

Department of Physics, Shivaji University, Kolhapur
M.Sc. (Physics) Examination 2020
(Question Paper for Practice)

Paper Code: XXX

Subject: Physics

Day, Date & Time:

Total Marks: 50

Note:

1. Attempt in all 25 questions.
2. Each question carries 02 marks.

- 1) Korringa, Kohn and Rostoker (KKR) method for calculating electronic band structure of periodic solids is used as alternative for method.
 - (a) Green's functions
 - (b) Muffin-Tin potential
 - (c) Pseudopotential
 - (d) Augmented plane wave (APW)
- 2) The correction term in the crystal Hamiltonian, $\Delta U(r)$ contains all corrections to the potential required to produce the full periodic potential of the crystal.
 - (a) electron
 - (b) lattice
 - (c) atomic
 - (d) all of above
- 3) Sommerfeld's theory of electrical conductivity is based on
 - (a) independent electron approximation
 - (b) free electron approximation
 - (c) dependent electron approximation
 - (d) bound electron approximation
- 4) Phonons are produced during
 - (a) elastic scattering
 - (b) inelastic scattering
 - (c) Rayleigh scattering
 - (d) both elastic and inelastic scattering
- 5) The in which two neighboring negative ion vacancies in a (100) plane bind electrons.
 - (a) M center
 - (b) F center
 - (c) R center
 - (d) V_k center
- 6) _____ is one of the most important materials is also known as solar grade silicon.
 - a) Crushed silicon
 - b) Crystalline silicon
 - c) Powdered silicon
 - d) Silicon

- 7) Porous _____ nanoparticle is used as a typical photoanode in DSSC solar cells.
- TiO₂
 - SnO₂.
 - ZnS
 - ZnO
- 8) Batteries are used as a
- Light conversion device
 - Storage devices
 - Nano to micro conversion device
 - energy conversion device
- 9) 'perovskite solar cell' is derived from the crystal structure
- ABX₃
 - ABC
 - KBC
 - dye
- 10)dye is used in DSSC solar cell.
- carbon black dye
 - Polyaniline dye
 - Zinc oxide dye
 - ruthenium-polypyridyl dye
- 11) Pomeranchuk cooling demagnetization produces cooling below _____.
- 3 mK
 - 300 μK
 - 30 mK
 - 0.3 K
- 12) Cooling in the Joule-Kelvin expansion occurs when initial temperature of gas must be _____ inversion temperature.
- Less than
 - Greater than
 - Equal to
 - Independent on
- 13) Amount of ground state atoms are higher, then the absorption is _____.
- lower
 - intermediate
 - higher
 - None of the above
- 14) Continuous source emits _____ band of radiation.
- broad
 - intense
 - maximum
 - minimum

- 15) The magnification power of a compound microscope does not depend upon _____.
a) The focal length and aperture of the eye lens
b) The apertures of the objective lens
c) Tube length of the microscope
d) None of the above
- 16) The electron density in ionosphere is proportional to _____ of the cosine of the Zenith angle.
a) square
b) square root
c) cube
d) cube root
- 17) The orbital period of GLONASS is _____.
a) 14 hrs 05 min
b) 12 hrs 35 min
c) 11 hrs 58 min
d) 11 hrs 16 min
- 18) TTDs causes disturbances in _____ wave propagations.
a) radio
b) visible
c) IR
d) gamma rays
- 19) NO_x in the atmosphere is produced from _____.
a) N₂O₄
b) N₂O
c) N₂
d) NO₂
- 20) Geostrophic flow is when _____ does not operate.
a) Gravity
b) pressure
c) coriolis force
d) gravity+pressure
- 21) Earth has its own natural magnetic field which produces
a) magnetic poles
b) geographic poles
c) electric poles
d) undefined poles
- 22) Earth's magnetic poles are not aligned with the
a) equator
b) axis
c) tropics
d) electric poles
- 23) Earth has two different sets of poles i.e.
a) south poles and north poles
b) magnetic poles and electric poles
c) magnetic poles and geographic poles
d) north, south and east, west poles

- 24) The part of thermosphere with charged particle ions is called
- a) ozone
 - b) ionosphere
 - c) meteors
 - d) auroras
- 25) The earth's atmosphere is divided into layers on the basis of
- a) weight
 - b) pressure
 - c) temperature
 - d) energy
- 26) Tunnel diode is a -----
- a) High conductivity two terminal p-n junction diode
 - b) Low conductivity two terminal p-n junction diode
 - c) High resistivity two terminal p-n junction diode
 - d) low resistivity two terminal p-n junction diode
- 27) A semiconductor that operates in avalanche region is called the ----- diode.
- a) Gunn
 - b) Tunnel
 - c) IMPATT
 - d) Varactor
- 28) The main factor which makes a MOSFET likely to breakdown during normal handling is its -----
- a) Very low gate capacitance
 - b) High leakage current
 - c) High input resistance
 - d) Both (a) and (c)
- 29) LED emits light only when -----.
- a) Forward biased
 - b) reverse biased
 - c) leakage current flowing through it
 - d) both a & b
- 30) In IBM format, 5.25 in floppy have -----
- a) 40 tracks per side
 - b) 77 tracks per side
 - c) 50 tracks per side
 - d) 70 tracks per side