245. A convex lens is immersed in a liquid, whose refractive index is equal to the refractive index of the material of the lens. Then its focal length will

(A) Increase
(B) Become infinite
(C) Become zero
(D) Decrease

246. Constantan wire is used to make very reliable resistors because .....

(A) Its resistivity is less
(B) Its resistivity is more
(C) The temperature coefficient is very less
(D) Its melting point is very high

247. Current is flowing from a thin wire to a thick wire,so current in thick wire will

(A) Increase
(B) Decrease
(C) Remain same
(D) Depends on material

248. A process in which heavy nucleus splits into two by bombarding a slow moving neutron is called

(A) radioactivity
(B) nuclear fusion
(C) nuclear fission
(D) nuclear spilitting

249. Which of the following statements is FALSE?

(A) a mixture of an ideal gas also behaves as an ideal gas
(B) the enthalpy of an ideal gas is a function of temperature only
(C) the entropy of an ideal gas is a function of temperature only
(D) the temperature of an ideal gas always decreases during isentropic expansion

250. Addition of trivalent impurity to a semiconductor creates many

(A) Holes
(B) Free electrons
(C) Valence electrons
(D) Bound electrons

251. The barrier voltage at a pn junction for germanium is about

(A) 5 V
(B) 3 V
(C) Zero
(D) 4 V

252. Lenz's law is related with the law of
(A) Conservation of charge
(B) Conservation of angular momentum
(C) Conservation of energy
(D) Faraday for electromagnetic induction

253. In producing Eddy currents, electrons move
(A) Along crack in metal
(B) On any arbitrary paths
(C) On the path of high resistance
(D) On the path of low resistance

254. What is the unit of inductance
(A) Farad
(B) Ampere
(C) Henry
(D) Ampere-meter

255. A coil of which resistance is called an ideal inductor?
(A) High
(B) Moderate
(C) Negligible
(D) 4.2Ω

256. The self-induction of a straight conductor is
(A) Zero
(B) Very large
(C) Very small
(D) Infinity

257. Which type of semiconductor device does not need any bias voltage?
(A) photodiode
(B) Varactor diode
(C) Solar cell
(D) Transister

258. …….is used to convert electrical energy in to light energy.
(A) LED
(B) Solar cell
(C) Photo cell
(D) Photo diode

259. Transistor is a device with
(A) one junction
(B) two junctions
(C) three junctions
(D) four junctions

260. When two semiconductors of P and N type are brought in to contact, they form a P-N junction which act like

(A) Conductor (B) Oscillator

(C) Amplifier (D) Rectifier

261. In intrinsic semiconductor what is ratio of free electrons and holes?

(A) 1 : 1 (B) 1 : 2

(C) 2 : 1 (D) None of these above

262. The ratio of energies of electron in the first excited state to its second excited state is

(A) 1 : 4 (B) 4 : 9

(C) 9 : 4 (D) 4 : 1

263. According to classical theory, Rutherford atom was

(A) Stable (B) Unstable

(C) Semi-stable (D) Meta-stable

264. When an electron goes from first orbit to third orbit it

(A) Absorbs energy (B) Emits energy

(C) Energy doesn't change (D) None of the above

265. How many spectral lines are possible for transition of electron in hydrogen atom between forth and first states ?

(A) 3 (B) 6

(C) 5 (D) 2

266. A spherical surface has

(A) One principal focus (A) Two principal foci

(C) Multiple principal foci (D) No principal focus

267. In a diffraction pattern, the width of any fringe is

(A) Directly proportional to slit width

(B) Inversely proportional to slit width

(C) Has no dependence on slit width

(D) All of the above

268. A device which produces plane polarized light is

(A) Nicol prism (B) A mirror

(C) A biprism (D) A half wave plate

269. What should be the width of a slit if the first dark line is to be formed at 1o with light of 5000 Ao?

(A) 0.25 m (B) 0.34 cm

(C) 0.028 mm (D) 0.28 mm

270. Which electrolyte is considered to be strongest, in means of polarity?

(A) NaCl (B) NH_3

(C) NH4Cl (D) H_2CO_3

271. In a solenoid the current

(A) In all the turns are parallel to the axis

(B) In consecutive turns are opposite to each other

(C) In consecutive turns are in the same direction

(D) Is I/n where n is the number of turns per unit length

272. Impurities like Boron, Aluminum, Gallium or Indium are added to intrinsic semiconductor to form

(A) N-type doped Semiconductor (B) P-type doped semiconductor

(C) A junction Diode (D) All of these

273. In Rutherford's experiment involving the deflection of alpha particles by atomic nuclei, the fact that some of the alpha particles bombarding the thin gold foil were back scattered, led to one of the following conclusions. It was concluded that:

