



WELCOME TO THE WORLD OF BIOLOGY

ORIENTATION SESSION

Grade XII

Session 2020-21

Biology

Subject Code: 044



Objectives of Learning



Understand basic principles of Biology



Learn emerging knowledge and its relevance to individual and society



Promoting rational/scientific attitude towards issues related to population, environment and development



Awareness about environmental issues, problems and their appropriate solutions



Awareness about diversity in the living organisms and developing respect for other living beings



Understand that most complex biological phenomena are built on essentially simple processes



What to Learn! (THEORY)

**Total
70 Marks
(THEORY)**

UNIT 6 Reproduction

- **Chapter 1** Reproduction in Organisms
- **Chapter 2** Sexual reproduction in flowering plants
- **Chapter 3** Human Reproduction
- **Chapter 4** Reproductive Health

14 Marks

UNIT 7 Genetics & Evolution

- **Chapter 5** Principles of Inheritance and variation
- **Chapter 6** Molecular basis of Inheritance
- **Chapter 7** Evolution

18 Marks

UNIT 8 Biology & Human Welfare

- **Chapter 8** Human health & disease
- **Chapter 9** Strategies for enhancement in food production
- **Chapter 10** Microbes in Human welfare

14 Marks

UNIT 9 Biotechnology & Its applications

- **Chapter 11** Biotechnology – Principles and processes
- **Chapter 12** Biotechnology and its application

10 Marks

UNIT 10 Ecology & Environment

- **Chapter 13** Organisms & Populations
- **Chapter 14** Ecosystem
- **Chapter 15** Biodiversity & its conservation
- **Chapter 16** Environmental Issues

14 Marks

Course completion month - November



What to Learn! (PRACTICAL)

**Total
30 Marks
(PRACTICAL)**

**One Major Experiment
Part A**

5 Marks

**One Minor Experiment
Part A**

4 Marks

**Slide Preparation
Part A**

5 Marks

**Spotting
Part B**

7 Marks

Practical Record + Viva Voce

4 Marks

Project Record + Viva Voce

5 Marks

Course completion month - November



What to Learn! (PRACTICAL) contd.

Part A List of Experiments

1. Study pollen germination on a slide.
2. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity. Correlate with the kinds of plants found in them.
3. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organism.
4. Study the presence of suspended particulate matter in air at two widely different sites.
5. Study the plant population density by quadrat method.
6. Study the plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch.
9. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

Part B Study/Observation (Spotting)

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Pollen germination on stigma through a permanent slide.
3. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides (Mammalian).
6. Mendelian inheritance using seeds of different color/sizes of any plant.
7. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and color blindness.
8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.
10. Two plants and two animals (models/virtual images) found in xeric conditions. Comment upon their morphological adaptations.
11. Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.



Question Paper Design!

Total Time 3 hours

Max. Marks 70

S.No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer-I (SA-I) (2 marks)	Short Answer-II (SA-II) (3 marks)	Long Answer (LA) (5 marks)	Total Marks	% Weightage
1	Remembering- (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories, Identify, define, or recite, information)	2	1	1	-	7	10%
2	Understanding- (Comprehension -To be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase information)	-	2	4	1	21	30%
3	Application (Use abstract information in concrete situation, to apply knowledge to new situations, Use given content to interpret a situation, provide an example, or solve a problem)	-	2	4	1	21	30%
4	High Order Thinking Skills (Analysis & Synthesis)- Classify, Compare, Contrast, or differentiate between different pieces of information, Organize and/or integrate unique pieces of information from a variety of sources	2	1	1	1	12	17%
5	Evaluation- (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	1	1	1	-	9	13%
Total		5X1=5	7X2=14	12X3=36	3X5=15	70(27)	100%



Question Paper Design (Ques Type Break-up)

Type of Question	Mark(s) per Question	Total No. of Questions	Total Marks
VSA	1	5	5
SA-I	2	17	14
SA-II	3	12	36
LA	5	3	15
Total		27	70

Units	Very Short Answer (VSA) (1 mark)	Short Answer-I (SA-I) (2 marks)	Short Answer-II (SA-II) (3 marks)	Long Answer (LA) (5 marks)	Total Marks
Reproduction	2(2)	4(2)	6(2)	-	12(6)
Genetics & Evolution	2(2)	4(2)	9(3)	5(1)	20(8)
Biology & Human Welfare	1(1)	2(1)	9(3)	-	12(5)
Biotechnology & Its Application	2(2)	2(1)	3(1)	5(1)	12(5)
Ecology & Environment	1(1)	8(4)	-	5(1)	14(6)
Total	8(8)	20(10)	27(9)	15(3)	70(30)

1. **Internal Choice:** There is no overall choice in the paper. However, there is an internal choice in one question of 2 marks weightage, one question of 3 marks weightage and all three questions of 5 marks weightage.

