University of Burdwan

B.Sc. Semester III (Honours) CBCS Examination

Anthropology

Paper: CC-6 (Human Ecology: Biological & Cultural Dimension)

Full Marks: 40   **Time: 2 Hours**

*Answer any **Eight** of the following questions. Each question is of equal value (**5**).*

1) State briefly the adaptive capabilities of human in high altitude environment.

2) Discuss culture as a tool of adaptation with suitable example.

3) 'Human subsistence pattern is dependent on ecology'. Justify your answer with suitable examples.

4) Briefly mention the impact of urbanization on human population.

5) Discuss about Allen's or Bergmann's rule with suitable examples.

6) Who coined the term Neolithic Revolution and why?

7) State the differences between adaptation and acclimatization with examples.

8) Write a short note on Homeostasis with suitable examples.

9) Write a brief note on Hydraulic civilization.

10) Describe the features of shifting cultivation emphasising its relation with Ecology.

B.Sc. 3rd Semester (Hons.) Examination, 2021
Subject: Biochemistry
Paper: CC - 6
(Physiology and Hormones)

Full Marks: 40   **Time: 2 Hrs**

Candidates are required to give the answers in their own words as far as practicable.

Answer any *eight* questions of the followings: 8×5=40

1. What is homeostasis? Briefly discuss the various regulatory mechanisms involved in homeostasis?

2. Give an account of the formation of fibrin from fibrinogen. Mention the roleof Vitamin K in coagulation of blood.

3. What are the important hormones secreted from the GI tract of human? Describe thesecretion and functional activity of any two hormones from the GI tract.

4. Explain the mechanism of cardiac muscle contraction.

5. Name the hormones of thyroid gland? Write a note on hyposecretion and hypersecretion.

6. What is the normal pH of blood? How the blood pH is maintained in human body?

7. Describe schematically the light reaction of photosynthesis. Write the chemical reactions involved in it.

8. Describe the role of growth hormone in the germination of seed.

9. Write a short note on CAM pathway

10. Describe the biosynthesis, mode of action and biological functions of abscisic acid.

B.Sc. Semester III (Hons.) Examinations 2021
Subject: Biotechnology
Paper: CC-6 (General Microbiology)

Marks:40   **Time: 2 hrs**

Answer *any eight* questions from the followings: **5x8=40**

1) Describe the different phases of a typical bacterial growth curve with a suitable diagram.

2) Comparatively discuss the batch culture and continuous culture.

3) Make a short note on Transformation and conjugation.

4) Narrate the different phases of sporulation process in bacteria.

5) Mention and discuss the different physical techniques to control the microorganisms.

6) Write a short note on Preservation of various types of foods.

7) Categorise the microorganisms on nutritional basis.

8) Write a short note onxs different techniques for isolation and purification of microorganism.

9) Discuss the Gram negative bacterial plasma membrane structure with a pictorial diagram.

10) Make a short note on Sewage composition and its disposal.

Full Marks- 40   Time- 2 hrs.

Answer any eight questions from the following: **5X8=40**

1. Discuss about any one important Botanical garden of India.

2. Name the classes of Bentham and Hooker system of classification. What are the demerits of this system?

3. Explain parallelism with example.

4. What is valid publication? Mention the rules of valid publication.

5. Distinguish briefly between Primitiveness and Advancement.

6. What are the principles uses in phylogeny of angiosperms?

7. What is alpha and omega taxonomy? Write about the hierarchy.

8. What is the full form of ICN and discuss the Principles and rules of ICN.

9. State the principle of priority and nomenclatural types.

10. How Phylogenetic tree illustrate the evolutionary relationship of angiosperms?

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B.Sc. 3rd Semester (Honours) Examination, 2021 (CBCS)

Subject: Chemistry

(Inorganic Chemistry-II)

Paper: CC-6

Time: 2 Hours   **Full Marks: 40**

Candidates are required to give their answers in their own words as far as practicable

Answer any *eight* questions from the following: **8 × 5 = 40**

1. "Water has its highest density at 4^0C"-Explain. "The electrical conductivity of metal decreases with the rise in temperature but the reverse occurs with semiconductors"-Explain.

