cap B' \quad b) (A \cap B)' = A' \cup B'$$

3) For any positive integer n , show that $1^3 + 2^3 + 3^3 \dots + n^3 = \frac{(n(n+1))^2}{4}$

Q.3 Attempt any four of the following

(16)

1) Find the solution of equation $z^3 = 1$.

2) Let $f; Z \rightarrow Z$ defined by $f(m) = m + 2$ then show that $f(m)$ is one-one and onto

3) Let $f, g; R \rightarrow R$ be defined as $f(x) = x^2$ and $g(x) = 3x + 1$ find $f \circ g$ and $g \circ f$. Are they same?

4) The modulus and the argument of the complex number $z = 1 - i$

5) If a/bc with $gcd(a, b) = 1$ then prove that a/c

SHIVAJI UNIVERSITY, KOLHAPUR
B Sc. I Semester II Examination (NEP)
March/ April 2024
English for Communication
Ability Enhancement Compulsory Course (AECC-2) B
Subject code: 90219

Day and Date: Wednesday, 03/04/2024

Marks: 40

Time: 2.00 pm to 4.00 pm

Instructions: 1) All questions are Compulsory.

2) Figures to the right indicate full marks.

Q. 1 A) Complete the following sentence by choosing the correct alternatives: [4]

1) The king Midas had a little daughter called

A) Marygold B) Sunbeam C) Rose D) Mary

2) Robert Frost is an..... poet.

A) African B) Australian C) American D) Indian

3) Name of the owner who bought slave is.....

A) John B) Korra C) Nick D) Jensen

4) An Epitaph is an inscription on a.....

A) tomb B) stone C) base D) None

Q. 1 B) Answer the following questions in one word/phrase/ sentence each. [4]

1) Where was Satish K. Tripathi delivered speech?

2) How many sons did the slave has?

3) What is the poet searching for in the poem *Offering in the Temple*?

4) What kind of music did the king Midas love?

Q. 2 A) Answer the following questions in three to four sentences each (Any Three) [6]

1) What is the impact of data science in the health science?

2) Describe the beauty of winter evening of woods.

3) Why did people blame 'one good man'?

4) How did the dealer describe the slave?

5) Where did the poet try to find God? Did he succeed in it?

Q. 2 B) Write short notes on the following in about 8 to 10 sentences (Any Two) [6]

- 1) What is speaker's opinion about Data in 21st century?
- 2) The central idea of the poem *Stopping by Woods on a Snowy Evening*
- 3) Character of King Midas
- 4) The theme of the poem *Offering in the Temple*

Q. 3 A) You wish to buy Smartphone. Write a telephonic conversation between you and the dealer. (Imagine details about the company, price, facilities, etc.) [6]

Or

Write a telephonic conversation between you and Salesman about making enquiry of smartwatch.

Q. 3B) Write an advertisement copy for a **Bathing Soap and describe its features. [6]**

Or

Draft an advertisement on the product of **Washing Soap** and give a suitable caption of your own.

Q. 4A) Write instructions to be followed while conducting different experiments in different subject laboratories. [4]

Or

Write a set of instructions given to you in Chemistry laboratory.

Q. 4B) Write a report for experiments conducted in the Botany laboratory. [4]

Or

Write report of an experiment conducted in Physics laboratory.

Shivaji University, Kolhapur
B.Sc.-I Semester-II Examination (NEP)
March / April 2024

Subject Code- 90225

Paper No.-III DSC-3B

Subject- Physical Chemistry

Day & Date- Thursday, 04/04/2024

Time-.02.00 to 04.00 pm

Total Marks: 40

- Instruction:** 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labeled diagrams wherever necessary.
4. Use of a Scientific calculator is allowed.
-

Q.1: Choose the character alternative and rewrite the sentence again. (8)

- (a) Ebonite is an example of.....
a) Conductor b) insulator c) electrolyte d) none of these
- (b) Stalagmometer is used to determine of the liquid
a) Refractive index b) density c) surface tension d) viscosity
- (c) In all simple reactions, the rate of reaction..... with increase in concentration of reactant.
a) increases b) decrease c) remains same d) none of these
- (d) A device that converts heat continuously into work is called.....
a) engine b) cold engine c) hot engine d) heat engine
- (e) Logarithm to the base e is called as.....
a) common logarithm b) anti logarithm
c) reserve logarithm d) natural logarithm
- (f) On dilution equivalent conductivity.....
a) Increases b) decreases c) remains same d) all of these
- (g) Refractive index of a liquid is measured by using.....
a) Conductometer b) potentiometer c) both a and b d) Abbe's refractometer
- (h) Inversion of cane sugar is an example of reaction.
a) first order b) second order c) third order d) pseudo first order

