DIWALIBA POLYTECHNIC, MAHUVA

Mechanical Department

SUBJECT: ENGINEERING PHYSICS (PY0001)

CHAPTER 1
SI UNIT and Measurements

1. The quantity which has the only magnitude is called _____
   a) A scalar quantity
   b) A vector quantity
   c) A chemical quantity
   d) A magnitude quantity

2. The quantity which has the magnitude and direction is called _____
   a) A scalar quantity
   b) A vector quantity
   c) A chemical quantity
   d) A magnitude quantity

3. Force is a vector quantity.
   a) True
   b) False
4. Acceleration is a scalar quantity
   a) True
   b) False

5. Formula for least count is if,
   a. m = Smallest division on main scale
   b. n = No. of divisions on Vernier scale
   a) m x n
   b) m/n
   c) m + n
   d) m – n

6. S.I. Unit of Power is
   a. Joule
   b. watt
   c. Pascal
   d. Hertz
7. _____ is a Scalar quantity.
   a) Velocity
   b) Temperature
   c) Force
   d) Acceleration

8. _____ is a Vector quantity.
    a) Velocity
    b) Temperature
    c) Mass
    d) Time

9. 1 Quintal = _____Kilogram.
    a. 10
    b. 1000
    c. 0.1
    d. 100

10. Formula of Pressure is:
    a) Force x acceleration
    b) Force x time
    c) Force/Area
    d) Force/ length

11. 10^9 is termed as:
    a. Tera
    b. Mega
    c. nano
    d. Giga

12. _____ is not a fundamental quantity.
    a. Electric Current
    b. Pressure
    c. Quantity of Matter
    d. Mass

13. 1 mm^2 = _____ m^2
    a) 10^{-6}
    b) 10^6
    c) 10^{-7}
    d) 10^7

14. S.I. Unit of length is:
    a) Inch
    b) Yard
    c) metre
    d) mile

15. S.I. Unit of surface area is
    a) m^2
    b) m^3
    c) m/s^2
    d) m^2/s

16. S.I. Unit of volume is
    a. m^2
    b. m^3
    c. m/s^2
    d. m^2/s

17. S.I. Unit of density is
    a. Kg/m^2
    b. m/s^2
    c. m^2/s
    d. kg/m^3

18. S.I. Unit of velocity is
    a. Kg/m^2
    b. m/s
    c. m/s^2
    d. kg/m^3

19. S.I. Unit of force is
    a. Joule
    b. watt
    c. Pascal
    d. newton

20. S.I. Unit of frequency is
    a. Joule
    b. watt
    c. Hertz
    d. Pascal

21. S.I. Unit of pressure is
    a. Kg/m^2
    b. m/s
    c. N/s^2
    d. N/m^2

22. S.I. Unit of acceleration is
    a. Kg/m^2
    b. m/s
    c. m/s^2
    d. kg/m^3

23. Formula of momentum is:
    a) mass x acceleration
    b) mass x velocity
    c) Force/Area
    d) Force/ length

24. Formula of work is:
    a) mass x acceleration
    b) mass x velocity
    c) Force x Area
    d) Force x distance

25. 10^{-9} is termed as:
    a. Tera
    b. Mega
    c. nano
    d. Giga

26. 10^{6} is termed as:
    a. Tera
    b. Mega
    c. nano
    d. Giga

27. In MKS system, unit of length is
    a) inch
    b) yard
    c) metre
    d) mile

28. In MKS system, unit of mass is
    a) gram
    b) kilogram
    c) milligram
    d) ton

29. 1 ton = _____Kilogram.
    a. 10
    b. 1000
    c. 0.1
    d. 100

30. In FPS system, unit of mass is
    a) gram
    b) kilogram
    c) milligram
    d) pound

31. In FPS system, unit of length is
    a) inch
    b) yard
    c) foot
    d) mile

32. In FPS system, unit of time is
    a) hour
    b) minute
    c) millisecond
    d) second

33. In CGS system, unit of mass is
    a) gram
    b) kilogram
    c) milligram
    d) pound

34. In CGS system, unit of length is
    a) metre
    b) centimetre
    c) foot
    d) mile

35. In CGS system, unit of time is
    a) hour
    b) minute
    c) second
    d) millisecond

36. 1 millicurie = _____ curie

    a) 10^{-9}
    b) 10^{-6}
    c) 10^{-3}
    d) 10^{3}

37. Water triple point temperature is known as

    a) 1 centigrade
    b) 1 kelvin
    c) 1 Fahrenheit
    d) None of above

38. Significant numbers of 3.531 is

    a) 2
    b) 3
    c) 4
    d) 5

39. Significant numbers of 0.02030 is

a) 1
b) 2
c) 3
d) 4

40. 6.007 have 2 significant numbers.