2. Define dipole moment and explain the low dipole moment value of CO molecule. "$BaSO_4$ is insoluble in water"-Give reason.

3. Draw MO diagram for O_2^+, O_2^- and O_2^{2-} and predict the stability order and magnetic properties in each case.

4. A piece of wood was found to have ^{14}C: ^{12}C ratio 0.7 times to that in a living plant. Calculate the period when the plant died ($t_{1/2}$ of ^{14}C=5760 years). "Radioactive iodine has an important application in life sciences"-Mention it.

5. Suggesting suitable reason rank the following in the order of decreasing bond angles of OF_2, OCl_2, OH_2, ON_2. Explain the term polarizing power and polarisibility.

6. Describe Frenkel and Schottky defects. Discuss the kind of crystal defect observed when ZnO is heated. State the detectable change.

7. What is Born-Haber Cycle? Calculate the lattice energy of NaCl crystal from the following data by use of Born-Haber Cycle. Sublimation energy (S) =108.7 kJmol^{-1}, Dissociation energy for Cl_2 (D)= 225.9 kJmol^{-1}, Ionization potential of Na(g) (I)= 489.5kJmol^{-1}, Electron affinity of Cl (g) (E)= −351.4kJmol^{-1},Enthalpy of formation of NaCl (ΔH_f) = −414.2kJmol^{-1}

8. "$AlCl_3$ anhydrous is covalent but $AlCl_3.6H_2O$ is ionic in nature." - How would you account for this behaviour? "N_3^- is more resonance stabilized than HN_3". Comment.

9. What are the hazards of radiation and what are their safety measures? Write short notes on 'artificial transmutation'.

10. The C-Cl bond distance in CH_3Cl and CF_3Cl are 1.78 Å & 1.75 Å respectively. Comment on this difference of bond distance with the help of Bent's Rule. "The nature of hybridization of the bonding atom has strong influence on its electronegativity"-illustrate.

B.Sc(Hons) 3rd SEMESTER EXAMINATION, 2021 (CBCS)

Subject: Computer Science

Paper Code: CC-6   **Paper Name: Operating System**

Time: 2Hrs   **FM: 40**

Answer any *eight* questions: **8×5=40**

1. What are system calls? Explain different categories of system calls with example?   1+4

2. Define essential properties of Batch operating system and Time sharing operating system.

3. What is a process? Draw and explain process state diagram.   1+4

4. What are semaphores? Explain two different semaphore operations.   2+3

5. Define Process scheduling. Differentiate Pre-emptive and Non-preemptive scheduling.   1+4

6. What do you mean by paging and demand paging? Discuss different memory allocation strategies.   2+3

7. Define Page fault. What steps are taken by operating system when a page fault occur?   2+4

8. What is critical section? Write short note on Race Condition.   2+3

9. Define Deadlock. What are the necessary conditions for deadlock ?   2+3

10. Discuss arrival time , burst time, turnaround time and response time in brief .

Time: 2 Hours **Full Marks: 40**

Answer any **EIGHT** questions. 5x8=40

1. Represent decimal number (-59) in binary format using signed magnitude and two's complement format. What are merits of two's complement format?
2. Design AND and EX-NOR gates using minimum number of NOR gates.
3. What is a DEMUX? How do you design it using basic gates? Write down its uses.
4. What is a clocked SR-FF? Convert it into a JK-FF.
5. What is a binary full adder? Design it with basic gates.
6. What is a ripple counter? Design a 4-bit ripple counter using D-FFs.
7. What is a RAM? Describe the operation of a single bit RAM with proper block diagram.
8. What are data flow modelling and behavioural modelling? Explain the concept of procedural continuous assignment.
9. What are built in primitive gates of VHDL? Give two examples of conditional circuit design with them.
10. Write notes on any one of the following:
    (a) Karnaugh map
    (b) Shift register.