Q.2: Attempt any TWO of the following (Out of Three) (16)

- (A) Derive the equation of velocity constant for first order reaction.
(B) Determine the relative surface tension of liquid by Stalagmometric method.
(C) Describe Wheatstone bridge Method to determine the conductivity of a solution.

Q.3: Attempt any FOUR of the following (Out of Six)

(16)

- (a) Distinguish between spontaneous process and non-spontaneous process.
- (b) What is the effect of temperature and catalyst on the rate of chemical reaction.
- (c) Explain in short specific refraction and molecular refraction.
- (d) State and explain the laws of logarithms
- (e) State First Law of thermodynamics and write its mathematical equation.
- (f) Distinguish between electronic and electrolytic conductors.

SHIVAJI UNIVERSITY, KOLHAPUR
Faculty: Science and Technology Course: B.Sc. Examination NEP
B. Sc.-I, Semester II
Examination March/April 2024
Chemistry Paper No: IV DSC B-4
Analytical Chemistry
Subject Code: 90225

Day & Date: Friday 05/04/2024
Time: 2.00 to 4.00 pm

Total Marks: 40

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

Q1. Select the correct alternatives from the following (10)

1. _____ is nothing but actual difference between true result and experimental result.

- | | |
|------------------|-------------|
| a) sampling | b) analysis |
| c) chemical test | d) error |

2. The number of phases operating in chromatography are

- | | |
|------|-------------------------|
| a) 4 | b) 2 |
| c) 3 | d) varies with the type |

3. Phenolphthalein is _____.

- | | |
|----------------------|------------------------|
| a) Weak acid | b) Strong acid |
| c) Weak organic acid | d) Weak inorganic acid |

4. Number of gram equivalents of solute dissolved in one litre of solution is called

- | | |
|--------------|------------------|
| a) Normality | b) Molarity |
| c) Molality | d) mole fraction |

5. Inorganic chemicals added to soap to increase detergent action are called

- | | |
|-----------------|--------------|
| a) antioxidants | b) rosins |
| c) builders | d) fixatives |

6. Eriochrome black T is also known as _____.

- | | |
|---------------------|---------------------|
| a) Solochrome black | b) Monochrome black |
|---------------------|---------------------|

b) Acid-Base indicator

d) Monochrome black T

7. In paper Chromatography _____ reagents cannot be used.

a) Corrosive

b) Sensitive

b) Colourless

d) Either a or b

8. Rf value is the ratio of _____.

a) Two concentrations

b) Two distances

c) Rate of migrations

d) Either a or b

Q2. Attempt **any two** of the following.

(16)

1. What is error? State & Explain types of Error?

2. What is acid-base indicators? Explain Ostwalds ionization theory?

3. What are Soaps ? Give and explain types of Soaps.

Q3. Attempt **any four** of the following.

(16)

1. Write note on Cleaning action of Soap

2. How will you prepare one litre solution of i) 1N NaOH ii) 1N Acetic acid.

3. Discuss Types of EDTA Titration.

4. Explain Neutralization of Strong acid with strong base

5. Difference between Paper chromatography and thin layer chromatography.

6. Give basic principle of paper chromatography.

SHIVAJI UNIVERSITY KOLHAPUR
B. Sc. I Semester II Examination (NEP)

