C12 Motion in a circle

1. **Radian = angle subtended at the centre where arc length = radius**
2. Uniform circular motion = type of movement where **acceleration perpendicular to velocity** and **magnitude of velocity is constant**

3. Geostationary orbit = a type of orbit in which the satellite:
   - **Directly above the equator** (orbits at the same point above the Earth's surface)
   - **Orbits from west to east** (same Direction as the Earth's spin)
   - **Orbital time period = Earth rotational period of 24 hr**
   - Remains at the same point above the Earth's surface

C13 Gravitational Fields

4. **Gravitation field, = force per unit mass**

5. Gravitational field strength = region of space where a mass experiences a force due to the gravitational attraction of **another mass** + (gravitational) force per unit mass

6. **Gravitational potential (at a point) = work done per unit mass in bringing a small test mass from infinity to the point**

7. Gravitational potential energy = work done in bringing a small test mass from infinity to the point

8. **Newton's Law of Gravitational , = gravitational force**

between two point masses is proportional to the product of the masses and inversely proportional to the square of their separation

C14 Temperature

9. Thermal equilibrium = region of equal temperature + no net transfer of thermal energy between two region (where two regions are **in contact with each other**)

10. Absolute scale = not depend in terms of property of any real substance

11. **Absolute zero = the temperature at which the atoms and molecules in all substances have zero kinetic and potential energy + also the lowest temperature possible, 0K.**

12. **Specific heat capacity, = thermal energy required to *change temperature* per unit mass per unit change in temperature**

13. **Specific latent heat of vaporisation//evaporation, = thermal energy per unit mass to change the state between liquid and gas at constant temperature**

14. **Specific latent heat of fusion, =thermal energy per unit mass to change the state between solid and liquid at constant temperature**

C15 Ideal gases

15. Mole = amount of substance containing   of particles/molecules/atoms

16. Avogrado's number, = number of atoms in 12g of carbon-12

17. **Ideal gas = gas which obeys the equation of state ,()**

at all pressures, volumes and thermodynamic temperatures

C16 Thermodynamics

18. **Internal energy, = sum of random distribution of kinetic and potential energies within a system of molecules (in random motion)**

19. First law of Thermodynamics, = increase in internal energy is equal to the sum of thermal energy supplied <u>to</u> the system by heating and work done <u>on</u> system

C17 Oscillations

20. **Simple harmonic motion (SHM) = , when acceleration is proportional to displacement from a fixed point and in the opposite <u>direction</u>**

21. Natural frequency of vibration = frequency at which body will vibrate when there is no (resultant external) resistive force/driving force acting on it

22. Resonance = when driving frequency is equal to natural frequency in oscillating system, causing maximum amplitude

23. Damping = when **resistive forces** acting on an oscillating system **causing a loss of energy**

C18 Electric fields

24. <u>**Electric field , = force per unit positive charge**</u>
25. Electric field line = direction of force on a positive charge

26. **Coulomb's law, = electric force between two point charges is proportional to the product of the charges and inversely proportional to the square of their**

separation

27. **Electric potential at a point = work done per unit positive charge in bringing a small test charge from infinity to the point.**

C19 Capacitance

28. Capacitance, = (charge stored per unit potential difference)
29. **Capacitance of a spherical conductor = ratio of charge to potential difference at the surface of the sphere**
30. **Capacitance of a parallel plate capacitor = ratio of the charge on one plate to the potential difference across the plates**

C20 Magnetic fields

→ field of force = region where a particle experiences a force
→ line of force = direction of force on a (small test) mass

31. Magnetic field = **region** where a magnet / magnetic material / moving charge / current carrying conductor **experiences a force**

32. **Magnetic flux density, = force acting per unit current per unit length on a wire/current placed perpendicular to the magnetic field**

33. Tesla = newton per ampere per metre where wire placed perpendicular to the magnetic field

34. **Magnetic flux , = product of the magnetic flux density and the cross-sectional area perpendicular to the direction of the magnetic flux density**

35. Magnetic flux linkage, = product of the magnetic flux density, number of turns and the cross-sectional area perpendicular to the direction of the magnetic flux density

36. Faraday's law of electromagnetic induction, =

magnitude of induced e.m.f is directly proportional to the rate of change of magnetic flux linkage

37. Lenz's law of electromagnetic induction, = underline direction of induced e.m.f. Is such that it opposes the change that caused it

C21 Alternating currents

38. Rectification = conversion from a.c. to d.c.
39. Smoothing = reduction in the variation of the output voltage/current
40. Root-mean-square (r.m.s) value of an a.c. = direct/**constant** current that produces/dissipates the same heating effect as the a.c.
→(peak value = r.m.s value in d.c.)

C22 Quantum physics

41. Photon = quantum of energy of EM radiation

42. Photoelectric effect = emission of electrons from a metal surface when EM radiation is incident on electrons

43. Work function energy(threshold energy), = minimum energy required for a **photon to remove an electron** from the metal's **surface** (causing its release as a photoelectron)

44. Threshold wavelength = maximum wavelength of a photon at which photoelectrons are emitted from the metal's surface

45. **De Broglie Wavelength = wavelength associated with a moving particle**

C23 Nuclear physics

46. **(nuclear) Binding energy = minimum energy required to separate the nucleons, to infinity**

47. **Mass defect = difference between mass of a nucleus and (total) mass of nucleons, where they are separated to infinity**

48. **Spontaneous decay = not affected by external factors/environmental factors**
49. **Random decay = cannot predict exact time when a nucleus will decay**
50. Radioactive decay = unstable nucleus decays spontaneously and emits ionising radiation

51. **Activity, = number of decay per unit time**
52. **(Radioactive) Decay constant = probability that individual nucleus will decay per unit time**
53. **Half-life, = time for activity of sample to halve**

54. Nuclear fusion = (two small) nuclei join together to form one larger nucleus
55. Nuclear fission = splitting of a large atomic nucleus into smaller nuclei

C24 Medical physics

56. **(Specific) Acoustic impedance, = product of density and speed of sound in medium**

57. **Tracer = substance containing radioactive nuclei that can be introduced into the body and absorbed by the tissue being studied**

58. Annihilation = when a particle interacts with its antiparticle and **their** mass is converted into energy(in photon form) →
→mass-energy and momentum are conserved

59. Attenuation of an ultrasound wave = reduction in power/intensity of a wave, as the wave passes through the medium

60. (intensity reflection coefficient), = ratio of reflected intensity and incident(transmitted) intensity

61. = Specific acoustic impedance of media on each side of the boundary

62. **Contrast = difference in degrees of blackening** (between structures)
- ● Improve by:
  - ○ **Use a contrast media**
  - ○ Use the correct level of X-ray hardness

63. **Sharpness = ease with which edges can be distinguished** // how well defined the edge of structures are
- ● Improve by:
  - ○ **Use a Narrow X-ray beam**
  - ○ **Use a collimator//lead grid to reduce X-ray scattering**
  - ○ Smaller pixel size

C25 Astronomy and cosmology

64. Luminosity = total power of radiation emitted by a star
65. **Standard candle = object of known luminosity (due to its properties)**

66. Wein's displacement law, = **wavelength of maximum intensity** (emitted by a star at peak intensity) is inversely proportional to thermodynamic temperature

67. **Hubble's Law, = recession speed of galaxies moving away from Earth/Observer is proportional to their distance from the Earth/Observer**

68. Redshift = **wavelength is greater than known value due to the star move away from the observer**