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B.Sc. 3rdSemester (Honours) Examination, 2021 (CBCS)
Subject: Environmental Science
Paper: CC 6
(Environmental Resources)

Time: 2 Hours   Full Marks: 40

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words

1. Answer *any eight* of the following: $5\times8 = 40$

i) Give a brief account of the global freshwater resources.

ii) Discuss any two chemical weathering processes of soil.

iii) Describe the different horizons of soil in correct order.

iv) Distinguish between conventional and non-conventional energy resources.

v) Write down the chemical composition and classification of petroleum.

vi) Illustrate the merits and demerits of geothermal energy.

vii) Explain the role of biofuel in conservation of fossil fuels.

viii) Describe the impact of deforestation on human society.

ix) Describe the major threats of biodiversity.

x) Describe the working principle of a photovoltaic cell.

B.Sc. 3rd Semester (Honours) Examination, 2021 (CBCS)
Subject: Geology
Paper: CC-6
(Sedimentology)

Time: 2 hours   **Full Marks: 40**

The figures in the margin indicate full marks
Candidates are required to give their answers
in their own words as far as practicable

1. **Answer *any eight* of the following questions.**   8x5=40

(a) Define primary sedimentary structures. Briefly describe any one primary sedimentary structure that is formed by deformation and disturbances in the sediment.

(b) What are the different conventions for measuring sediment grain size?

(c) Describe Udden-Wentorth grade scale for measuring sediment grain size?

(d) What is the significance of a negatively skewed/strongly coarse skewed (Ski<= -0.30) curve and an extremely leptokurtic (Kg>3) curve drawn from sediment grain sizes?

(e) Why do the sandstones in a collisional orogen contain abundant sedimentary/ metasedimentary rock fragments?

(f) How can you differentiate the opaque coatings around the sand grains from the opaque cement in a sandstone, studied under microscope? Use illustrations to explain your answer.

(g) What is the petrogenetic significance of a clast-supported, plane bedded conglomerate with a(t)b(i) fabric? How can you determine the flow direction of this conglomerate?

(h) Draw a diagram, as studied under microscope, of a fractured bioclast healed with carbonate cement. What are the stages of its development?

(i) Why are the shallow marine carbonates not so ubiquitous at present time?

(j) In a sedimentary succession, there are multiple sandstone beds. Petrographic analysis of these sandstones indicate that the lower units contain abundant sedimentary rock fragments while the feldspars and metamorphic rock fragments increase up section. What is the significance of this change in petrography?

B.A./B.Sc. Semester-III (Honours) Examination, 2021 (CBCS)
Subject: Geography
Course: CC6 (Statistical Methods in Geography)

Time: 2 Hours   Full Marks: 40

The figures in the right-hand margin indicate full marks. Candidates are required to give their answer in their own words as far as possible.

Answer any eight questions from the following   8 x 5=40

যে কোনও আটটি প্রশ্নের উত্তর লেখ।

1. Mention different types of scale of measurement with suitable examples.

    উপযুক্ত উদাহরণ সহ বিভিন্ন ধরণের পরিমাপের স্কেল গুলো উল্লেখ কর।

2. Make a comparison between continuous data and discrete data.

    নিরবিচ্ছিন্ন তথ্য এবং বিক্ষিপ্ত তথ্যের মধ্যে একটি তুলনা কর।

3. Mention different parts of a statistical table.

    একটি পরিসংখ্যান সারণীর বিভিন্ন অংশ উল্লেখ কর।

4. Differentiate between Stratified random sampling and Systematic random sampling.

    স্তরিত র‍্যানডম স্যাম্পলিং এবং প্রণালীবদ্ধ র‍্যানডম স্যাম্পলিং এর মধ্যে পার্থক্য কর।

