**WINTER VACATIONS HOMEWORK**

**(BIOLOGY-XIITH)**

I. SOLVE ATLEAST 10 CBSE SAMPLE PAPERS OF BIOLOGY.

II. DRAW ANATROPOUS OVULE, EMBRYO SAC, T.S. OF TESTIS AND OVARY, MONOCOT AND DICOT SEED, MENSTRUAL CYCLE, LAC OPERON, DNA REPLICATION, RECOMBINANT DNA TECHNOLOGY FLOW CHART, XEROSERE, HYDROSERE, BIOREACTOR NEATLY AND WELL LABELLED.

III. REVISE CLASS NOTES THOROUGHLY.

IV. SOLVE ALL ASSIGNMENTS OF MCQs GIVEN IN CLASS.

V. REVISE ALL NCERT QUESTIONS.

VI. SOLVE THE FOLLOWING CHAPTER WISE MOST IMPORTANT QUESTIONS:

**REPRODUCTION IN ORGANISMS**

1. EXPLAIN THE SIGNIFICANCE OF MEIOCYTES IN A DIPLOID ORGANISM.

2. EXPLAIN THE IMPORTANCE OF SYNGAMY AND MEIOSIS IN A SEXUAL LIFE CYCLE OF AN ORGANISM.

3. COCONUT PALM IS MONOECIOUS WHILE DATE IS DIOECIOUS. WHY ARE THEY CALLED SO?

4. WHY IS NILAKURANJI KNOWN?

**SEXUAL REPRODUCTION IN FLOWERING PLANTS**

1. DEFINE PARTHENOCARPY. GIVE ONE EXAMPLE IN WHICH IT OCCURS NATURALLY.

2. WHY ARE POLLEN GRAINS PRODUCED IN ENORMOUS QUANTITY IN MAIZE?

3. THE MEIOCYTES OF RICE HAS 24 CHROMOSOMES. HOW MANY CHROMOSOMES ARE PRESENT IN ITS ENDOSPERM?

4. PEA FLOWERS PRODUCE ASSURED SEED SETS. GIVE A REASON.

5. NORMALLY ONE EMBRYO DEVELOPS IN ONE SEED BUT WHEN AN ORANGE SEED IS SQUEEZED MANY EMBRYOES OF DIFFERENT SHAPES AND SIZES ARE SEEN. MENTION HOW IT HAS HAPPENED.

6. STATE ONE ADVANTAGE AND ONE DISADVANTAGE OF CLEISTOGAMY.

7. LIST THE POST FERTILIZATION EVENTS IN ANGIOSPERMS.

8. OUT OF MANY PAPAYA PLANTS GROWING IN YOUR GARDEN, ONLY A FEW BEAR FRUITS. GIVE REASON.

9. DIFFERENTIATE BETWEEN GEITONOGAMY AND XENOGAMY; PERISPERM AND ENDOSPERM.

10. LIST ANY THREE OUTBREEDING DEVICES THAT PLANTS HAVE DEVELOPED.

11. WHY ARE SOME SEEDS REFERRED TO AS APOMICTIC SEEDS? MENTION ONE ADVANTAGE AND ONE DISADVANTAGE TO A FARMER WHO USES THEM.

12. DRAW A DIAGRAMMATIC SKETCH OF A SECTIONAL VIEW OF A TYPICAL ANATROPOUS OVULE.

13. DRAW A LABELLED DIAGRAM OF AN EMBRYO SAC OF AN ANGIOSPERM.

14. DRAW A DIAGRAM OF A SECTION OF MEGASPORANGIUM.

**HUMAN REPRODUCTION**

1. WHY IS BREAST FEEDING RECOMMENDED DURING THE INITIAL PERIOD OF AN INFANT’S GROWTH?

2. DRAW A LABELLED DIAGRAM OF HUMAN SPERM.

3. DRAW A WELL LABELLED DIAGRAM OF A SECTION THROUGH OVARY.

4. EXPLAIN THE MENSTRUAL PHASE IN HUMAN FEMALE.

5. DRAW A GRAFFIAN FOLLICLE AND LABEL ANTRUM AND SEXONDARY OOCYTE.

**REPRODUCTIVE HEALTH**

1. WHY IS HORMONE RELEASING IUDS CONSIDERED A GOOD CONTRACEPTIVE TO SPACE CHILDREN?

2. WHY DO SOME WOMEN USE SAHELI PILLS?

3. LIST FOUR ILL EFFECTS OF OVER POPULATION.

4. DESCRIBE THE LACTATION AMENORREA METHOD OF BIRTH CONTROL.

5. NAME TWO INTRA UTERINE CONTRACEPTIVE DEVICES THAT AFFECT THE MOTILITY OF SPERM.

6. EXPLAIN VARIOUS SPECIAL TECHNIQUES USED IN ASSISTED REPRODUCTIVE TECHNOLOGIES?

**PRINCIPLES OF INHERITANCE AND VARIATION**

1. NAME ONE AUTOSOMAL DOMINANT AND ONE AUTOSOMAL RECESSIVE MENDELIAN DISORDER IN HUMANS.

2. A HUMAN BEING SUFFERING FROM DOWN’S SYNDROME SHOWS TRISOMY OF 21ST CHROMOSOME. MENTION THE CAUSE OF THIS CHROMOSOMAL ABNORMALITY.

