CREATIVE MIND ACADEMY (CMA)

Important (Expected) Topics for Annual Exam 2025 Grade SSC-II

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CHAPTER NO.10 S.H.M AND WAVES

Important long Topics:

1. Show that motion of mass attached to spring is S.H.M. Derive a relation for its Time period and frequency.
2. Show that motion of simple pendulum is S.H.M. Derive a relation for its Time period and frequency
3. With the help of Ripple tank experiment explain the term reflection, refraction and Diffraction of water waves

Important Numerical:

(PTB) problem 10.1, 10.3, 10.410.5, 10.8

(NBF) example 10.4.10.5 problem 1, 3 ,5, 6

Short questions SLO based:

i. What is the displacement of an object in S.H.M. when K.E. and P.E. are equal?
ii. What will happen to the time period of simple pendulum if length becomes double of its original length? And what if its length reduces to half?
iii. Why time period of simple pendulum is different at Murree, and at Mount Everest?
iv. Same masses are attached to different springs, one is vibrating faster. why?
v. What are damped oscillations? Explain shock absorber as an application of damping. Also explain how damping progressively reduces the amplitude of vibrations.
vi. Waves are carrier of energy without carrying a matter. Justify this statement.

vii. Derive a relationship between wave speed, frequency and wavelength OR prove $v = f\gamma$

viii. Write down difference between longitudinal and transverse waves.

ix. What happens to the frequency and speed of water waves when water waves enter from shallow to deep water? What will happen to the wavelength?

x. Why do water waves refract at boundary of shallow water and does not diffract?

CHAPTER NO.11 SOUND

Important long Topics:

1. What is sound intensity level? Derive a relationship for decibel scale for measuring intensities of sound.

Important Numerical:

(PTB) 11.2, 11.5, 11.6, 11.7 , 11.8

(NBF) example 11.2, 11.3 problem 1, 3, 8, 4,5,6

Short questions SLO based:

i. Sound waves are longitudinal in nature. Justify this statement OR sound waves are termed as pressure waves. Explain

ii. Why speed of sound in solid is greater than in liquid and gases?

iii. Write down difference and similarities between
   a) Loudness and intensity b) loudness and pitch

iv. What is loudness of sound? On what factors loudness of sound depends?

v. Explain the relationship between pitch and frequency, justify your answer graphically.

vi. What is an ECHO? Write down the necessary condition for the production of clear echo.

vii. Will two separate 50dB sounds together constitute 100 dB sounds? Explain.

viii. How noise pollution effect the human health? How it can be reduced?

ix. How echoing in a large room can be reduced? Hence explain the term acoustic protection.

x. Write down uses of ultrasonic waves in medical field? And explain the term SONAR for detection of depth of sea.

CHAPTER NO.12 GEOMETRICAL OPTICS

Important long Topics:

1. Explain the working and construction of compound microscope. What is its magnifying power.
2. What is astronomical telescope? Describe its construction and working. What is its magnifying power?
3. Explain the image formation in human eye.

Important Numerical:

1. Problem related refractive index using formula $n = \frac{c}{v}$, $n_1 \sin\theta i = n_2 \sin\theta r$
   (PTB) example 12.3, 12.4 problem 12.11 **(NBF)** example 12.2, 12.3, 12.4 problem 4,5
2. Problem related mirror formula and lens formula $\frac{1}{f} = \frac{1}{p} + \frac{1}{q}$
   (PTB) example 12.6 problem 12.2,12.5,12.8 **(NBF)** example 12.1 problem 1
3. Problem related magnification using formula $m = \frac{N}{f}$, $m = \frac{N}{f} + 1$, $m = -\frac{di}{f0} \times \frac{N}{fe}$
   (NBF) example 12.5, 12.7
4. Problem related power of lens

Short questions SLO based:

i. What is total internal reflection? Write down the necessary condition for total internal reflection.
ii. Which mirrors are used for rear views of vehicles and why?
iii. Why do your legs appear shorter while walking in a pool?
iv. What is refractive index? And explain why speed of light is different in different media? Explain your answer in terms of Snell law.
v. Why or why not a concave mirror is suitable for makeup?
vi. Define critical angle. Derive a relationship between critical angle and refractive index?
vii. What is difference between short-sightedness and long-sightedness.
viii. Derive a relationship for mirror equation.
ix. Define power of a lens. Write down its formula and unit.

CHAPTER NO.13 ELECTROSTATICS

Important long Topics:

1. Derive a relationship for equivalent capacitance of the capacitors in series and parallel combination.

Important Numerical:

(PTB) problem 13.3, 13.4, 13.5, 13.8, 13.9, 13.10

(NBF) example 13.1 problem 2, 4, 5, 6, 7

Short questions SLO based:

i. How charging by friction is different by charging by electrostatic induction?
ii. If a high voltage power line fell across your car while you were in the car, why should you not come out of the car?
iii. Show that potential difference can be described as a energy transfer per unit charge between the two points.
iv. State and derive Coulomb law of electrostatic. Also discuss the nature and direction of force.
v. By using electroscope how can you determine the
    a) Presence of charge on the body
    b) Nature of charge on the body
vi. Why is it dangerous for construction workers to hold long steel pole upright during lightning weather condition? OR How lightning is produced? How can high rise building be secured from lightning strikes?
vii. Do two capacitors of different plate area gain same or different amount of charge if connected with the same battery?
viii. What is electric field intensity? Is it a vector quantity? If yes then what will be its direction?
ix. Why lightning conductors are used at tall buildings?
x. What are electric field lines? Why do they never cross each other?