5. Compare between mean deviation and standard deviation.

    গড় বিচ্যুতি এবং আদর্শ বিচ্যুতির মধ্যে তুলনা কর।

6. Mention the merits and demerits of mean.

    গড় এর গুণাবলী এবং অপূর্ণতা উল্লেখ কর।

7. Mention the uses and limitations of Median.

    মধ্যমার গুণাবলী এবং ক্রটিগুলি উল্লেখ কর।

8. Mention merits and demerits of correlation coefficient.

    Correlation Coefficient এর গুনাবলী ও ক্রটিগুলী উল্লেখ কর।

9. Distinguish between Absolute and Relative measures of dispersion.

    বিস্তৃতির পরম এবং আপেক্ষিক পরিমাপের মধ্যে পার্থক্য নিরুপণ কর।

10. Mention importance of moving average method in time series analysis.

    সময় সিরিজ বিশ্লেষণে চলমান গড় পদ্ধতির গুরুত্ব উল্লেখ কর।

B.Sc. Semester-III Examinations-2021
Subject- Microbiology

Paper- CC-6 (CELL BIOLOGY)   **(Theory)**   **Time- 2 hrs.**

Answer any eight questions from the following   **5 x 8 = 40**

1. What is a nuclear pore complex? Write down its function.
2. Describe MAP kinase mediated signalling pathway.
3. Write down the different factors that transform a normal cell into a malignant cell.
4. Describe the structure and functions of the endoplasmic reticulum.
5. Give a pictorial description of meiotic cell division.
6. Mention the regulatory checkpoints that control eukaryotic cell cycle.
7. Describe the ultrastructure of a typical bacterial flagellum.
8. Discuss the structure and organization of actin filaments.
9. Write short notes on:
   a. Glycosylation of proteins
   b. Nucleolus

10. Define autophagy. Write down the function and clinical significance of lysosomes.

Time: 3 Hours   Full Marks: 60

The figures in the margin indicate full marks.
Candidates are required to write their answers in their own words as far as practicable.
[Notation and Symbols have their usual meaning]

1. **Answer any six questions:**   6×5 = 30

(a)   Show that if a group G has finite number of subgroups, then G is finite.   [5]

(b)   Show by an example that if H is a normal subgroup of G and K is a normal subgroup   [5]
         of H then K may not be a normal subgroup of G.

(c)   If G has only one element x of order n, then show that x is in Z(G),where Z(G) is the   [5]
         center of the group G.

(d)   If x is an element of group G of finite order and k is any non zero integer then show   [5]
         that $0(x) = 0(x^k)$ if and only if k and $0(x)$ are relatively prime where $0(x)$ denotes the
         order of x.

(e)   Find the all 3-cycles in S_4 [5]

(f)   Let n,m≥ 2. Find all the homomorphism from $\mathbb{Z}_n$ to $\mathbb{Z}_m$.   [5]

(g)   Let G be an abelian group of odd order and $f: G \to G$ be defined by $f(x) = x^2$ [5]
         for all G. Show that f is an isomorphism.

(h)   Find all homomorphism from $\mathbb{Q}$ to $\mathbb{Z}$.   [5]

2. **Answer any three questions:**   10×3 = 30

(a) (i)   Let k be an integer and $f_k : \mathbb{R}^* \to \mathbb{R}^*$ be the map $f(x) = x^k$ for all x in $\mathbb{R}^*$. Is the map   [5]
            f_k an isomorphism? Justify your answer.

     (ii) Let G be a group and $x \neq e$ be an element in G. Then prove that there exists a unique   [5]
            homomorphism $f: \mathbb{Z} \to G$ such that $f(1) = x$. and also prove that kerf=$d\,\mathbb{Z}$ for some
            $d \neq 0$ iff $0(x)=d$.

(b) (i)   Let $G := \{A \in GL(2, \mathbb{R}): A = \begin{pmatrix} a & -b \\ b & a \end{pmatrix}\}$. Show that $\mathbb{C}^*$ is isomorphic to the group G.   [5]

     (ii) Let G=$\mathbb{R}^2$ and $H = \{(x, 0) \in G : x \in \mathbb{R}\}$. Show that $\frac{G}{H}$ is isomorphic to ($\mathbb{R}$,+).   [5]

(c) (i)   Let n be a positive integer and N=<n> be the cyclic subgroup of the additive group $\mathbb{Z}$ [5]
            of integers. Show that $0(\frac{\mathbb{Z}}{N})=n$.

     (ii) If p is the smallest prime factor of the order of finite group G, prove that any subgroup   [5]
            of index p is normal.