3. WHAT ARE TRUE BREEDING LINES THAT ARE USED TO STUDY INHERITANCE PATTERN OF TRAITS IN PLANTS?

4. STATE A DIFFERENCE BETWEEN A GENE AND AN ALLELE.

5. GIVE AN EXAMPLE OF A HUMAN DISORDER THAT IS CAUSED DUE TO SINGLE GENE MUTATION.

6. WHAT DO YOU UNDERSTAND BY A PHENOTYPE AND A GENOTYPE? EXPLAIN BY GIVING AN EXAMPLE.

7. DEFINE F1 AND F2 GENERATION.

8. WORK OUT A CROSS TO FIND THE GENOTYPE OF A TALL PEA PLANT. NAME THE TYPE OF CROSS.

9. WITH THE HELP OF AN EXAMPLE EXPLAIN THE PHENOMENON OF CODOMINANCE AND MULTIPLE ALLELISM IN HUMAN POPULATION.

10. EXPLAIN MECHANISM OF SEX DETERMINATION IN BIRDS.

11. DIFFERENTIATE BETWEEN MALE AND FEMALE HETEROGAMETY?

12. IN ONE FAMILY, EACH OF THE FOUR CHILDREN HAS A DIFFERENT BLOOD GROUP. EXPLAIN WITH THE HELP OF A CROSS.

13. A COLOURBLIND CHILD IS BORN TO A NORMAL COUPLE. WORK OUT A CROSS TO SHOW HOW IT IS POSSIBLE. MENTION THE SEX OF THIS CHILD.

14. WOMEN ARE OFTEN BLAMED FOR PRODUCING FEMALE CHILDREN. CONSEQUENTLY THEY ARE ILL TREATED AND OSTRACIZED. HOW WILL YOU ADDRESS THIS ISSUE SCIENTIFICALLY IF YOU WERE TO CONDUCT AN AWARENESS PROGRAMME TO HIGHLIGHT THE VALUES INVOLVED.

15. DESCRIBE THE MECHANISM OF PATTERN OF INHERITANCE OF ABO BLOOD GROUPS IN HUMANS.

16. EXPLAIN THE GENETIC BASIS OF BLOOD GROUPING IN HUMAN POPULATION.

**MOLECULAR BASIS OF INHERITANCE**

1. Why is hnRNA required to undergo splicing?

2. Which organic molecule other than protein can act as biocatalyst?

3. Mention two functions of codon AUG.

4. Name the enzyme and state its property that is responsible for continuous and discontinuous replication of two strands of a DNA molecule.

5. What is cistron?

6. How does a degenerate code differ from an unambiguous one?

7. Write the full form of VNTR. How is VNTR different from probe?

8. What is aminoacylation? State its significance.

9. Discuss the role of enzyme DNA ligase in DNA replication.

10. What is satellite DNA in a genome? Explain their role in DNA finger printing.

11. In a series of experiments with Streptococcus and mice Griffith concluded that R-strain bacteria had been transformed. Explain.

12. List the salient features of double helix of DNA.

13. How are the structural genes activated in the lac operon in *Escherichia coli*?

14. How was a heavy isotope of nitrogen used to provide experimental evidence to semi-conservative mode of DNA replication?

15. Expand ‘SNPs’ identified by scientists in HGP.

16. How did Alfred Hershey and Martha Chase arrive at the conclusion that DNA is the genetic material?

17. Describe Fredrick Griffith’s experiment on Streptococcus pneumonia. Discuss the conclusion he arrived at.

18. How did Avery, Mcleod and McCarty prove that DNA was the genetic material?

19. How do mRNA, tRNA and ribosome help in the process of translation?

20. Why is DNA replication said to be semiconservative?

21. How are the following formed and involved in DNA packaging in a nucleus of a cell?

i. Histone octamer ii. Nucleosome iii. Chromatin

22. List the criteria a molecule that can act as genetic material must fulfil. Which one of the criteria is best fulfilled by DNA of by RNA thus making one of them a better genetic material than the other.

**EVOLUTION**

1. According to de Vries what is saltation?

2. Mention any three characteristics of Neanderthal man that lived in Near East and Central Asia.

3. “Ontogeny repeats phylogeny”. Explain it.

4. Explain Darwinian theory of evolution with the help of one suitable example. State the two key concepts of the theory.

5. What is adaptive radiation? Explain it with reference to Australian marsupials. Can this fauna indicate it is parallel evolution with placental mammals? How do you explain their geographical distribution.

6. State the Hardy-Weinberg’s law. Write the mathematical formula representing this law.

7. ‘Mammals and birds have evolved from reptiles.’ In what way does a comparative study of their embryology establish the validity of this statement?

**HUMAN HEALTH AND DISEASE**

1. How do neutrophils act as a cellular barrier to pathogens in humans?

2. Explain what is meant by metastasis?

3. What type of virus causes AIDS? Name its genetic material.

4. Give four differences between benign and malignant tumours.

5. How do macrophages in the human body act as ‘HIV factory’?

6. Name the two types of immune system in human body. Why are cell mediated and humoral immunities so called?

7. State the functions of primary and secondary lymphoid organs in humans.

8. Expand SCID. How it is caused?

9. A boy of ten years had chicken pox. He is not expected to have the same disease for the rest of his life. Mention how it is possible.