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CHAPTER NO.14 CURRENT ELECTRICTY

Important long Topics:

1. Derive a relationship for equivalent resistance of the resistors in series and parallel combination.
2. Explain the factor affecting resistance hence prove that $R = \rho \frac{L}{A}$

Important Numerical:

(PTB) examples 14.6, 14.8 problems 14.4, 14.5, 14.6, 14.9

(NBF) example 14.8 problem 3,4,5,8

Short questions SLO based:

i. A bird can sit harmlessly on high tension wire. But it must not reach and grab neighboring wire, why?
ii. Why is dangerous to touch a live wire while standing on earth bare footed?
iii. Why ammeter is connected in series while voltmeter is connected in parallel?
iv. Write down difference between
    a) E.M.F and potential difference
    b) Conventional current and electronic current
    c) A.C and D.C
v. Explain how energy is dissipated in an electrical circuit? Explain joule law.
vi. What are the safety measures that should be taken in connection with the house hold circuit?
vii. Define electric power. Write down its formula and show that
1KWH = 3.6 MJ
viii. Why we prefer parallel combination over series combination?
ix. State ohm law. Write down its limitations.
x. Discus hazard of electricity and how to prevent damage from them?

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CHAPTER NO.15 ELECTROMAGNETISM

Important long Topics:

1. Explain the turning effect on a current carrying coil in magnetic field.
2. Explain the working and construction of
   a. D.C motor
   b. A.C generator
   c. Transformer

Important Numerical:

(PTB) problems 15.2, 15.3

(NBF) example 15.3 problem 1, 3, 5

Short questions SLO based:

i. Under what condition force experienced by the conductor in magnetic field is Maximum.
ii. State the rule for determining the direction of
   a. Force on current carrying conductor in magnetic field.
   b. Magnetic field through solenoid.
iii. Two parallel straight conductors carrying current in same direction, attract each other, why? What will happen if current in both wires is in opposite direction to each other?
iv. What is electromagnetic induction? Name the device which works on that principle.
v. How can coil make to rotate continuously in D.C motor? OR how the direction of current can be reversed in D.C motor to rotate the armature continuously?
vi. Write the factors affecting the magnitude of an induced E.M.F.
vii. How lenz law is used to determine the direction of an induced E.M.F? Explain how this phenomena relate to conservation of energy?
viii. Why transformer can not operate on direct current?

ix. Why is the voltage used for domestic supply is much lower than the voltage at which power is transmitted?
x. What is difference between slip ring and split ring?

CHAPTER NO.16 ELECTRONICS

Important long Topics:

1. Explain the working and construction of Cathode ray oscilloscope CRO.

Short questions SLO based:

i. Explain the process of thermionic emission.
ii. How electron beam deflected by electric and magnetic field?
iii. Write down difference between
   a. Analogue and digital electronic
   b. Analogue and digital quantities
iv. What are universal logic gate? Write their symbol and truth table.
v. NAND gate is an inverter gate. Justify this statement.
vi. Why is image distorted when a magnet is brought close to old television screens with cathode ray tube inside?

CHAPTER NO.17 INFORMATION TECHNOLOGY

Short questions SLO based:

i. What are basic component of information and communication technology?
ii. Why optical fibre is used for communication purposes?
iii. Write down difference between
   a. RAM and ROM
   b. Primary and secondary memory
   c. Data and information
iv. What are word processing software and data managing software? What are their characteristics?

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CHAPTER NO.18 RADIOACTIVITY

Important long Topics:

1. What is half life? Derive the formula for number of un-decayed atoms. Draw graph for decaying atoms with time.
2. What is meant by nuclear fission? Discuss how can energy be released in the fission process? Explain how fission chain reaction can be controlled?

Important Numerical:

(PTB) problems 18.2, 18.3, 18.5, 18.7

(NBF) example 18.3, 18.4 problem 3,4,6

Short questions SLO based:

i. Why is energy released when two lighter nuclei fuse to form a heavier nucleus? What is this process called? Give one example of its occurrence in nature.
ii. Why do heavier nuclei require more neutrons in order to maintain stability?
iii. An alpha particle has the twice the charge of the beta particle. Why does the former deflect less than the later when passing through electric field, assuming they both have the same speed.
iv. What factors make a fusion reaction difficult to achieve?
v. Discuss the similarities and differences between fission and fusion reaction.
vi. What are background radiations?
vii. Why alpha has more ionizing ability then beta and gamma rays?
viii. Write down the comparison of α, β and gamma emission.
ix. What are radio isotopes? Write down their uses.

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