(d) (i)   Let G= S_3 and H=A_3. Show that G/H is isomorphic to {1,-1}.   [5]

(ii) Let G be a group with at least two elements such that G has no subgroup other than $\{e\}$ and itself. Then prove that G is a cyclic group of prime order. [5]

(e) (i) Let G be a finite group. Then prove that every element in G is of finite order. Is the converse true? Justify your answer. [5]

(ii) Let G be an infinite group. Show that G has infinitely many proper subgroups. [5]

The University of Burdwan

B.Sc. (Honours) Semester-III Examination (CBCS): 2021
Subject: Nutrition
Course Code: CC 6
Course Title: Nutrition: Life Cycle Approach

The figures in the right hand margin indicate full marks

Candidates are required to give their answers in their own words as far as practicable.

Answer all *questions* as instructed

Examinees are instructed to submit the scanned copies / photographs of their answer scripts within 30 minutes after the completion of examination

F.M.–40   **Time: 2hrs**

Answer *any eight* questions of the following: 5×8=40

1. What are the factors that must be considered while planning a menu for an athlete?

2. Briefly describe the nutritional advantages of breast feeding.

3. How the energy requirement of a pregnant woman varies with the advancement of pregnancy? Explain.

4. What are the causes of protein energy malnutrition (PEM) in pre-school children?

5. Elaborate the potential role of folic acid on pregnancy outcome.

6. What is exclusive breast feeding? Write a brief note on formula feeding.

7. Write the causes and possible consequences of vitamin D deficiency in elderly people.

8. Discuss in brief about common complications associated with weaning.

9. What is antioxidant? Elaborate the role of different antioxidant on geriatric health.

10. Briefly discuss the nutritional management of preterm baby.

B.Sc. Semester III (Honours) Examination, 2021 (CBCS)

Subject: Physics

Paper: CC-VI

Time: 2 Hours   **Full Marks: 40**

The questions are of equal value. Candidates are required to give their answers in their own words as far as practicable.

Answer any **eight** of the following questions: $5 \times 8 = 40$

1. a) State the Zeroth law of thermodynamics and discuss its importance?

    b) What is Coefficient of Performance (COP) of a refrigerator? Why COP of an ideal refrigerator will be higher in winter than in summer?

2. a) What is free expansion? Show that for an ideal gas, internal energy depends only on temperature and is independent of pressure and volume.

    b) One mole of an ideal gas expands from volume V_o to $2V_o$ under Joule expansion. What is the change of entropy in the gas, the surroundings, and the Universe during this Joule expansion?

3. a) What is the change in internal energy due to adiabatic expansion of an ideal gas from (P_1, V_1) to (P_2, V_2) ?

    (b) What is adiabatic lapse rate? Graphically represent how the temperature of the atmosphere vary with height above sea level, considering atmosphere as an ideal gas system?

4. a) Explain why an adiabatic process need not be isentropic always.

    b) A system has heat capacity $C = \alpha T^2$ J/K with temperature 200 K, where α is a constant. Find out the change in entropy of the system when it is cooled down to the temperature of the thermal reservoir which is at 100 K.

5. a) Establish the condition of equilibrium of a closed composite system consisting with two simple systems separated by a movable diathermic wall that is impervious to the flow of matter.

    b) Write down any two important differences between the first and the second order phase transition.

6. a) What do you mean by inversion line and inversion point in case of Joule-Thomson effect?

b) State Nernst's heat theorem and establish the equivalence of this theorem with the unattainability of absolute zero.

7. a) Show that, $C_P = T \left(\frac{\partial V}{\partial T} \right)_P \left(\frac{\partial P}{\partial T} \right)_S$ and $C_V = -T \left(\frac{\partial P}{\partial T} \right)_V \left(\frac{\partial V}{\partial T} \right)_S$.

b) Prove that heat is generated under compression for a substance which expands on heating and cooling takes place for a substance which contracts on heating.

8. a) What do you mean by Doppler broadening of spectral lines?

b) Show that the root mean square value of a Cartesian component of molecular velocity v_x is equal to $\sqrt{\frac{P}{\rho}}$, where P is the pressure and ρ the density of the gas.

9. a) Show that mean free path of an ideal gas is directly proportional to the absolute temperature of the gas and inversely proportional to its pressure.

b) What are the different degrees of freedom of a linear tri-atomic molecule? Are all these degrees of freedom excited simultaneously? Justify your answer.