10. What is alcoholism? Describe the ill effects of alcohol on different parts of the body of an individual.

11. Write the source and the effect on the human body of the following drugs: Morphine, Cocaine, Marijuana

12. Explain with flow chart the life cycle of Plasmodium.

13. Name the pathogen that causes amoebiasis in humans. Give the symptoms and the mode of transmission of this disease.

**STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION**

1. Name the fungus (apart from yeast) used for the production of SCP.

2. What is meant by biofortification?

3. Mention the role of ‘genetic mother’ in MOET.

4. Write differences between the inbreeding and outbreeding.

5. Why are the plants raised through micropropagation termed as somaclones?

6. List the disadvantages of production of genetically modified crops.

7. Plant breeding technique has helped sugar industry in North India. Explain how.

8. What is plant breeding? List the two steps the classical plant breeding involves.

**MICROBES IN HUMAN WELFARE**

1. Name the blue green algae used as human food.

2. What are bioreactors?

3. Expand TPA. Give its importance.

4. What is the biological significance of *Azolla pinnata* in agriculture?

5. Name the source of cyclosporin-A. How does this bioactive molecule function in our body?

6. Why does the Bt toxin not kill the bacterium that produces it but kills the insect that ingest it?

7. Bottled fruit juices are cleaner as compared to those made at home. Explain.

8. Explain the different steps involved during primary treatment of sewage.

9. Name a free living and a symbiotic bacterium that serves as biofertilizer. Why are they so called?

10. Name the genus to which baculovirus belong. Describe their role in integrated pestmanagement programmes.

11. What are bio-fertilizers? Describe their role in agriculture. Why are they preferred to chemical fertilizers?

**BIOTECHNOLOGY: PRINCIPLES AND PROCESSES**

1. Draw a schematic sketch of pBR 322 plasmid.

2. What is ‘ori’?

3. Explain with the help of a suitable example the naming of a restriction endonuclease.

4. What are selectable markers? What is their use in genetic engineering?

5. List the two key tools used in recombinant DNA technology.

6. How is the amplification of gene of interest carried out using polymerase chain reaction (PCR)?

7. Name the source of the DNA polymerase used in PCR technique. Mention why it is used?

8. What is downstream processing in respect of biotechnology?

9. Name the selectable markers in the cloning vector pBR322? Mention the role they play?

10. Why must a cell be made ‘competent’ in biotechnology experiments? How does calcium ion help in doing so?

11. Why DNA cannot pass through the cell membrane? How is a bacterial cell made competent.

12. Describe the characteristics a cloning vector must possess.

13. What are the molecular scissors? Explain their role in recombinant DNA technology.

14. Describe the technique that is used for separating the fragments of DNA cut by restriction endonucleases.

**APPLICATIONS OF BIOTECHNOLOGY**

1. Expand GEAC.

2. What is biofortification?

3. Explain the role of Ti plasmids in biotechnology.

4. How is Bt cotton made to attain resistance against bollworm?

5. How did the process of RNA interference help to control the nematode from infecting roots of tobacco plants? Explain.

6. What is GMO? List any five possible advantages of GMO to a farmer.

7. Describe briefly the structure of insulin. How is genetically engineered insulin synthesized?

8. *Bacillus thuringiensis* has great potential in biological control of pests. Discuss.

9. How is the separated DNA visualised and extracted for use in recombinant technology?

10. What is sustainable agriculture?

**ORGANISMS AND POPULATIONS**

Q1. An orchid plant is growing on the branch of mango tree. How do you describe this interaction between the orchid and the mango tree?

Q2. With the help of suitable diagram describe the logistic population growth curve.

Q3. What is meant by the carrying capacity of the environment?

Q4. Differentiate between the following:

1. Hibernation and estivation
2. Eurythermal and stenothermal

Q5. Why do predators avoid eating Monarch butterfly? How does the butterfly develop this protective feature?

Q6. What are the two primary requirements of a parasite from the host?

Q7. What is a lichen?

Q8. Why do people living in high altitude have more haemoglobin and high RBC count?

Q9. What is Allen’s rule?

Q10. What would be the growth rate pattern when the resources are unlimited?

Q11. What is a mycorrhiza?

Q12. What is aerenchyma? Where would you find them?

Q13. How is a cactus or a xerophyte adapted to survive in its habitat?

Q14. Why are small animals rarely found in the polar regions? Explain.

Q15. What is diapause?

Q16. How is S-shaped pattern of population growth different from J-shaped growth pattern?

Q17. Lichen is considered a good example of obligate mutualism. Explain.

Q19. Name the interaction in each of the following:

1. Cuckoo lays her eggs in the crow’s nest.
2. Orchid grows on a mango tree.
3. Ticks live on the skin of dogs.
4. Sea anemone is often found on the shell of hermit crab.
5. Cuscuta growing on a shoe flower plant.
6. Mycorrhizae living on the roots of the higher plants.
7. Clown fish living among the tentacles of sea anemone.
8. Ascaris worm living in the intestine of humans.
9. Wasp pollinating fig inflorescence.
10. Disappearance of smaller barnacles when Balanus dominated in the coast of Scotland.

Q20. Differentiate between mutualism and commensalism.

Q22. What is Gause’s competitive exclusion principle? Explain with an example.

Q23. What are the various strategies which are used by organisms to cope with adverse conditions?

Q24. Differentiate between triangular, bell shaped and urn shaped age pyramids.

Q25. Define the following with example: Parasitism, Amensalism, Commensalism, Protocooperation, Mutualism, Competition, Biome, Ecosystem, Niche.

**14. ECOSYSTEM**

Q1. Define ecosystem. Who gave this term?

Q2. Define the following: Biotope, Standing crop, standing state.

Q3. Differentiate between Primary productivity and secondary productivity.

Q4. What do you mean by a trophic level? Name two fundamental trophic levels.

Q5. What is a food chain? Give example of a parasitic food chain.

Q6. What is food web? What are advantages of a food web?

Q7. State ten percent law. Who gave this law?

Q8. Define Eltonian pyramids with various examples.

Q9. Differentiate between pyramid of number, pyramid of biomass and pyramid of energy with suitable examples.

Q10. Could the ecological pyramids be inverted? Explain how. Give suitable examples too.

Q11. What are various limitations of ecological pyramids?

Q12. Define the following: Pioneer community, Climax community, Seral communities, Sere.

Q13. Differentiate between primary and secondary ecological succession.

Q14. What do you mean by xerarch? Explain the xerosere succession with all its stages supported with suitable examples. Draw diagram also if possible.

Q15. Write the correct sequence of stages in hydrosere succession.

Q16. What do you mean by hydrosere? Explain the hydrosere succession with all its stages supported with suitable example. Draw diagram also if possible.

Q17. What do you mean by biogeochemical cycle? Give example of a gaseous cycle and a sedimentary cycle.

Q19. Draw carbon cycle.

Q20. Draw phosphorous cycle.

Q21. What are ecosystem services? Give few examples.

Q22. Name the dominant producers in a deep aquatic ecosystem. What other name could you give to a primary consumer?

Q23. What is net primary productivity?

Q24. Write the equation that helps in deriving the net primary productivity of an ecosystem.

Q25. What is the starting point of detritus food chain?

Q26. Differentiate between standing state and standing crop?

Q27. Why the rate of assimilation of energy at the herbivore level is called secondary productivity?