March / April 2024

Botany Paper III DSC-13 B

Mycology, Phytopathology and Mushroom cultivation

Subject code: 90226

Day and date: 06/04/2024

Time: 2.00 pm to 4.00 pm

Marks: 40

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

Q. 1. Complete the following sentences with correct alternative. [08]

- The word 'fungus' is derived from Latin which means -----.
a. mushroom
b. dead
c. saprophyte
d. organic
- Sufu is prepared from -----.
a. *Penicillium*
b. *Puccinia*
c. *Mucor*
d. *Pteris*
- Antibiotic 'proliferin' is obtained from ----- species.
a. *Aspergillus*
b. *Nostoc*
c. *Zamia*
d. *Mucor*
- Mucor* is a ----- fungi.
a. parasitic
b. saprophytic
c. autotrophic
d. partial parasitic
- Follicolous lichens grows on -----.
a. tree bark
b. soil
c. leaves
d. rock
- Algal component of the lichen is called as-----.
a. bryophyte
b. pteridophyte
c. mycobiont
d. phycobiont
- Grassy shoot disease of sugarcane is ----- disease.
a. viral
b. bacterial
c. fungal
d. mycoplasmal
- Oyster is common name for -----.
a. *Pleurotus*
b. *Volvariella*
c. *Agaricus*
d. *Morchella*

Q. 2. Answer the following questions (Any two)

[16]

1. Describe vegetative structure and method of reproduction in *Penicillium*.
2. Describe symptoms and control measures of blight of pomegranate.
3. Describe economic importance of fungi.

Q. 3. Write short notes (Any four)

[16]

1. Vegetative thallus structure in *Mucor*
2. Economic importance of lichens
3. White rust of crucifers
4. Preparation of seed grain spawns
5. General symptoms of phytopathology
6. Yellow vein mosaic of bhendi

Q. 2. Answer the following questions (Any two)

(16)

1. Describe General characters of Bryophyte
2. Describe the male and female strobili of *Gnetum*.
3. Explain in brief economic importance of Pteridophytes

Q. 3. Write short notes (Any four)

[16]

1. General characters of Gymnosperm.
2. Structure of Anthidium of *Anthoceros*.
3. External morphology of *Selaginella*.
4. Strobilus of *Selaginella*
5. Gametophyte of *Anthoceros*
6. Economic importance of *Gnetum*.

Seat No

SHIVAJI UNIVERSITY KOLHAPUR

B.A. I, Semester II Examination (CBCS-NEP)

March/April 2024

Geography-II DSC-B24

Human Geography - Paper -II

Subject Code: 88391

Day and Date: Monday 08/04/2024

Marks: 40

Time: 10.00 to 12.00 pm

Instructions: 1) All questions are Compulsory.

2) Figures to the right indicate full marks.

प्रश्न.१ अ. योग्य पर्याय निवडून रिकाम्या जागा भरा

०५

१) आधुनिक मानवी भूगोलाचे जनक आहेत

अ) फ्रेड्रिक रेंटझेल् ब) एल्सवर्थ हंटिंगटन

क) विडाल डिला ब्लाश ड) जीन ब्रुन्स

२) जगातील ९०% लोकसंख्या गोलार्धात राहते

अ) पूर्व ब) प्रश्चिम क) दक्षिण ड) उत्तर

३) ग्रामीण वसाहतीत प्रामुख्याने स्वरूपाचे उद्योग चालतात

अ) प्राथमिक ब) द्वितियक क) तृतीयक ड) चतुर्थ श्रेणी

४) दिल्ली हे भारतातील कार्य करणारे प्रमुख शहर आहे

अ) मनोरंजन ब) धार्मिक क) व्यापारी ड) प्रशासकीय

५) हा शेतीवर परिणाम करणारा सर्वात प्रभावी घटक आहे

अ) आर्थिक घटक ब) सामाजिक घटक

क) प्राकृतिक घटक ड) जैविक घटक

प्रश्न.२ टिपा लिहा. (कोणतेही तीन)

१५

- १) मानवी भूगोलाचे महत्त्व
- २) कालावधीनुसार स्थलांतर
- ३) स्थलांतरित शेतीची वैशिष्टे
- ४) विखुरलेल्या वस्तीची गुण/दोष
- ५) ग्रामीण वसाहतींची कार्ये

प्रश्न.३ खालील प्रश्नांची सविस्तर उत्तरे लिहा. (कोणतेही एक)

१०

- अ) लोकसंखेच्या वितरणावर परिणाम करणारे प्रकृतिक घटक स्पष्ट करा
- ब) नागरीकरण म्हणजे काय ते सांगून नागरांची कार्ये लिहा

प्रश्न.४ खालील प्रश्नांची सविस्तर उत्तरे लिहा. (कोणतेही एक)