a) True
b) False

41. 9.1 x 10^{-31} have 2 significant numbers.

a) True
b) False

42. In an experiment to find out Refractive index of glass, observations are 1.36, 1.29, 1.33 then what will be the average refractive index.

a) 1.33
b) 1.35
c) 1.30
d) 1.29

43. If measured value is closed to true value then accuracy is good.

a) True
b) False

44. Least count of Vernier calliper's is

a. mm
b. mm
c. mm
d. mm

45. Least count of micrometre screw gauge is

a. mm
b. mm
c. mm
d. mm

46. If Vernier scale's zero mark remain at right side of main scale zero mark then it is called positive error.

    a) True
    b) False

47. If Vernier scale's zero mark remain at left side of main scale zero mark then it is called positive error.
    a) True
    b) False

48. Temperature is a vector quantity.
    a) True
    b) False

49. Velocity is a vector quantity
    a) True
    b) False

50. 1 cm^2 = _____ m^2
    a) 10^{-6}
    b) 10^{6}
    c) 10^{-4}
    d) 10^{4}

Chapter 3
General Properties of Matter

1. External force is applied on body and body undergoes into deflection, as external force removes body regains its original shape this property is called elasticity

a) True
b) False

2. External force is applied on body and body undergoes into deflection, as external force removes body doesn't regain its original shape this property is called elasticity
a) True
b) False

3. Force opposing to deflection of body is called

a) Deforming force
b) Restoring force
c) External force
d) None of above

4. Body doesn't regain its original size and shape after force removed is called

a) Elastic body
b) Deformed body
c) Plastic body
d) None of above

5. Body regain its original size and shape after force removed is called

a) Elastic body
b) Deformed body
c) Plastic body
d) None of above

6. Force applied on body causes deformation is called deforming force

a) True
b) False

7. Force applied on body causes deformation is called restoring force
a) True
b) False

8. Stress equal to

a) Force/area
b) Force x area
c) Mass/area
d) Mass x area

9. Stress defined as resistance offered by material to external force per unit area

a) True
b) False

10. SI unit of stress is

a) $N\text{-}s/m^2$
b) N/m^3
c) N/m^2
d) $N\text{-}s/m^3$

11. Pascal is also a unit of stress

a) True
b) False

12. Types of stress is

a) Longitudinal stress
b) Volume stress
c) Shearing stress
d) All of above

13. If external force is applied on rod and its length is increased then stress generated is called tension

a) True
b) False

14. If external force is applied on rod and its length is decreased then stress generated is called compression

a) True
b) False

15. Tension and compression both are type of longitudinal stress

a) True
b) False

16. External force is applied on solid body causes change in its volume then force applied per unit area of that body is called volume stress.

a) True
b) False

17. Stress and pressure both are same.
a) True
b) False

18. According to Hooke's law

a) Stress is inversely proportional to strain
b) Stress is reciprocal of strain
c) Stress is directly proportional to strain
d) None of above

19. Young's modulus equal to

a) Strain/stress
b) 1/Stress
c) Stress/strain
d) 1/strain

20. Bulk modulus is equal to

a) Stress/strain
b) Longitudinal stress/longitudinal strain
c) Shearing stress/shearing strain
d) Volume stress/volume strain

21. Modulus of rigidity equal to

a) Stress/strain
b) Longitudinal stress/longitudinal strain
c) Shearing stress/shearing strain
d) Volume stress/volume strain

22. Poisson's ratio equal to

a) Stress/strain
b) Lateral strain/longitudinal strain
c) shearing strain /Shearing stress
d) Volume stress/ longitudinal strain

23. Strain equal to

a) Change in length/original length
b) original length /Change in length
c) both (A) & (B)
d) None of above

24. Volumetric Strain equal to

a) Change in length/original length
b) original length /Change in length
c) both (A) & (B)
d) Change in volume/original volume

25. Lateral Strain equal to

a) Change in length/original length
b) Change in diameter /original diameter
c) both (A) & (B)
d) Change in volume/original volume

26. Equation of young modulus from experiment is

a) $\pi r^2 \Delta l / mgl$
b) $m \pi r^2 / gl \Delta l$
c) $mgl / \pi r^2 \Delta l$
d) $m \Delta l / gl \pi r^2$

27. Equation for deflection of beam having weight (W) in the middle is equal to
a) $WL^3 / 4bd^3 y$
b) $4bd^3 y / WL^3$
c) $WL^3 y / 4bd^3$
d) $4bd^3 / WL^3 y$
28. Height of mountains are limited because of its
a) Plasticity
b) Elasticity
c) Elastic limit
d) Plastic limit