(A) The charge of an electron is negative

(B) The nucleus of gold atom carries all its charge

(C) Most of the mass of a gold atom is in its nucleus

(D) The nucleus of a gold atom occupies nearly the entire space of the atom

274. A child weighing 50 Newtons is on the swing. He goes from minimum height of 0.2 meters to a maximum height of 1.5 meters. His maximum speed is closest to:

(A) 3 meters per second (B) 5 meters per second

(C) 7 meters per second (D) 9 meters per second

275. During an INELASTIC collision, the colliding bodies
(A) Lose kinetic energy
(B) Keep the same amount of kinetic energy
(C) Gains kinetic energy
(D) First lose then gain kinetic energy

276. The half life of a radioactive element which has only 1/32 of its original mass left after a lapse of 60 days is
(A) 12 days
(B) 60 days
(C) 32 days
(D) 64 days

277. Alfred Nobel invented
(A) X-ray
(B) Diesel engine
(C) Dynamite
(D) Dynamo

278. Sound waves travel fastest in
(A) Steel
(B) Water
(C) Air
(D) Vacuum

279. Energy of photon is given by
(A) $E=hf$
(B) $E=pc$
(C) $E=mc^2$
(D) all of the above

280. The films are coloured due to
(A) Interference of light
(B) Diffraction of light
(C) Refraction of light
(D) None of these

281. Longitudinal waves are produced in
(A) Solid
(B) Liquids
(C) Gases
(D) In all three states

282. Rotational and vibrational motions are
(A) Quantized
(B) Not-quantized
(C) May or may not quantized
(D) None of these

283. In gamma emission, change in nucleon number is
(A) zero
(B) definit
(C) increase by 1
(D) decrease by 1

284. The spin of atoms and molecules is the sum of the spins of----------, which may be parallel or antiparallel.

(A) unpaired electrons (B) paired electrons
(C) valence electrons (D) all electrons

285. The forces between two charges is 120 N. If the distance between the charges are doubled, the force will be

(A) 60 N (B) 30 N
(C) 40 N (D) 15 N

286. In alpha decay (α-decay) proton number of parent nuclide

(A) increases by 2 (B) increases by 1
(C) decreases by 2 (D) decreases by 4

287. In fission, mass of product is

(A) less than the original nucleus
(B) more than the original nucleus
(C) equal to original nucleus
(D) both B and C

288. Not a basic step of precipitation strengthening

(A) Solutionizing (B) Mixing and compacting
(C) Quenching (D) Aging

289. In the most general case, which one of the following quantities is NOT a second order tensor?

(A) Stress (B) Strain
(C) Moment of inertia (D) Pressure

290. The first law of thermodynamics is conservation of .....

(A) Momentum (B) Energy
(C) Both A and B (D) None of these

291. When applied to solar radiation, Planck's law reduces to Wien's law in the .....

(A) Ultraviolet region (B) Microwave region
(C) Infrared region (D) Visible region

292. According to Debye's theory of specific heat at high temperature specific heat is proportional to

(A) T (B) T^2

(C) T^3 (D) independent of temperature

293. The electrostatic potential $V(x, y)$ in free space in a region where the charge density ρ is zero is given by $V(x,y) - 4e^{2x}f(x) - 3y^2$. Given that the x-component of the electric field Ex, and V are zero at the origin, $f(x)$ is

(A) $3x^2 - 4e^{2x} + 8x$ (B) $3x^2 - 4e^{2x} + 16x$

(C) $4e^{2x} - 8$ (D) $3x^2 - 4e^{2x}$

294. Consider a system of three spins S1, S2 and S3 each of which can take values +1 and -1. The energy of the system is given by E = −J[S1S2 + S2S3 + S3 S1] where J is a positive constant. The minimum energy and the corresponding number of spin configuration are, respectively,

(A) J and 1 (B) −3 and 1J

(C) −3 and 2J (D) −6 and 2

295. The radius of Earth is approximately 6400 km. The height h at which the acceleration due to Earth's gravity differs from g at the Earth's surface by approximately 1 % is

(A) 64 km (B) 48 km

(C) 32 km (D) 16 km

296. The ratio of intensities of the D1 and D2 lines of sodium at high temperature is

(A) 1:1 (B) 2:3

(C) 1:3 (D) 1:2

297. Which of the following statements is incorrect?

(A) The Liquid – Solid Phase transition is first order

(B) The Liquid – Solid Phase transition is Continuous

(C) A Crystal has a latent heat of Formation

(D) The liquid can be super cooled below its solidification temperature.

298. A charged particle will move through region getting undeflected if

(A) $v = B/E$. (B) $v = BE$.

(C) $v = E/B$. (D) $v = B + E$.

299. In photocell cesium, coated oxidized silver cathode emits electrons for

(A) Visible light. (B) Ultraviolet.

(C) Infrared light. (D) x-rays.

300. At low temperature, body emits radiations of

(A) Shorter wavelength. (B) High frequencies.

(C) Longer wavelength. (D) Low frequencies.