१०

- अ) वसाहत म्हणजे काय ते सांगून वसाहतींचे स्वरूपानुसार प्रकार सांगा
- ब) शेतीवर परिणाम करणारे घटक थोडक्यात स्पष्ट करा

c) r^2 ,

d) $\frac{1}{r^2}$

vi) The capacitance of an isolated spherical conductor of radius R is -----

a) $C = 4\pi\epsilon_0 R$,

b) $C = \frac{\epsilon_0 A}{d}$,

c) $C = \frac{4\pi\epsilon_0}{R}$,

d) $C = 2\pi\epsilon_0 R$

vii) The electric displacement vector \vec{D} is given by the relation -----

a) $\vec{D} = \epsilon_0 \vec{P} + \vec{E}$,

b) $\vec{D} = \epsilon_0 \vec{E} + \vec{P}$,

c) $\vec{D} = \epsilon_0 \vec{P} - \vec{E}$,

d) $\vec{D} = \epsilon_0 \vec{E} - \vec{P}$

viii) The formation of dipole is due to two equal and dissimilar point charges placed at a -----

a) Short distance,

b) long distance,

c) above each other,

d) none of these

Q.2. Attempt any two of the following.

16

- i) Obtain an expression for capacitance of parallel plate capacitor.
- ii) State and prove Gauss law in electrostatics.
- iii) Define gradient of a scalar field. Show that $d\phi = \text{grad}\phi \cdot d\vec{r}$, where notations have their usual meaning.

Q.3. Attempt any four of the following.

16

- i) Write note on dielectric medium.
- ii) Write note on del operator.
- iii) Define curl of a vector field. Obtain an expression for it.
- iv) Define scalar or dot product of two vectors. State its characteristics.
- v) Obtain expression for potential due to point charge.
- vi) Explain electric flux of electric field.

SHIVAJI UNIVERSITY KPLHAPUR
B.Sc. I, Semester II Examination (NEP)

March/April 2024

MICROBIOLOGY

Paper-III (DSC 25 B): Bacteriology

Subject Code:90230

Day and Date: Wednesday 10/04/2024

Marks:40

Time: 02.00 to 04.00 pm

Instructions: 1) All Question are Compulsory.

2) Figures to the right indicate full marks.

Q 1. Select the correct alternatives from the following

08 marks

1. is an example of a differential medium.
(a) Nutrient agar (b) Blood agar (c) Nutrient broth (d) Peptone water
2. As per the approximate elementary composition of E. coli, carbon accounts for% of the total dry weight.
(a) 50% (b) 80% (c) 14% (d) 1%
3. Diatoms need with the help of which they can construct their beautiful cell wall.
(a) Silicic acid (b) Muramic acid (c) Succinic acid (d) Oxaloacetic acid
4. Lithotrophic bacteria are those which utilize as an electron donor.
(a) reduced organic compounds (b) reduced inorganic compounds
(c) H₂O (d) all of the above
5. Alkaline peptone water is an example of a transport medium for organisms.
(a) Campylobacter (b) Vibrio cholerae (c) Salmonella typhi (d) Shigella dysenteriae
6. medium is used to check the caseinase activity of bacteria.
(a) MacConkey's agar (b) Starch agar (c) Nutrient agar (d) Milk agar
7. The risk of genetic changes as well as contamination is usually associated with the method of culture preservation.
(a) Sub-culturing (b) Paraffin (c) Refrigeration (d) Freeze drying
8. medium is used for the isolation of strict anaerobes.
(a) MacConkey's agar (b) Thioglycollate (c) Nutrient agar (d) Milk agar

Q 2. Attempt any TWO of the following

16 marks

1. Discuss in brief the conditions required for the growth of organisms.
2. Discuss methods for the isolation and cultivation of anaerobes by exclusion of air.
3. What is meant by culture media? Discuss in brief differential and selective media.

Q 3. Attempt any FOUR of the following

16 marks

1. Photoautotrophs
2. Pour plate method
3. Oxygen concentration
4. Growth factors
5. Sugar fermentation test
6. Enrichment media

SHIVAJI UNIVERSITY KOLHAPUR
B.Sc. I Semester II Examination (NEP) April 2024
Physics Paper - IV (DSC B2 ELECTRICITY AND MAGNETISM-II)
Subject code - 90224

Day & Date: Friday, 12/4/2024

Time: 2.00 to 4.00 pm

Marks: 40

Instructions: 1) Attempt all questions.

2) Figures to the right indicate full marks.

3) Diagrams must be drawn wherever necessary.