29. SI unit of surface tension is

a) N-m
b) N/m
c) m/N
d) None of above

30. Types of molecular force is

a) Cohesive force
b) Adhesive force
c) Both (A) & (B)
d) None of above

31. Force exerted between same molecules is known as cohesive force

a) True
b) False

32. Force exerted between different molecules is known as Adhesive force

a) True
b) False

33. Molecular force exerted between molecules up to certain distance, this distance is called

a) Molecular distance
b) Molecular range
c) Sphere of influence
d) None of above

34. Surface energy per unit area of free surface of stationary liquid is called surface tension of that liquid

a) True
b) False

35. CGS unit of surface tension is

a) Erg/cm^2
b) N/m
c) m/N
d) None of above

36. If angle of contact is less than 90°, then

a) Liquid wets surface
b) Liquid doesn't wet surface
c) No effect on surface
d) None of above

37. If angle of contact is greater than 90°, then

a) Liquid wets surface
b) Liquid doesn't wet surface
c) No effect on surface
d) None of above

38. Value of angle of contact for water is

a) 90°
b) 0°
c) 17°
d) 148°

39. Value of angle of contact for alcohol is

a) 90°
b) 0°
c) 17°
d) 148°

40. Value of angle of contact for mercury is

a) 90°
b) 0°
c) 17°
d) 148°

41. Value of angle of contact for turpentine is

a) 90°
b) 0°
c) 17°
d) 148°

42. Value of angle of contact for paraffin is

a) 107°
b) 90°
c) 0°
d) 148°

43. If angle of contact is less than 90°, then

a) Shape of free surface is concave
b) Shape of free surface is convex
c) Both (A) & (B)
d) None of above

44. If angle of contact is greater than 90°, then

a) Shape of free surface is concave
b) Shape of free surface is convex
c) Both (A) & (B)
d) None of above

45. Formula for surface tension is

a) rhdg/2 cosϴ
b) 2cosϴ/ rhdg
c) rhd/2g cosϴ
d) 2g cosϴ/ rhd

46. Viscosity of water is more than oil

a) True
b) False

47. Viscosity of honey is greater than water

a) True
b) False

48. SI unit of viscosity is

a) N-s/m^2
b) centistoke
c) dyne-s/cm^2
d) poise

49. Reynold’s number is less than 2000, then

a) Flow is transient
b) Flow is turbulent
c) Flow is laminar
d) None of above

50. Reynold’s number is greater than 3000, then

a) Flow is transient
b) Flow is turbulent
c) Flow is laminar
d) None of above

Chapter 5
Semiconductor & Nanotechnology

1. What does the conductivity of metals depend upon?
   a) The nature of the material
   b) Number of free electrons
   c) Resistance of the metal
   d) Number of electrons

2. What happens to the free electrons when an electric field is applied?
   a. They move randomly and collide with each other
   b. They move in the direction of the field
   c. They remain stable
   d. They move in the direction opposite to that of the field

3. What are the charge carriers in semiconductors?
   a) Electrons and holes
   b) Electrons
   c) Holes
   d) Charges

4. How are charge carriers produced in intrinsic semiconductors?
   a. By pure atoms
   b. By electrons
   c. By impure atoms
   d. By holes

5. What type of material is obtained when an intrinsic semiconductor is doped with pentavalent impurity?

a) N-type semiconductor
b) Extrinsic semiconductor
c) P-type semiconductor
d) Insulator

6. P-type semiconductor is obtained through doping _____ impurity in an intrinsic semiconductor

a) pentavalent
b) tetravalent
c) trivalent
d) hexavalent

7. N-type semiconductor is obtained through doping _____ impurity in an intrinsic semiconductor

a) tetravalent
b) trivalent
c) hexavalent
d) pentavalent

8. What type of material is obtained when an intrinsic semiconductor is doped with trivalent impurity?

a) Extrinsic semiconductor
b) Insulator
c) N-type semiconductor
d) P-type semiconductor

9. When does a normal conductor become a superconductor?

a) At normal temperature
b) At Curie temperature
c) At critical temperature
d) Never

10. Meissner effect occurs in superconductors due to which of the following properties?

a) Diamagnetic property
b) Magnetic property
c) Paramagnetic property
d) Ferromagnetic property

11. Superconductors can be used as a memory or storage elements in computers.

a. True
b. False

12. What are the major charge carriers in P-type semiconductors?

a) Electrons
b) Protons
c) Holes
d) Photons

13. What are the major charge carriers in N-type semiconductors?

a) Protons
b) Holes
c) Photons
d) Free Electrons

14. Which type of impurity generated in P-type semiconductor?
a) Conductor
b) Acceptor
c) Donor
d) Valence

15. Which type of impurity generated in N-type semiconductor?
a) Conductor
b) Acceptor
c) Donor
d) Valence

16. The concentration of doping is kept below _____
a) 1 %
b) 5 %
c) 10 %
d) 50 %

17. In N-Type semiconductors, which extra energy level is added?
a. Conduction level
b. Donor Energy Level
c. Acceptor energy level
d. Valence level

