Total No. of Printed Pages: 3

SUBJECT CODE NO: - 2014
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y Sem. I
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper-II
Heat and Thermodynamics

[Time: 1:53 Hours]

[Max.Marks:50]

Please check whether you have got the right question paper.

N.B.
  i) Attempt all questions.
  ii) Use of logarithm table & electronic Pocket Calculator is allowed.

Q.1
  a) Explain, in detail the flow of heat along the wall of a cylindrical tube.   10
  b) Derive an expression for thermal conductivity of a gas & prove that   10
     $K \propto \sqrt{T}$, where K = coefficient of the thermal conductivity of a gas
     T = absolute Temperature.

OR

  c) What is an adiabatic process? Derive an expression for work done during an adiabatic   10
     process.
  d) Derive the Clausius - Clapeyron's latent heat equation from maxwell's thermodynamical   10
     relation and explain the effect of pressure on (i) boiling point of liquid and (ii) melting
     point of solid.

Q.2
  a) Write a Short note on transference of heat.   10
  b) Two thin concentric spherical shells of radii 4cm & 8cm respectively have their annular   10
     cavity filled with Charcoal powder. When energy is supplied at the rate of 10.5 watt to a
     heater at the centre, a temperature difference of 60°C is set up between the shells find the
     thermal conductivity of Charcoal (J = 4.2 Joule/cal).
  c) State the Second law of thermodynamics with the help of Kelvin and Clausius statement.
  d) Find the efficiency of Carnot's enging working between 127°C and 27°C. It absorbs 80
     Cals of heat. How much heat is rejected?

OR

  a) Define mean free path, and obtain expression for mean free path.   05
  b) The viscosity of a gas is 25×10^{-4} gm/m sec. If the free path of the gas molecule is $2 \times$ 05
     10^{-8} m & its density is 1 kg/m³, then calculate the R.M.S. velocity of the gas molecule.
  c) Define entropy. Explain change of entropy is independent of path.   05
  d) Calculate the change in temperature of boiling water, when the pressure is increased by   05
     3.6×10^4 dyne/cm². The normal boiling point of water at atmospheric pressure is 100°C.
     Latent heat of steam = 537 cal/g & specific volume of steam = 1672 cm³ (1cal = 4.2 ×
     10^7)

Q.3   Multiple choice questions.   10
  1. The S.I. unit of thermal conductivity is
  (a) J/m²sK

(b) Js/mK
(c) Jk/ms
(d) J/msK

2. If the density of material 'ρ' and specific heat is 'C' then its thermal diffusivity is
(a) $h = C/\rho K$
(b) $h = K/\rho C$
(c) $h = K\rho/C$
(d) $h = \rho C/K$

3. The Critical Constant of Pressure (Pc)
(a) $a/27b^2$
(b) $27b^2/a$
(c) $a/27b$
(d) $27b/a$

4. The mean free path of gas raises with absolute temperature (T) as,
(a) T
(b) T^2
(c) 1/T
(d) T^3

5. In Vander Waal's equation for real gas, Volume correction is
(a) a/V^2
(b) a/V
(c) b
(d) V/b

6. In Carnot's cycle, the first step is
(a) Isothermal expansion
(b) Adiabatic expansion
(c) Isothermal compression
(d) Adiabatic compression.

7. A Carnot engine is operating between 100°C and 50°C. Its efficiency will be
(a) 15.2%
(b) 13.4%
(c) 25%
(d) 74.4%

8. The efficiency of the engine is
(a) always less than 1
(b) always greater than 1
(c) equal to 1
(d) Both a & b

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            T = absolute Temperature.

<div align="center">OR</div>

    c) What is an adiabatic process? Derive an expression for work done during an adiabatic 10
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Q.3   Multiple choice questions.   10
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    (a) J/m^{2}sK

<div align="center">1</div>

(b) Js/mK

(c) Jk/ms

(d) J/msK

2. If the density of material 'ϱ' and specific heat is 'C' then its thermal diffusivity is

(a) $h = C/\varrho K$

(b) $h = K/\varrho C$

(c) $h = K\varrho/C$

(d) $h = \varrho C/K$

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(a) $a/27b^2$

(b) $27b^2/a$

(c) $a/27b$

(d) $27b/a$

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(b) 13.4%

(c) 25%

(d) 74.4%

8. The efficiency of the engine is

(a) always less than 1

(b) always greater than 1

(c) equal to 1

(d) Both a & b

2

9. The entropy of a system in an irreversible process.
(a) increases
(b) decreases
(c) Remain constant
(d) Remains zero

10. When 5kg of water heated at 100°C is converted into Steam at same temperature. The change in entropy is
(a) 1865 cal/k
(b) 13 cal/k
(c) 1665 cal/k
(d) 7240 cal/k

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SUBJECT CODE NO:- 2025
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-II)
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper- IV
Geometrical & Physical Optics

[Time:1:53 Hours]   [Max. Marks:50]

Please check whether you have got the right question paper.