.....
Q.1. Choose the correct alternatives.

8

I) At resonance, reactance (X_L) of the inductance and reactance (X_C) of the capacitor are ---

- a) $X_L = X_C$ b) $X_L = X_C = 0$ c) $X_L > X_C$ d) $X_L < X_C$

II) A reciprocal of impedance of A. C. circuit is -----

- a) admittance b) susceptance c) resistance d) reactance

III) In Thevenin's and Norton's equivalent circuits ...

- a) $R_{TH} = R_N$ b) $R_{TH} = 2R_N$ c) $R_{TH} = \frac{1}{R_N}$ d) $R_{TH} = \frac{V_{TH}}{R_N}$

IV) A deflecting couple acting on the coil of ballistic galvanometer carrying current (I) is-----

- a) $\tau = \frac{nBI}{A}$ b) $\tau = nBI A$ c) $\tau = nBI$ d) $R_{TH} = \tau = nB l$

V) Magnetic induction at an axial point of current carrying infinite solenoid is -----

- a) $B = \mu_0 I$ b) $B = \mu_0 n I$ c) $B = \frac{\mu_0 I}{n}$ d) $B = \frac{\mu_0 I}{4 n}$

VI) For diamagnetic materials -----

- a) $\mu > \mu_0$ b) $\mu < \mu_0$ c) $\mu \gg \mu_0$ d) $\mu = 0$

VII) Curie law for paramagnetic material is -----

- a) $\chi = \frac{C}{T}$ b) $\chi = \frac{C}{T-\theta}$ c) $\chi = \frac{C}{T+\theta}$ d) $\chi = C T$

VIII) Which of the following is antiferromagnetic material?

- a) Cobalt b) Copper c) Iron d) Manganese oxide

Q.2. Attempt any two of the following

16

- A) Obtain an expression for an electric a.c. current in a series LCR circuit.
- B) Derive an expression for magnetic induction at a center of a current carrying coil.
- C) Explain construction, working and theory of ballistic galvanometer.

Q.3. Attempt any four of the following

16

- A) State the properties of ferromagnetic materials.
- B) Explain hysteresis in magnetism.
- C) State and explain Biot- Savart's law in magnetostatics.
- D) Obtain differential form of Ampere's circuital law.
- E) State and explain Thevenin's theorem and Norton' theorem.
- F) Explain Owen's a. c. bridge to determine inductance of a coil.

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SHIVAJI UNIVERSITY KPLHAPUR
B.Sc. I, Semester II Examination (NEP)

March/April 2024
MICROBIOLOGY

Paper-IV (DSC 26 B): Microbial Biochemistry & Metabolism
Subject Code:90230

Day and Date: Friday, 12/04/2024

Marks:40

Time: 02.00 to 04.00 pm

Instructions: 1) All Question are Compulsory.

2) Figures to the right indicate full marks.

Q 1. Select the correct alternatives from the following

08 marks

1. Phosphofructokinase catalyzes the reaction
(a) $G \rightarrow G6P$ (b) $G6P \rightarrow F6P$ (c) $F6P \rightarrow F1:6 \text{ dip}$ (d) $F1:6 \text{ dip} \rightarrow G3P + DHAP$
2. is the energy storage polysaccharide in plants.
(a) Glycogen (b) Starch (c) Cellulose (d) Fructose
3. is the most common glycolytic pathway.
(a) HMP (b) PPP (c) EMP (d) ED
4. Tertiary structure of proteins is stabilized by
(a) Hydrogen bonds (b) Electrostatic interactions
(c) Van der Waals interactions (d) All of the above
5. The induced fit hypothesis of enzyme-substrate binding was proposed by
(a) Pasteur (b) Fischer (c) Watson and Crick (d) Koshland
6. Organic chemical component required for enzyme action is called
(a) Coenzyme (b) Apoenzyme (c) Holoenzyme (d) Conjugate enzyme
7. is the energy currency of a cell.
(a) ATP (b) NAD (c) PEP (d) Co-enzyme A
8. Primary structure of a protein consists of
(a) Linear sequence of amino acids joined by peptide bond (b) An alpha helix
(c) A beta pleated sheet (d) Loops and turns

Q 2. Attempt any TWO of the following

16 marks

1. What are enzymes? Describe in detail constitutive and inducible enzymes.
2. Describe in detail the structure and function of DNA.
3. Write in detail on Bacterial Photophosphorylation.