2. The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.

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Sample Question Paper

SAMPLE PAPER III XII - BIOLOGY

Time : 3 Hours

Max. Marks : 70

GENERAL INSTRUCTIONS :

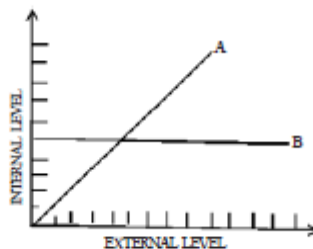
- All questions are compulsory.
- The question paper consists of four sections A, B, C and D. Section-A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D is of 3 questions of 5 marks each.
- There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
- Wherever necessary, the diagrams drawn should be neat and properly labelled.

SECTION -A

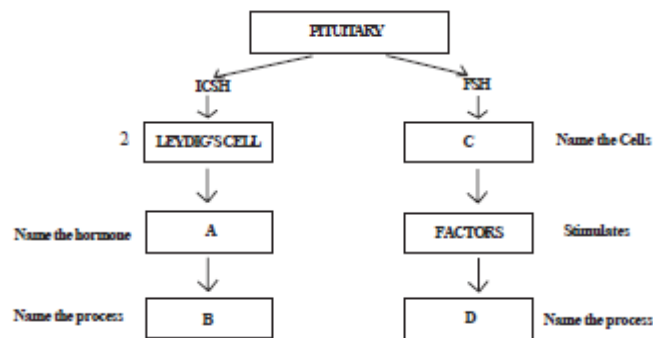
- Cite an example of an inverted ecological pyramid. What kind of pyramid of energy would it have? 1
- When is the structure and composition of a community expected to remain unchanged? 1
- At what stage of life is oogenesis initiated in a human female? When does the oocyte complete oogenesis? 1
- After a successful in-vitro fertilisation, the fertilised egg begins to divide. Where is this egg transferred before it reaches the 8-cell stage and what is this technique named? 1
- AaBb was crossed with aabb. What would be the phenotypic ratio of the progeny? Mention the term to denote this kind of cross. 1
- In F.Griffith's experiment, how did the nonvirulent strain of *Streptococcus Pneumoniae* become virulent? 1
- State the use of:
 - Trichoderma* with respect to organ transplant, and
 - Nucleopolyhedrovirus with respect to pest management
- Bacteria that convert milk into curd play two other beneficial roles. What are they? 1

SECTION B

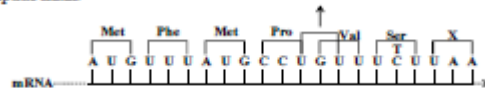
- Given below is a graph depicting organismic response to changing external conditions. According to their response the organisms are grouped into two types. Name the type which will show (i) pattern A and (ii) pattern B. 2



- Given below is an incomplete flow chart showing influence of hormones on gametogenesis in males. Observe the flow chart carefully and fill in the blanks A, B, C, and D. 2



- Read the sequence of the nucleotides in the given segment of mRNA and the respective amino acid sequence in the polypeptide chain. 2



Polypeptide : met-phe-met-proline-valine-serine

- Provide the triplet of bases (codon) for (a) valine (b) proline
- Write the nucleotide sequence of the DNA strand from which this mRNA was transcribed
- What does the last codon of this RNA stand for?

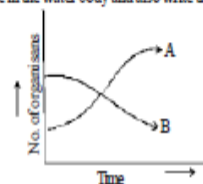
OR

(34)

- The following table shows the genotypes for ABO blood grouping and their phenotypes. Fill in the gaps left in the table: 2

S.No.	Genotype	Blood Group
1	I ^A I ^A	A
2		A
3	I ^A I ^B	B
4		B
5	I ^A I ^O	
6		O

- The graph below represents the growth patterns of two types of aquatic organisms over a brief period of time in a water body surrounded by an agricultural land extensively supplied with fertilisers. Identify the organisms that would represent (i) A and (ii) B.
 - State the reason for such a change in the water body and also write the term given to it.