Q28. Name the basic requirement of any ecosystem to function and sustain properly?

Q29. What is meant by 10% law?

Q30. What is common to earthworm, mushroom, soil mites and dung beetle in an ecosystem.

Q31. What is a trophic level?

Q32. Give one example of inverted pyramid of number.

Q33. Define climax community.

Q34. Why is the length of a food chain in an ecosystem generally limited to 3-4 trophic levels? Explain with an example.

Q35. “It is possible that a species may occupy more than one trophic level in the same ecosystem at the same time.” Explain with the help of one example.

Q36. Why the pyramid of energy is always upright? Explain.

Q37. Construct a pyramid of biomass starting with phytoplankton. Label 3 trophic levels. Is the pyramid upright or inverted? Why?

Q38. Explain how does a primary succession start on a bare rock and reach a climax community.

Q39. Name the four functional aspects of an ecosystem.

Q40. What is an incomplete ecosystem? Explain with the help of a suitable example.

Q41. Primary productivity varies from ecosystem to ecosystem. Explain.

Q42. What are limitations of ecological pyramids in the study of ecosystem?

Q43. What is stratification in an ecosystem? Explain with an example.

Q44. Why is secondary succession faster than the primary succession?

Q45. Differentiate between xerarch and hydrarch succession.

**BIODIVERSITY AND CONSERVATION**

Q1. Define biodiversity? What are various types of diversities?

Q2. What is ecological diversity? Explain its various types?

Q3. What are various causes of loss of biodiversity?

Q4. What do you mean by EVIL QUARTET?

Q5. What do you mean by IN-SITU conservation? What are various methods of in-situ conservation?

Q6. Define HOT SPOT? Name various Indian hotspots.

Q7. What do you mean by EX-SITU conservation? What are various methods of Ex-Situ conservation?

Q8.What is difference between Endemic and exotic species?

Q9. Name two national parks of India?

Q10. What is Red data book? Expand IUCN.

Q11. What does the term genetic diversity refer to? What is the significance of large genetic diversity in a population?

Q12. Where would you expect more species biodiversity- in tropics or in polar regions? Give reasons in support of your answer.

Q13. What is meant by “alien species” invasions? Name one plant and one animal alien species that are a threat to our Indian native species.

Q14. Explain ‘rivet popper’ hypothesis. Name the ecologist who proposed it.

Q15. What is IUCN red list? Give any two uses of this list.

Q16. What is cryopreservation? Give its one use.

Q17. A particular species of wild cat is endangered, In order to save them from extinction, which is a desirable approach in situ or ex situ? Justify your answer and explain the difference between the two approaches.

Q18. Write a note on biodiversity conservation.

Q19. Explain the efforts for the conservation of biodiversity at international level.

Q20. What are sacred groves? Where are sacred groves found in India? Name any four.

Q21. Alien species are a threat to native species. Justify taking examples of an animal and a plant alien species.

**ENVIRONMENTAL ISSUES**

Q1. Why are lichens regarded as pollution indicators?

Q2. BOD of two samples of water A and B were 120 mg/L and 400 mg/L, respectively. Which sample is more polluted?

Q3. Which weed is known as “Terror of Bengal” and why?

Q4. What do you mean by “Green House Effect”? Name three most contributing gases in green house effect?

Q5. Which type of UV radiations is most lethal to human beings? List its harmful effects.

Q6. Why CNG is considered a better fuel than diesel for automobiles?

Q7. In which year was the Air Prevention and control of pollution Act amended to include noise as air pollution?

Q8. What do you mean by algal bloom?

Q9. Why is ozone hole form in spring and not in winter?

Q10. What is ozone shield? Where it is found in atmosphere?

Q11. How do automobiles fitted with catalytic converters reduce air pollution? Suggest the best fuel for such vehicles.

Q12. Explain why thermal power plants are not considered eco-friendly?

Q13. Mention any four methods by which the vehicular air pollution can be controlled?

Q14. How does and electrostatic precipitator work to remove particulate pollutants released from the thermal power plants?

Q15. What is biological magnification? Illustrate with help of example of DDT.

Q16. What is eutrophication? Explain its consequences on the life of plants and animals in such water bodies.

Q17. Differentiate between natural and accelerated eutrophication?

Q18. Describe how the population of fish eating birds living on the banks of a lake, where DDT is regularly spread to check mosquito growth for many years, would differ from that living on the banks of another lake, which is free from such insecticides. Name the phenomenon involved.

Q19. During the secondary treatment of the primary effluent how does the significant decrease in BOD occur?

Q20. Which one gas is most abundant out of the four commonest greenhouse gases? Discuss the effect of this gas on the growth of plants.

Q21. What is global warming? List four strategies for reducing global warming?

Q22. Refrigerants are considered to be a necessity in modern living, but are said to be responsible for ozone holes detected in Antarctica. Justify.

Q23. What is polyblend? Why did the plastic manufacturers think of producing it? Write its usefulness.

Q24. How did Ahmed Khan, plastic sacks manufacturer from Bangalore, solve the ever-increasing problem of accumulating plastic waste?

Q25. What is hybrid vehicle technology? Explain the advantages with a suitable example.

Q26. What can be the effect of discharging hot water into a water body on the organisms in it?

Q27. What is meant by jhum cultivation? Explain how it is responsible for deforestation?

Q28. Describe chipko movement.

Q29. What is integrated waste water management? Discuss its advantage.

Q30. What do you mean by Ecosan toilets?

Q31. What is full form of PAN?

Q32. What is the difference between Classical and Photochemical smog?

Q33. How acid rain is caused?

Q34. Give four ways of solid waste management.

Q35. What do you mean by 3R’s?

Q36. Define Deforestation, Afforestation and Reforestation.

**CHEMISTRY**

1.SOLUTION OF SAMPLE PAPER ATLEAST 10.

2.PREVIOUS YEAR PAPER OF CBSE.

3.MCQ OF ALL CHAPTERS.