10. a) Derive reduced equation of state from Vander Waal's equation and state its significance.

b) Transportation of which quantity in a gas gives rise to the phenomenon of thermal conductivity? Why hydrogen gas has larger thermal conductivity compared to any other gas at any given temperature?

THE UNIVERSITY OF BURDWAN

B. Sc. Semester 3 (Honours) Theory Examination, 2021(CBCS)

SUBJECT:PHYSIOLOGY

Paper: CC6 (Circulation)

Time: 2 Hours   **Full Mark: 40**

The figures in the right hand margin indicate full marks
Candidates are required to give their answers in their own words as far as practicable.

*Examinees are instructed to submit the scanned copies/photographs of their
answers' scripts within 30 minutes after the completion of examination*

Answer any ***eight*** questions of the following: **(8 x5 = 40)**

1. Explain refractory period and staircase phenomena of cardiac muscles. What are gap junctions?

2. What is pace maker potential? Discuss the normal pathway of action potential conduction through the heart.

3. Explain Frank Starlings law of the heart. How is this law related to changes in ventricular preload?

4. Write briefly about myocardial infarction.

5. Discuss the role of arterial baroreceptor reflex in short-term regulation of blood pressure.

6. What is vascular tone? Discuss how vascular tone is regulated by prostaglandins and bradykinin.

7. State the ionic basis of Cardiac action potential. Mention the cause of plateau.

8. Define cardiac cycle? Outline the pressure volume changes in ventricles and aorta during each cardiac cycle.

9. Explain the physical basis of the Karotkoff sound. What is mean arterial pressure?

10. What is autoregulation of blood flow? Mention the peculiarities of cerebral circulation.

SUBJECT: PSYCHOLOGY

Paper: CC6 (METHODOLOGY)

TIME: 2 Hrs   **Full Marks: 40**

The figures in the margin indicate full marks. Candidates are required to give their answer in their own words as far as practicable.

A. **Answer any *eight* of the following questions.**   **8X5=40**

1. What are the differences between random and stratified sampling?

2. Discuss briefly the three major principles of experimental design.

3. What are the criteria of a good hypothesis?

4. Bring out the concept of balancing and counter balancing in controlling extraneous variables.

5. What are the components of field study?

6. Write a short note on content validity.

7. Discuss briefly the features of a research problem.

8. Compare between Percentile norms and standard score norms.

9. What are the characteristics of a standardised test?

10. Differentiate between single group design and separate group design.

B.Sc. 3rd Semester(Honours)Examination, 2021(CBCS)
Subject: Statistics
Course: CC-6

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
The notations or symbols have their usual meaning.

Time: 2 hours   **Full Marks: 40**

Demography and Vital Statistics

Answer any **eight** from the following: **5X8=40**

1. Define CDR and CBR.
2. Describe the errors in Census.
3. Write a short note on IMR.
4. Define SDR. State two specifications made in SDR.
5. Write a short note on Standard Population.
6. Define L_x in the context of the life table.
7. Write a short note on population growth measurements.
8. Write a short note on Stable population.
9. Describe A.P. method for population estimate.
10. Write a short note on the Logistic curve.

B.Sc. 3rd Semester (Hons.) Examination, 2021 (CBCS)
Subject: Zoology
Paper: CC - 6
(Animal Physiology: Controlling & Coordinating Systems)

Full Marks: 40   **Time: 2 Hrs**

Candidates are required to give the answers in their own words as far as practicable.

*Answer any **eight** questions of the following:*   5×8=40

1.   Describe briefly structure and functions of the squamous epithelial tissue.

2.   Represent histological architecture of a thyrofollicle with a neat diagram.

3.   Compare and contrast functional mechanisms of chemical and electrical synapses.

4.   Give a brief account of the ultra structure of striated muscle.

5.   Elaborate crucial role of Ca^{2+} in muscle contraction.

6.   Draw a labeled diagram of the sectional view of mammalian seminiferous tubule.

7.   Point out the role of one hypophyseal hormone and one ovarian hormone in the regulation of menstrual cycle.

8.   Give a diagrammatic representation for generation of the action potential.

9.   Schematically represent signal transduction pathway of any one of the non-steroidal hormones.

10.   Name two major placental hormones. Add a brief note on their functions.

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