- Sex determination is based on particular chromosomes in both birds and humans. State two points of difference between their mechanisms of sex determination. 2
- Following are the steps in MOET programme for herd improvement in which a cow has been administered hormones with FSH like activity. Arrange steps A to D in their correct sequence.
 - Transferred to a surrogate mother
 - It is either mated with an elite bull or artificially inseminated.
 - Fertilised eggs at 32 cell stage are recovered non surgically.
 - It produces 6-8 eggs instead of one egg which they normally yield per cycle.
- In which disease is there an uncontrolled division of cells resulting in formation of tumours? How is this disease detected?
 - How do interferons help in controlling the disease?
- State the principle underlying 'gel electrophoresis' and mention two applications of this technique in biotechnology. 2
- You have developed a GM organism. Which government organisation will you approach to obtain clearance for its mass production? Why is such a body necessary? Give two reasons. 2
- How has *Agrobacterium tumefaciens* been suitably modified to act as a cloning vector? 2



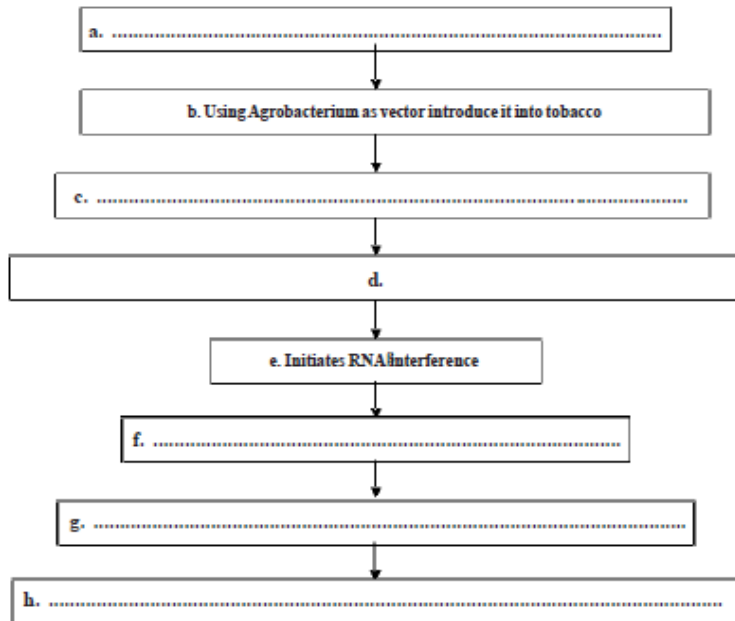
Sample Question Paper (Contd.)

SECTION C

19. Amazonian rain forest has the greatest biodiversity on earth. List any two hypotheses that are proposed by the biologists to account for the greater biological diversity. 3
20. (a) In which part of the human female reproductive system do the following events take place?
 I - Release of 1st polar body.
 II - Release of 2nd polar body.
 III - Fertilisation
 IV - Implantation.
- (b) From where do signals for parturition originate and what does maternal pituitary release for stimulating uterine contractions for child birth? 3
21. A true breeding tall plant is crossed with a true breeding dwarf plant. F₁ progeny is 100% tall and F₂ has tall : dwarf in the ratio 3:1 (i) Explain why F₁ shows only one type of parental phenotype. (ii) Name the patterns of inheritance in which the ratio deviates from above. Also mention the deviated phenotypic ratio. 3
22. In the following diagram the two DNA strands represented are ready for transcription
-
- (i) Label the parts marked 1 to 4 and state their functions in transcription. 4
- (ii) Which one of the two strands of DNA has nucleotide sequence similar to the mRNA that will be transcribed and why?
23. State in what ways Stanley Miller simulated the conditions of:
 (i) Primitive atmosphere on earth.
 (ii) Energy source at the time of origin of life, and
 (iii) Formation of organic molecules of life to prove the theory of chemical evolution. 3

(36)

24. Draw a flow chart to depict the multiplication of an HIV virus in a host cell. 3
25. What are "flocs"? State their role in effluent treatment and their ultimate fate in sewage treatment tank. 3
26. Two of the steps involved in producing nematode resistant tobacco plants based on the process of RNAi are mentioned below. Write the missing steps in its proper sequence. 3



OR

In a bacterial culture some of the colonies produced blue colour in the presence of a chromogenic substrate and some did not due to the presence or absence of an insert (rDNA) in the coding sequence of β -galactosidase.

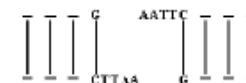
- (a) Mention the mechanism and the steps involved in the above experiment.
 (b) How is it advantageous over simultaneous plating on two plates having different antibiotics? 3

(37)

27. An interesting property of restriction enzymes is molecular cutting and pasting. Restriction enzymes typically recognize a symmetrical sequence of DNA.