4.ONE WORDS QUESTION/REASONING QUESTION.

**PHYSICS**

**ELECTROSTATICS**

1. **ELECTRIC CHARGES AND FIELDS**

* Define electric lines of force. Write their important properties.
* Derive an expression for the torque acting on an electric dipole placed in a uniform electric field.
* State Gauss Law in electrostatics.

1. **ELECTRIC POTENTIAL AND CAPACITANCE**

* What is electrostatic shielding?
* Derive an expression for the capacitance of a parallel plate capacitor.
* What are dielectrics?
* Explain why the polarization of a dielectric reduces the electric field inside the dielectric?

**CURRENT ELECTRICITY**

1. **CURRENT ELECTRICITY**

* Derive Ohm’s law on the basis of the theory of electron drift.
* proves Ohm’s law for a conductor and here is the resistance of the conductor.
* Alloys of metals have greater resistivity than their constituent metals. Why?
* Define temperature coefficient of resistivity. Write its SI unit.
* Why alloys like constantan or manganin are used for making standard resistors?
* What are ohmic and non-ohmic conductors/resistors? State the conditions under which Ohm’s law is not obeyed. Give one example of each type.
* What is internal resistance of a cell?
* Define potential gradient. Give its SI unit.
* What is a potentiometer? Give its principle.
* Explain how you can compare the emf of two primary cells using potentiometer.
* Explain how you can determine the internal resistance of a cell using potentiometer.
* State Kirchhoff’s laws.
* What is a Wheatstone bridge? Write the condition for which the bridge is balanced.
* What is a metre bridge or slide wire bridge? Write its principle and draw its diagram.

**ELECTORMAGNETISM**

1. **MAGENTIC EFFECTS OF CURRENT**

* State Biot-Savart Law.
* Using Biot-Savart Law, deduce an expression for the magnetic field on the axis of a current carrying circular loop.
* State Ampere’s circuital law.
* Derive an expression for the magnetic field inside a long straight solenoid.
* What is Lorentz force? Write an expression for the total force experienced by a charged particle of charge q moving with velocity through a region subjected to both electric field and magnetic field .
* Write the principle construction and working of a Cyclotron.
* Derive an expression for the force per unit length acting on each of the two straight parallel metallic conductors carrying current in the same direction and kept near each other. Hence define an **ampere**.
* Write the principle, construction and working of Moving coil Galvanometer. Why radial field is used in it?
* How will you convert a galvanometer into an ammeter of range 0-I amperes?
* What is a shunt? Mention its important uses.
* How can a galvanometer be converted into a voltmeter of range 0-V volts?

1. **MAGNETISM**

* Explain how does an atom behaves as a magnetic dipole. Define Bohr magneton.
* Name and define the magnetic elements of earth’s magnetic field at a place.
* Classify materials on the basis of their behaviour in a magnetic field.
* Explain the phenomenon of hysteresis in the magnetic materials. What is the significance of the area of hysteresis loop.
* Why soft iron is used for making the cores of transformers?

1. **ELECTROMAGNETIC INDUCTION**

* What is electromagnetic induction?
* State and illustrate Lenz’s law.
* What is motional emf?
* What are eddy currents? How are they produced? Give some important applications of eddy currents.
* What is self induction?
* What is mutual induction?

1. **ALTERNATING CURRENT AND ELECTRICAL MACHINES**

* What do you mean by sharpness of resonance in a series resonant circuit? Write an expression for Q-factor of the circuit.
* Define power factor of an a.c. circuit.
* Derive the condition for resonance in LCR circuit.
* What are LC oscillations?
* Write the principal, construction and working of an AC Generator.
* Write the principal, construction and working of a Transformer. Write different types of energy losses and their remedies.
* State some important uses of transformers.

**EM WAVES**

1. **ELECTROMAGNETIC WAVES**

* What is displacement current?
* State **Maxwell’s equations.**
* What is electromagnetic spectrum?
* Discuss the uses of different waves of electromagnetic spectrum.

**OPTICS**

1. **RAY OPTICS AND OPTICAL INSTRUMENTS**

* what is spherical aberration in spherical mirrors. How can it be reduced?
* Derive mirror formula.
* Explain why does a water tank appear shallower?
* Explain the phenomenon of total internal reflection. State two conditions that must be satisfied for total internal reflection to take place.
* What are optical fibres? How are light waves propagate in them?
* Derive lens makers formula.
* Derive the formula for refractive index of a prism.
* Define the magnifying power of a microscope. With the help of a ray diagram, explain the formation of the image in a compound microscope.
* With the help of diagram explain the formation of in an astronomical telescope for a distant object.

1. **WAVE OPTICS**

* State the postulates of Huygen’s wave theory.
* Deduce Snell’s law of refraction using Huygen’s wave theory.
* What are coherent sources of light?
* Describe Young’s double slit experiment and derive the expression for the fringe width.
* Define resolving power of an optical instrument.
* Explain polarisation by reflection. **OR** . State and prove Brewster’s’ law of polarisation.

**MODERN PHYSICS**

1. **DUAL NATURE OF RADIATION AND MATTER**

* Define work function for a given metallic surface.
* Define electron volt. Express its value in joule.
* What is photoelectric effect?
* State the laws of photoelectric emission.
* Establish Einstein’s photoelectric equation.
* What is a photocell? Give its important uses.

1. **ATOMS**

* Explain the origin of the spectral lines of hydrogen using Bohr’s theory.

1. **NUCLEI**

* What do you mean by binding energy of a nucleus.
* Draw a plot showing binding energy per nucleon with mass number.
* Mention the important properties of α-, β-, γ-rays.
* State the law of radioactive disintegration.
* What is nuclear energy? With the help of the binding energy curve, explain how nuclear energy can be released?
* Differentiate between nuclear fission and nuclear fusion.

