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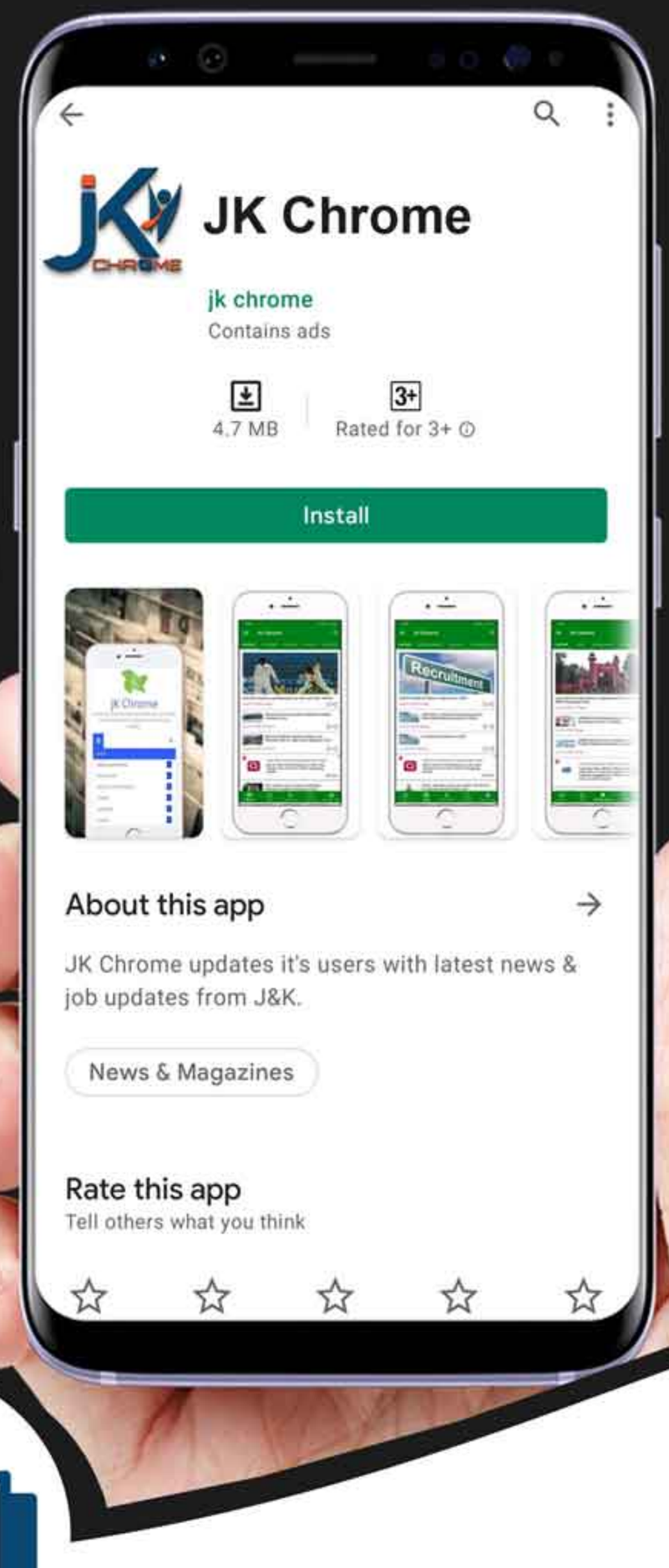

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Wave

1. A wave is a disturbance which propagates energy from one place to the other without the transport of matter.

Waves are broadly of two types

(i) Mechanical Wave (ii) Non-mechanical wave

2. Mechanical Wave : The waves which require material medium (solid, liquid or gas) for their propagation are called mechanical waves or elastic wave.

Mechanical wave are of two types

(i) Longitudinal wave : If the particles of the medium vibrate in the direction of propagation of wave, the wave is called longitudinal wave.

Waves on springs or sound waves in air are examples of longitudual waves.

(ii) Transverse Wave : If the particles of the medium vibrate perpendicular to the direction of propagation of wave, the wave is called transverse wave.
Waves on strings under tension, waves on the surface of water are examples of transverse waves.

3. Non-mechanical waves or electromagnetic waves : The waves which do not require medium for their propagation i.e. which can propagate even through the vacuum are called non mechanical wave.
Light, heat are the examples of non-mechanical wave. In fact all the electromagnetic waves are non-mechanical.

4. All the electromagnetic wave consists of photon.

5. The wavelength range of electromagnetic wave is 10-14m to 104 m.

Properties of electromagnetic waves

(i) They are neutral.

(ii) They propagate as transverse wave.

(iii) They propagate with the velocity of light.

(iv) They contains energy and momentum.\

(v) Their concept was introduced by Maxwell.

Following waves are not electromagnetic

(i) Cathode rays (ii) Canal rays (iii) a rays (iv) ß rays (v) Sound wave (vi) Ultrasonic wave

Note : Electromagnetic waves of wavelength range 10-3 m to 10-2 m are called microwaves.

Phase of vibration : Phase of vibration of a vibrating particle at any instant is the physical quantity which express the position as well as direction of motion of the particle at that instant with respect to its equilibrium (mean) position.

Amplitude : Amplitude is defined as the maximum displacement of the vibrating particle on either side from the equilibrium position.

Wavelength : Wavelength is the distance between any two nearest particle of the medium, vibrating in the same phase. It is denoted by the Greek letter lembda. (?)

In transverse wave distance between two consecutive crests or troughs and in longitudinal wave, distance between two consecutive compressions or rarefaction is equal to wavelength.

Relation between wavelength, frequency and velocity of wave

Velocity of wave = frequency x wavelength or, v = n?.s