Notice that the top strand is the same as the bottom strand, but reads backward. When the enzyme cuts the strand between G and A, it leaves overhanging chains:



- A. What is this symmetrical sequence of DNA known as?
 B. What is the significance of these overhanging chains?
 C. Name the restriction enzyme that cuts the strand between G and A. 3

SECTION D

28. (i) A decade back, the enormous vehicular traffic in Delhi had made Delhi rank 4th among polluted cities of the world. Two measures taken by the Delhi Government brought marked improvement in air quality by 2005. What were these two measures and how did they reduce air pollution? 3
- (ii) What is the norm set by Euro II for petrol and diesel vehicles?

OR

How is the "sixth episode of extinction" of species on earth, now currently in progress, different from the five earlier episodes? What is it due to? Explain the various causes that have brought about this difference.

29. (a) Draw the embryo sac of a flowering plant and label (i) central cell (ii) Chalazal end of the embryo sac (iii) synergids.
 (b) Name the cell that develops into the embryo sac and explain how this cell leads to the formation of Embryo sac. Also mention the role played by the various cells of the embryo sac. 5

OR

Show diagrammatically the stages of embryonic development from zygote upto implantation in humans. 5

30. Name the genes that constitute an operon. How does lac operon get switched on in the presence of lactose? 5

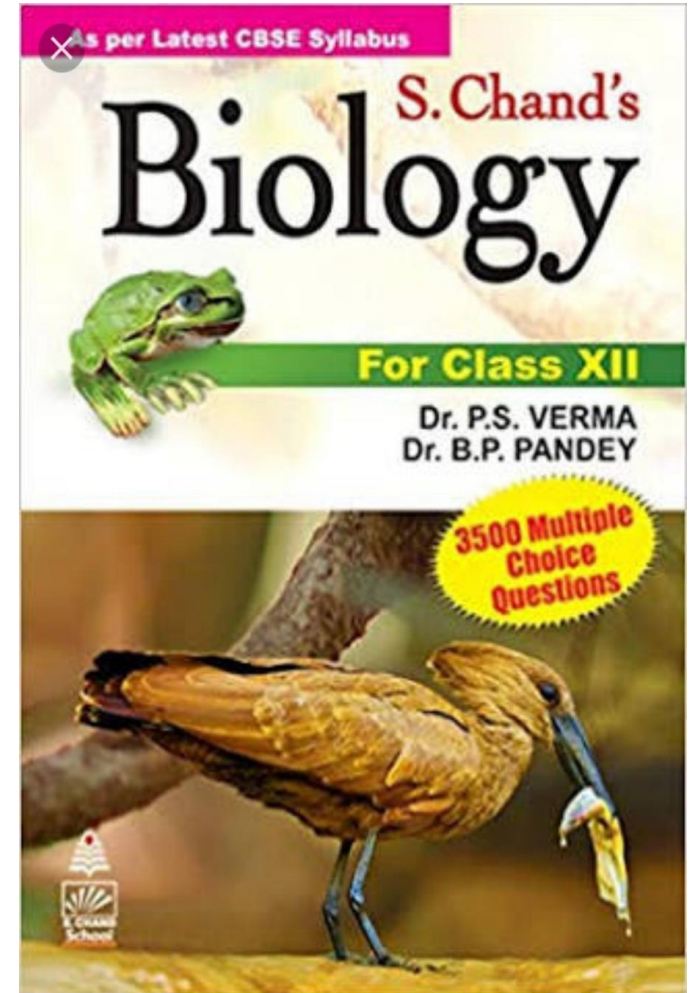
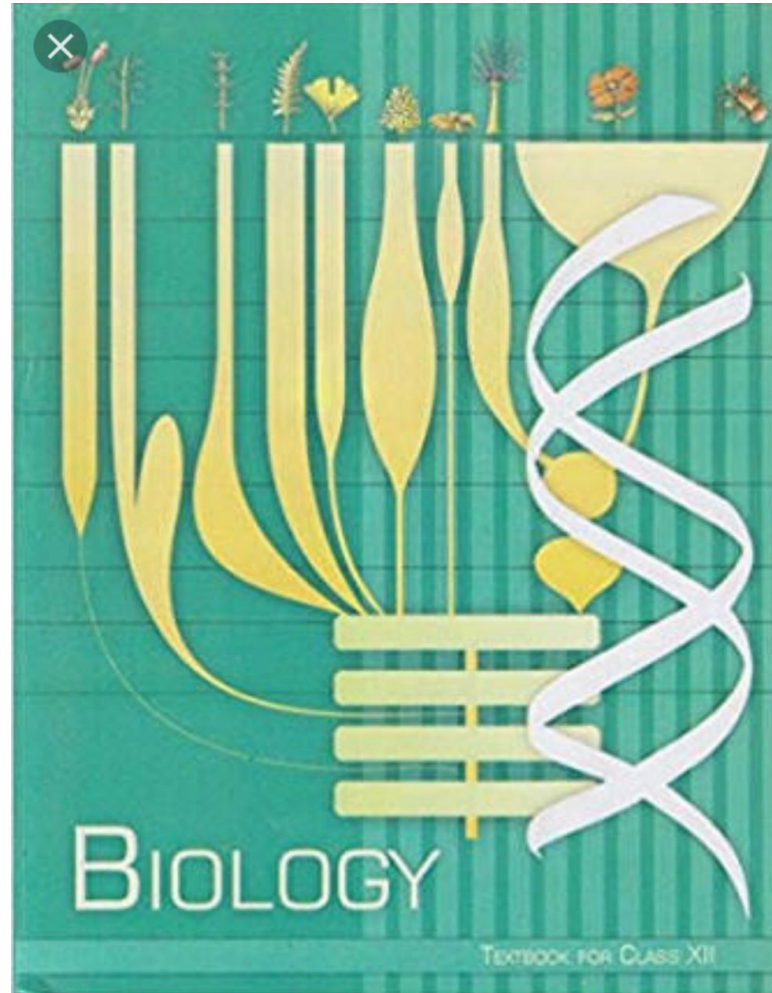
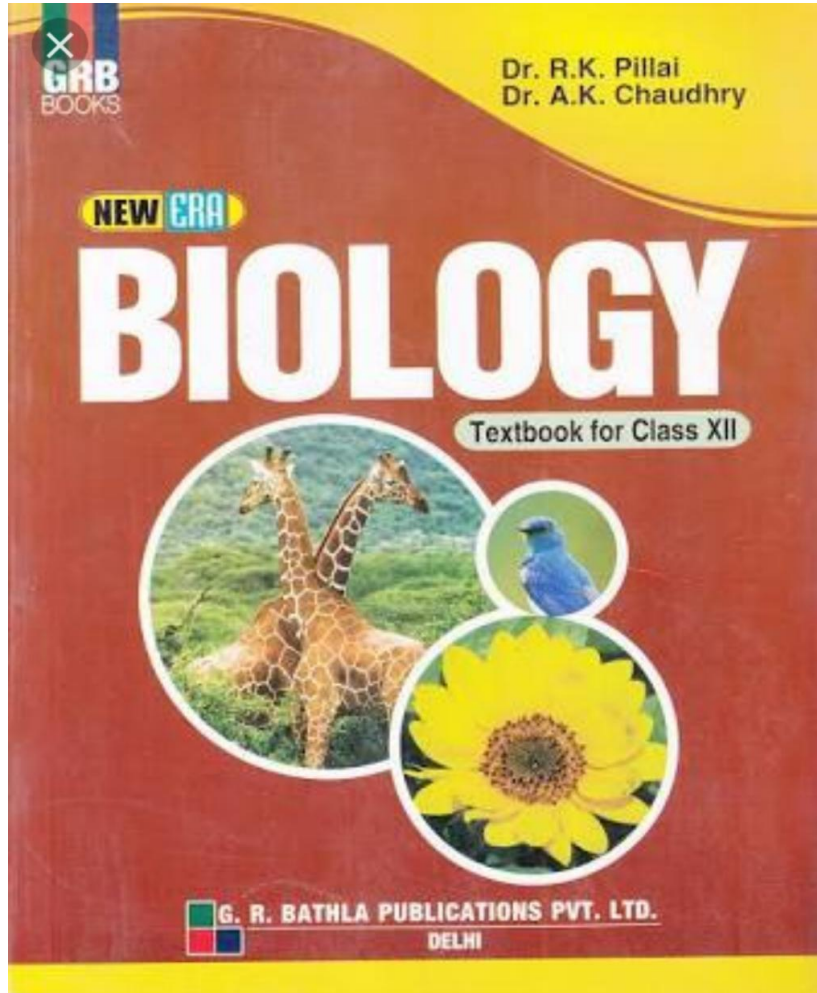
OR

With the advent of rDNA technology a powerful tool is available to identify a criminal or to the real parents. Name this technique. Write the missing steps in the procedure given below. There of three steps are mentioned in the flow chart: Extraction of DNA from the cells - (i)
 (ii) DNA is cut into fragments by restriction enzymes
 → (iv) → (v) → (vi) → (vii) Autoradiography. → (viii) 5

(38)



Textbooks to Refer





Glorifying Career



MEDICAL & HEALTHCARE SERVICES

Doctor

Para medical

Veterinary Sciences

Pharmaceutical

Physiotherapy

Radiography

Nutrition & Dietetics

Rehabilitation Therapy



SCIENCE & RESEARCH

Food technology

Biomedical Engg.