Q 3. Attempt any FOUR of the following

16 marks

1. Concept of Catabolism with example
2. mRNA
3. High energy compounds
4. Secondary Structure of Protein
5. Disaccharides
6. Exergonic and Endergonic reactions

Seat No.

SHIVAJI UNIVERSITY, KOLHAPUR
B.Sc. (Part – I) (Semester – II) (NEP)
Examination March/April, 2024
ZOOLOGY (Paper - III)
Animal Diversity and insect Vector
Sub. Code: 90227

Day and Date: Saturday, 13/4/2024

Total Marks: 40

Time: 02:00 am to 4.00 pm

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat labeled diagrams whenever necessary

Q.1. Select the correct answer from the following and rewrite complete sentence [8 M]

- i) Heart of rat is Chambered.
a) One b) Two c) Three d) Four
- ii) Schizont of plasmodium is found in
a) Liver b) Blood c) Both d) Mosquito
- iii) Central nervous system consists of.....
a) Brain and spinal cord b) Brain and cranial nerves.
c) Spinal cord and spinal nerve d) Cranial and spinal nerves
- iv) The larva of *Musca domestica* is known as
a) Wrigglers b) Catterpillar c) Maggot d) Tumbler
- v) Chikungunya fever is typically diagnosed by.....
a) Blood Test b) X-ray c) CT scan d) Stool sample
- vi) The causative agent of plague is.....
a) Yersinia Pestis b) Leishmania Donovanii
c) Trichinella Spiralis d) Salmonella typhi

vii) Dengue haemorrhagic fever (DHF) is a severe form offever.

- a) Malaria b) Dengue c) Plague d) Corona

viii) The adult flea feed on

- a) Cell sap b) Nector c) Honey d) Blood

Q.2. Attempt any two of following.

[16 M]

- a) Describe the male reproductive system of rat.
b) Explain the causal organisms, lifecycle, symptoms and preventive measures of malaria.
c) What is digestion ? Describe the digestive system of rat.

Q.3. Attempt any four of following.

[16M]

- a) The habits and habitat of rat
b) Symptoms of Chikungunya
c) Myiasis
d) Types of plague
e) Preventive and curative measures of dengue
f) Heart of rat

Seat No.

SHIVAJI UNIVERSITY, KOLHAPUR
B.Sc. (Part – I) (Semester – II) (NEP)
Examination March/April, 2024
ZOOLOGY (Paper - IV)

DSC B16 Genetics

Sub. Code: 90227

Day and Date : Monday, 15/04/2024

Total Marks: 40

Time: 2:00 to 4:00 pm

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat and labeled diagram wherever necessary.

Q.1 Select the correct answer from the following and rewrite complete sentence. 8 M

i. Griffith effect is related with -----

a) DNA trascription

b) RNA translation

c) Bacterial transformation

d) Bacterial transduction

ii. An organisms is $4n$. This condition is called-----

a) Nullisomy

b) Tetraploidy

c) Trisomy

d) aneuploidy

iii. ----- Blood group is universal recipient

a) 'B'

b) 'A'

c) 'AB'

d) 'O'

iv. Sickle cell anemia is -----

a) Sex linked inheritance

b) Autosomal heritable disease

c) Infectious disease

d) Deficiency disease

- 59
- v. Mechanism of crossing over occur during-----
- a) Pachytene of prophase b) Second meiotic division
c) Before synapsis d) Diplotene
- vi. Allele is-----
- a) Segment of gene b) Form of a Gene
c) Special kind of gene d) A muton
- vii. Patau's syndrome is due to-----
- a) Nullisomy b) monosomy c) Deletion d) Trisomy
- viii. Recessive gene can be expressed in -----
- a) Homozygous condition b) Heterozygous condition
c) Both the above condition d) None of this condition

Q.2 Attempt any two of following.

16 M

- a) Explain the Law Of Segregation in detail.
b) Describe in brief incomplete dominance.
c) What is mutation ? Describe various types of mutations due to change in structure of a chromosome.

Q.3 Attempt any four of the following.

16 M

- a) Types of genetic variation.
b) Codominance.
c) Incomplete Linkage.
d) Write a note on inversion.
e) Mechanism of sex determination in honey bee.
f) Crossing over.