**SEMICONDUCTORS**

1. **SEMICONDUCTORS AND ELECTRONIC DEVICES**

* What is a p-n junction?
* With the help of a circuit diagram, explain how a p-n junction diode can be used as a half-wave rectifier? Draw the waveforms of input and output voltages.
* With the help of a circuit diagram, explain how a p-n junction diode can be used as a full-wave rectifier? Draw the waveforms of input and output voltages.
* What is a Zener diode? Give its symbol. Sketch and explain the I-V characteristics of Zener diode.

**CBSE EXAMINATION PAPER 2019**

**SET – I**

SECTION ‘A’

1. Draw the pattern of electric field lines, when a point charge –Q is kept near an uncharged conducting plate.
2. How does the mobility of electrons in a conductor change, if the potential difference applied across the conductor is doubled, keeping the length and temperature of the conductor constant?
3. Define the term “threshold frequency”, in the context of photoelectric emission.

OR

Define the term “Intensity” in photon picture of electromagnetic radiation.

1. What is the speed of light in a denser medium of polarising angle 60o?
2. ~~In the sky wave mode of propagation, why is the frequency range of transmitting signals restricted to less than 30 MHz?~~

SECTION ‘B’

1. Two bulbs are rated (P1,V) and (P2,V). If they are connected (i) in series and (ii) in parallel across a supply V, find the power dissipated in the two combinations in terms of P1 and P2.
2. Calculate the radius of curvature of an equi-concave lens of refractive index 1.5, when it is kept in a medium of refractive index 1.4, to have a power of -5 D.

OR

An equilateral glass prism has a refractive index 1.6 in air. Calculate the angle of minimum deviation of the prism, when kept in a medium of refractive index 4/5.

1. An α-particle and a proton of the same kinetic energy are in turn allowed to pass through a magnetic field , acting normal to the direction of motion of the particles. Calculate the ratio of radii of the circular paths described by them.
2. State Bohr’s quantization condition of angular momentum. Calculate the shortest wavelength of the Bracket series and state to which part of the electromagnetic spectrum does it belong.

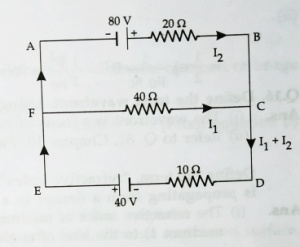
OR

Calculate the orbital period of the electron in the first excited state of hydrogen atom.

1. ~~Why a signal transmitted from a TV tower cannot be received beyond a certain distance? Write the expression for the optimum separation between the receiving and the transmitting antenna.~~
2. Why is wave theory of electromagnetic radiation not able to explain photoelectric effect? How does photon picture resolve this problem?
3. Plot a graph showing variation of de-Broglie wavelength (λ) associated with a charged particle of mass m, versus 1/, where V is the potential difference through which the particle is accelerated. How does this graph give us the information regarding the magnitude of the charge of the particle?

SECTION ‘C’

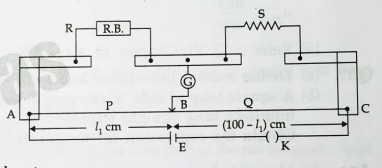
1. (a) Draw the equipotential surfaces corresponding to a uniform electric field in the z-direction.

(b) Derive an expression for the electric potential at any point along the axial line of an electric dipole.

1. Using Kirchhoff’s rules, calculate the current through the 4 Ω and 20 Ω resistors in the given circuit:

OR

What is end error in a metre bridge? How is it overcome?

The resistances in the two arms of the metre bridge are R = 5 Ω and S respectively. When the resistance S is shunted with an equal resistance, the new balance length is found to be 1.5 *l*1, where *l*1 is the initial balancing length. Calculate the value of S.

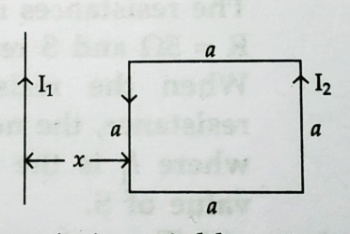
1. (a) Identify the part of the electromagnetic spectrum used in (i) radar and (ii) eye surgery. Write their frequency range.

(b) Prove that the average energy density of the oscillating electric field is equal to that of the oscillating magnetic field.

1. Define the term wavefront. Using Huygen’s wave theory, verify the laws of reflection.

OR

Define the term, “refractive index” of a medium. Verify Snell’s law of refraction when a plane wavefront is propagating from a denser to a rarer medium.

1. (a) Define mutual inductance and write its S.I. unit.

(b) A square loop of side ‘*a*’ carrying a current I2 is kept at a distance *x* from an infinitely long straight wire carrying a current I1 as shown in the figure. Obtain the expression for the resultant force acting on the loop.

1. (a) Derive the expression for the torque acting on a current carrying loop placed in a magnetic field.

(b) Explain the significance of a radial magnetic field when a current carrying coil is kept in it.

1. Draw a labelled ray diagram of an astronomical telescope in the near point adjustment position. A giant refracting telescope at an observatory has an objectivelens of focal length 15 m and an eyepiece of focal length 1.0 cm. If this telescope is used to view the Moon, find the diameter of the image of the Moon formed by the objective lens. The diameter of the Moon is 3.48 x 106 m, and the radius of lunar orbit is 3.8 x 108 m.
2. (a) State Gauss’s law for magnetism. Explain its significance.

(b) Write the four important properties of the magnetic field lines due to a bar magnet.

OR

Write three properties of differences between para-, dia- and ferro- magnetic materials, giving one example for each.

1. Define the term ‘decay constant’ of a radioactive sample. The rate of disintegration of a given radioactive nucleus is 10,000 disintegrations/s and 5000 disintegrations/s after 20 hr. and 30 hr. respectively from start. Calculate the half life and initial number of nuclei at t = 0.
2. (a) Three photo diodes D1, D2 and D3 are made of semiconductors having band gaps of 2.5 eV, 2 eV and 3 eV respectively. Which of them will not be able to detect light of wavelength 600 nm?