Biotechnology

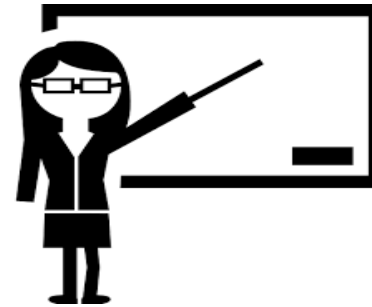
Micro Biology

Bio Chemistry

Agriculture

Fisheries Science

Scientist



ACADEMICIANS

Teacher

Professor

Research fellowship

Doctorate



CIVIL SERVICES

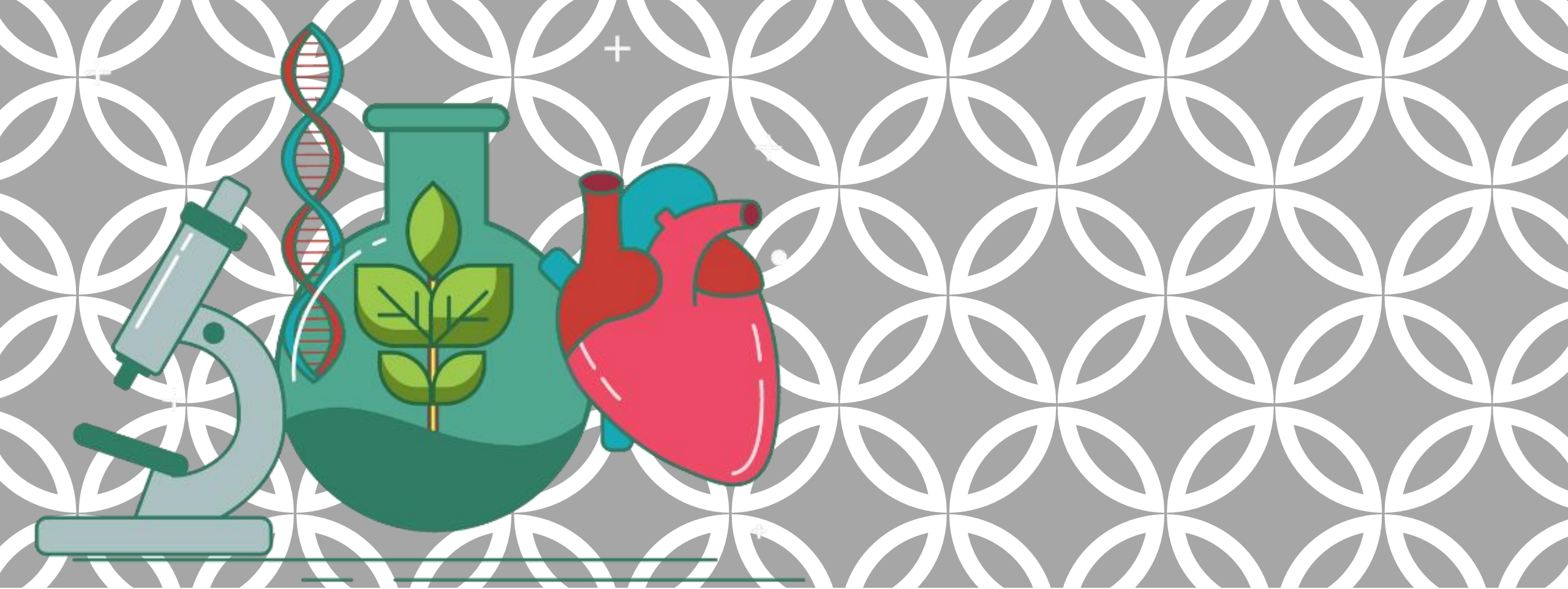
IAS

IPS

Bureaucrat

Intelligence Services

And Lot many more!!!



THANK YOU

All the Best & Happy Learning