18. Which of the following can be used to create a P-Type Semiconductor?
a) P
b) Sb
c) Ga
d) As

19. Which one of the following is not an intrinsic semiconductor?
a) Carbon
b) Silicon
c) Germanium
d) Lead

20. P-Type semiconductor has a lower electrical conductivity than N-Type semiconductor.
a) True
b) False

21. Holes are the majority carries in Intrinsic Semiconductors.
a) True
b) False

22. In a P-N Junction, the depletion region is reduced when _____
a) P side is connected to the negative side of the terminal
b) P side is connected to the positive side of the terminal
c) N side is connected to the positive side of the terminal
d) Never reduced

23. The voltage at which forward bias current increases rapidly is called as _____
a) Breakdown Voltage
b) Forward Voltage
c) Knee Voltage
d) Voltage barrier

24. The resistance of the semiconductor decreases in forward biased.
a) True
b) False

25. The current produced in reverse-bias is called as _____
a) Reverse Current
b) Breakdown Current
c) Negative Current
d) Leakage Current

26. The leakage current is measured in _____
a) A
b) mA
c) µA
d) nA

27. CVD stands for _____
a) Carbon vapour density
b) Chemical vapour density
c) Chemical vapour deposition
d) Carbon vapour deposition

28. CNTs stands for _____
a) Carbon Nanotubes
b) Carbon Nanotechnology
c) Carbon Nanoscience and technology
d) Carbon Nine Technology

29. The carbon tubes have high conductivity.
a) True
b) False

30. Which property of Nanomaterials make them suitable to be used for elimination of pollutants?

a) High purity
b) Better thermal conductivity
c) Enhanced chemical activity
d) Small size

31. Which nanomaterial is used for cutting tools?

a) Fullerene
b) Aerogel
c) Tungsten Carbide
d) Gold

32. Valence electrons situated in

a) Valence band
b) Conduction band
c) Forbidden gap
d) None of above

33. Free electrons are situated in

a) Valence band
b) Conduction band
c) Forbidden gap
d) None of above

34. For insulators, conduction band is

a) Fully filled with free electrons
b) Partially filled with free electrons
c) Empty
d) None of above

35. For conductors, conduction band is

a) Fully filled with free electrons
b) Partially filled with free electrons
c) Empty
d) None of above

36. For conductors, valence band is

a) Partially filled with free electrons at 0 K
b) Fully filled with free electrons at 0 K
c) Empty
d) None of above

37. For insulators, valence band is

a) Partially filled with free electrons at 0 K
b) Fully filled with free electrons at 0 K
c) Empty
d) None of above

38. For semiconductors, valence band is

a) Empty
b) Partially filled with free electrons at 0 K
c) Fully filled with free electrons at 0 K
d) None of above

39. Electrical resistivity of conductors is equal to

a) 10^{-6} Ωm
b) 10^{-4} Ωm to 10^{3} Ωm
c) 10^{3} Ωm to 10^{27} Ωm
d) 10^{-9} Ωm to 10^{-6} Ωm

40. Electrical resistivity of semiconductor is equal to

a) 10^{-6} Ωm
b) 10^{-4} Ωm to 10^{3} Ωm
c) 10^{3} Ωm to 10^{27} Ωm
d) 10^{-9} Ωm to 10^{-6} Ωm

41. Electrical resistivity of insulator is equal to

a) 10^{-6} Ωm
b) 10^{-4} Ωm to 10^{3} Ωm
c) 10^{3} Ωm to 10^{27} Ωm
d) 10^{-9} Ωm to 10^{-6} Ωm

42. Energy gap for conductor is equal to

a) 1.21 eV
b) 5 eV
c) 1 eV
d) 0.785 eV

43. Energy gap for insulator is equal or greater than to

a) 1.21 eV
b) 5 eV
c) 1 eV
d) 0.785 eV

44. Energy gap for germanium at 0 K is equal to

a) 1.21 eV
b) 5 eV
c) 1 eV
d) 0.785 eV

45. Energy gap for silicon at 0 K is equal to

a) 1.21 eV
b) 5 eV
c) 1 eV
d) 0.785 eV

46. Process of adding impurities in intrinsic semiconductor is called doping

a) True
b) False

47. Value of critical temperature of mercury is

a) 1.20 K
b) 4.22 K
c) 7.18 K
d) 9.46 K

48. Temperature at which specimen converted into superconductor is known as critical temperature.

a) True
b) False

49. Value of critical temperature of aluminium is

a) 1.20 K
b) 4.22 K
c) 7.18 K
d) 9.46 K

50. Flux density in superconductor is equal to

a) Maximum
b) Minimum
c) Zero
d) None of above