(b) Why photodiodes are required to operate in reverse bias? Explain

1. ~~(a) Describe briefly the functions of the three segments of n-p-n transistor.~~

~~(b) Draw the circuit arrangement for studying the output characteristics of n-p-n transistor in CE configuration. Explain how the output characteristics is obtained.~~

1. ~~(a) If A and B represent the maximum and minimum amplitudes of an amplitude modulated wave, write the expression for the modulation index in terms of A & B.~~

~~(b) A message signal of frequency 20 kHz and peak voltage 10 V. Calculate the modulation index. Why the modulation index is generally kept less than one?~~

SECTION ‘D’

1. (a) In a series LCR circuit connected across an ac source of variable frequency, obtain the expression for its impedance and draw a plot showing its variation with frequency of the ac source.

(b) What is the phase difference between the voltages across inductor and the capacitor at resonance in the LCR circuit?

(c) When an inductor is connected to a 200 V dc voltage, a current of 1 A flows through it. When the same inductor is connected to a 200 V, 50 Hz ac source, only 0.5 A current flows. Explain, why? Also, calculate the self inductance of the inductor.

OR

(a) Draw a diagram of a device which is used to decrease high ac voltage into a low ac voltage and state its working principle. Write four sources of energy loss in this device.

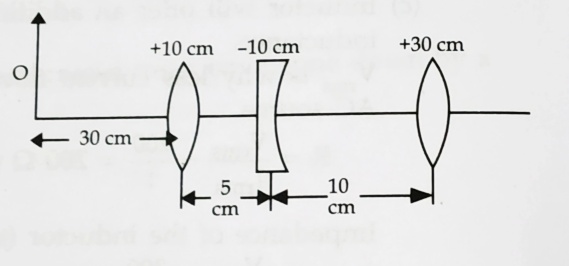
(b) A small town with a demand of 1200 kW of electric power at 220 V is situated 20 km away from an electric plant generating power at 440 V. The resistance of the two wire line carrying power is 0.5 Ω per km. The town gets the power from the line through a 4000-220 V step-down transformer at a sub-station in the town. Estimate the line power loss in the form of heat.

1. (a) Describe any two characteristic features which distinguish between interference and diffraction phenomena. Derive the expression for the intensity at a point of the interference pattern in Young’s double slit experiment.

(b) In the diffraction due to a single slit experiment, the aperture of the slit is 3 mm. If monochromatic light of wavelength 620 nm is incident normally on the slit, calculate the separation between the first order minima and the 3rd order maxima on one side of the screen. The distance between the slit and the screen is 1.5 m.

OR

(a) Under what conditions is the phenomenon of total internal reflection of light observed? Obtain the relation between the critical angle of incidence and the refractive index of the medium.

(b) Three lenses of focal lengths +10 cm, -10 cm and +30cm are arranged coaxially as in the figure given here. Find the position of the final image formed by the combination.

1. (a) Describe briefly the process of transferring the charge between the two plates of a parallel plate capacitor when connected to a battery. Derive an expression for the energy stored in a capacitor.

(b) A parallel plate capacitor is charged by a battery to a potential difference V. It is disconnected from battery and then connected to another uncharged capacitor of the same capacitance. Calculate the ratio of the energy stored in the combination to the initial energy on the single capacitor.

OR

(a) Derive an expression for the electric field at any point on the equatorial line of an electric dipole.

(b) Two identical point charges, q each, are kept 2 m apart in air. A third point charge Q of unknown magnitude and sign is placed on the line joining the charges such that the system remains in equilibrium. Find the position and nature of Q.

**MATHS**

Solve 10 sample question papers provided by KVS RO Jammu

Practice following Questions(Solve atleast 5 questions a day)

* Show that f: R →R defined by f (x) = [ x ] is neither one-one nor onto.
* Let S = {1,2,3}. Find whether the function f : S → S defined as f = {(1,3), (3,2), (2,1)} has inverse. If yes, find f-1.
* For θ = , find the value of θ
* Find the Principal value of tan­­-1 ()
* Evaluate: sin(cot-1x)
* Express in simplest form: sin-1[3x – 4x3]
* Prove: 
* Show that the function f : R →R given by f(x) = 3x – 4 is a bijection.
* Prove that: 
* If A = and B = , show that AB ≠ BA
* Find a matrix X, for which X = 
* If A = , prove that A – AT is a skew-symmetric matrix.
* If A = find ‘k’ for **A2 = kA – 2 I**
* If A and B are symmetric matrices, show that AB is symmetric, if AB = BA.
* Find the equation of the line joining (1, 2) and (3 , 6) using determinants.
* For what value of ‘k’ the matrix has no inverse.
* For , find determinant {A(adj A)}
* Evaluate ‘x’ if =
* Vertices of a triangle ABC are A(1,3), B(0,0) and C(k,0). Find the value of ‘k’ such that the area of the triangle ABC is 2 square units.
* Express the matrix A = as a sum of symmetric and skew-symmetric matrices.
* If A = , then prove by principle of Mathematical induction that An=
* If A = , evaluate A3 – 4 A2 + A
* If f(x) = , show that **f(x) f(y) = f(x + y)**
* Show that the matrix A = satisfies the equation A2 – 5A + 7I = 0. Hence find A-1.
* If A = and B = verify that (AB)-1 = B-1 A-1
* If A = , prove that A2 – 4A – 5I = 0. Hence find A-1
* Using matrix method, solve the system: x + y + z = 3 ; 2x – y + z = 2, x – 2y + 3z = 2
* Using matrix method, solve the system: x + y – z = 1 ; 3x + y – 2z = 3 ; x – y – z = -1
* Solve the system using matrices: ; ; 
* Given A = and B-1 = , compute (AB)-1
* If A = , prove that A-1 = A2 – 6A + 11I
* Find for y = log [x + ]
* Find  for y = tan-1
* Find for y = xsec x
* Find y’ for y = cos
* Find y’’ for y = x sinx
* For y = log , show that = cosec x
* Find the interval at which f(x) = x3 + 3 x2 – 4 is increasing.
* Show that f(x) = tan x – 4x is decreasing in < x < 0
* Find  if x6 + y6 + 6x2 y2 = 16.
* If y = , prove that  = 
* If y = ex tan-1x, then prove that : (1 + x2)  - 2 (1 – x +x2) + (1 – x2)y = 0
* If y = (log x)2, then prove that x2 y’’ + x y’ = 2
* If x = 2 cos t – cos 2t , y = 2 sint – sin 2t, find at t = 
* Differentiate: tan-1with respect to tan-1x
* Find the equations of tangents to the curve y = x3 + 2x + 6 which are perpendicular to the line x + 14 y + 4 = 0.
* Find the largest possible area of a right angled triangle whose hypotenuse is 5 cm long.
* Find the local maximum and local minimum values, if any for f(x) = sinx + cos x for 0 < x <
* Find two positive numbers whose sum is 16 and sum of whose cubes is maximum.
* Find the equation of the tangent to the curve x + 3y – 3 = 0 which is parallel to the line 4x – y – 5 = 0
* Evaluate:
* If , find the values of ‘a’ and ‘b’
* Evaluate: 
* Evaluate: 
* Evaluate: 
* Evaluate: 
* Evaluate: 
* Evaluate: 
* Evaluate using properties of definite integrals: 
* Evaluate using properties of definite integrals: 
* Evaluate: 
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* Evaluate: 
* Prove that: . Use it to evaluate: 
* Evaluate: 
* Evaluate: 
* Evaluate: 
* Find the area of the smaller region bounded by the ellipse  and the line 
* Using integration find the area of the region given by: {(x,y) : 0 ≤ y ≤ x2 , 0 ≤ y ≤x+1, 0≤ x ≤2}
* Solve: + 2y = 2x
* Solve: + y cot x = sec x.
* Solve: (1 +y2)dx + x dy = 0 given that y(1) = 1.
* Solve: = y2 tan2x given that y(0) = 2.
* Solve : +  = 0
* Solve: (x – 1)= 2xy, given that y(2) = 1.
* Solve: – y = x ex
* Solve: (x – xy)dy = y dx.
* Show that y = e-x +ax +b is a solution of the differential equation: exy2 = 1
* Show that y = A cosx – B sin x is a solution of the differential equation y2 + y = 0
* Solve: y2 dx + (x2 – xy) dy = 0.
* Solve: x y1 = y - 
* Solve: = (y/x) + tan(y/x)
* x dx + y dy = 0.
* Determine the order and degree of the equation.

, Order -2, Degree – 2

* If is a unit vector and = 15, find
* Given = - - 5 and coordinate of the terminal point are (0, 1, 3). Find the coordinate of the initial point.
* If , are any two vectors, give the geometrical interpretation of the relation =
* If the sum of the two unit vector is a unit vector, prove that the magnitude of their difference is .
* If = 2, = 5 and = 8, find the value of
* If = +2 - and =3 + - find a unit vector in the direction of
* If the position vectors of the points A and B are 2 +3 - and 3 +2 + then find the vector of magnitude 6 units in the direction of
* If P(1, 5, 4) and Q(4, 1, -2), find the direction ratios and direction cosines of
* If the angle between two vectors and of equal magnitude is 30° and their scalar product is 2, find their magnitudes.
* Find the value of λ so that the vectors - - 5 and 2 +3 -λ are parallel
* Find the value of λ so that the vectors - - 5 and 2 +3 -λ are perpendicular
* Find the distance of the point (1 , -2, 3) from the plane x – y + z = 5 measure along a line parallel to
* Find the distance of the point A(-2, 3, -4) from the line measured parallel to the plane 4x + 12y – 3z + 1 = 0.
* Find the equation of the line passing through the point (2, 1, 3) and perpendicular to the lines and .

**ENGLISH**

1. SOLVE THE 10 SAMPLE PAPERS PROVIDED

2. WRITE 2 LETTERS OF EACH TYPE (JOB APPLICATION & LETTER TO THE EDITOR)

3. WRITE AN SPEECH ON -  'INDIA IN 21ST CENTURY'   OR   'NEED TO CONSERVE WATER'

**HINDI**

1. अतीत में दबे पाँव पाठ को याद करें उसका सार और प्रश्न उत्तरों सहित लिखें।
2. पिछलेवर्षों२०१४ से २०२०के(सी बी एस सी)प्रश्न-पत्रोंकोहलकरकेअपनी-अपनीउत्तर-पुस्तिकामैं लिखें ।
3. (सी बी एस सी) केदूवारा प्रकाशित नवीनतमनमूनापत्रकाशीतकालीन अवकाश में अभ्यास करे।
4. संपूर्ण पाठ्यक्रम को यादकरें और प्रतिदिन एक पृष्ठ अपनी- अपनी उत्तर पुस्तिका में लिखें।
5. जम्मू संभाग द्वारा प्रेषित 10 प्रतिदर्श प्रश्न पत्रों को हल करें औरअपनी- अपनी उत्तर पुस्तिका में लिखें।
6. अपनी इच्छा अनुसार दसरचनात्मक लेख ,दस प्रार्थना पत्र, दस अलेखलिखें।
7. परियोजना कार्य में हिंदी साहित्य के इतिहास विषयपर एक फाइल तेयार करे।

**अधिक जानकारी के लिए संपर्क करे (9797358766)**

**COMPUTER SCIENCE**

Solve the chapter wise assignment provided to you and while doing this follow the below mentioned rules:

1. Before starting solving the questions, read that chapter from the book. Make sure you have gone through every concept.
2. You have not copied your assignment from book or from anyone.
3. Daily solve at least 10 questions and try to evaluate them by yourself at the end of the day.
4. If you feel that the marks are not as per your expectations then revise that concept again.

**Solve the sample papers provided ( 7 solved and 7 unsolved)**

**PHYSICAL EDUCATION**

* Draw a knock-out fixture of 27 team, and draw a league fixture of 11 teams by cyclic method.
* Write a notes on Khelo India fitness test.
* And Harward step test.
* Write about micro nutrition and macro- nutrition in details.