N.B.   i) Attempt all questions.
                 ii) Use of logarithmic table and Electronic pocket calculator is allowed.

Q.1   a) Explain with the help of neat diagram the construction and working of Huygen's eyepiece.   10
       b) Describe the principle, construction and working of Michelson's interferometer.   10

OR

       c) Derive an expression for resolving power of prism.   10
       d) Explain in detail Lorentz half shade polarimeter.   10

Q.2   a) Write a short note on cardinal points of an optical system.   05
       b) The focal length of lenses of Ramsden's eyepiece in 8 cm. Determine the equivalent focal
          length. (Given $f_1 = f_2 = 8$ cm).   05
       c) Explain resolving power of grating.   05
       d) Deduce the missing orders for a double slit fraunhofer diffraction pattern if the slit width
          are 0.16mm and they are 0.8mm apart.   05

OR

       a) Write a short note on types of fringes of Michelson's interferometer.   05
       b) In a Newton's rings experiment, the diameter of 10th dark ring due to wavelength 6000 Å in
          air is 0.5cm. Find the radius of curvature of the lens.   05
       c) Explain Huygen's theory of double refraction in uniaxial crystal.   05
       d) Find the specific rotation of given sample of sugar solution if the plane of polarization is
          turned through 13.2°, the length of the tube containing 10% sugar solution in 20cm.   05

Q.3   Multiple Choice Question   10

1) In lens system the numbers of Cardinal points are
   a) 2   b) 4   c) 6   d) 8

2) In Huygen's eyepiece focal length is 5 cm then distance between two lenses is ………cm.
   a) 5   b) 10   c) 15   d) 20

3) The soap film appears colorful due to
   (a) Interference   (b) Diffraction
   (c) Reflection   (d) Refraction

1

Total No. of Printed Pages:2

SUBJECT CODE NO:- 2026
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. F.Y (Sem-II)
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper-V
Electricity & Magnetism

[Time: 1:53 Hours]   [Max. Marks:50]

Please check whether you have got the right question paper.

N.B.
    i) Attempt all questions.
    ii) Use of logarithmic table and Electronic pocket calculator is allowed.

Q.1
  a) State and prove Gauss's divergence theorem.   10
  b) Derive the expression for potential and field due to electric dipole.   10

OR

  a) State and prove Amper's law.   10
  b) Derive the expression for decay of current in LR Circuit.   10

Q.2
  a) Define and explain scalar triple product   05
  b) Prove that $\nabla \cdot (\nabla \times \vec{A}) = 0$ where A is position vector.   05
  c) State and explain Biot-Savart law.   05
  d) Find the magnetic Induction at distance of 10 cm from straight conductor carrying current   05
    of 500 mA ($\mu_0 = 4\Pi \times 10^{-7}$ S. I. unit.

OR

  a) Derive the relation between D,E and P.   05
  b) The force between the two charges is $4 \times 10^9 N$ when the two charges of 12nc and 10nc.   05
    Calculate the distance between them.
  c) Write a note on time constant of charging condenser through resistance.   05
  d) A capacitor of capacitance 0.1 µf is first charged and then discharge through a resistance of   05
    10mΩ. Find the time potential will take to fall half of it's original value.

Q.3   Multiple Choice Question   10
  1. For current carrying solenoid the Amper law can be written as
    (a) $\oint B . dl . \mu_0 IN$ (b) $\oint B . dl = \mu_0 I$
    (c) $\oint B . dl = \mu_0$ (d) $\oint B . dl = I/\mu_0$

  2. $\nabla \cdot (AB) = \ldots\ldots\ldots\ldots$
    (a) $(\nabla . A)(\nabla . B)$ (b) $\nabla A + \nabla B$
    (c) $\nabla^2 AB$ (d) $B\nabla A + A\nabla B$

  3. If divergence of velocity V of fluid is zero then.
    a) Fluid is in compressible
    b) V is solenoidal vector
    c) There is no net flow of fluid.
    d) All the above

1

4. The potential difference of 2 volts is applied between two metallic plates separated by 2 cm the Electric field is
   a) 50 V/m
   b) 100 V/m
   c) 200 V/m
   d) 20 V/m

5. The electric potential due to point charge varies as
   a) r
   b) r^{-1}
   c) r^{-2}
   d) r^2

6. Electric Intensity is
   a) Scalar
   b) Tensor
   c) Vector
   d) Both a and b

7. The magnetic induction due to straight conductor carrying current of 200mA at a point 2 cm from it is
   a) 2×10^{-6}T
   b) 2×10^{-7}T
   c) 2×10^{-5}T
   d) 2×10^{-4}T

8. The time constant of LR Circuit for L=50H and R=5Ω is
   a) 100 sec
   b) 150 sec
   c) 5 sec
   d) 10 sec

9. Decay of current in LR Circuit is given by
   (a) $I = I_0 e^{-Rt/L}$
   (b) $I = I_0 e^{Rt/L}$
   (c) $I = I_0 e^{-Lt/R}$
   (d) $I = I_0 e^{-Lt/R}$

10. If $(\vec{A} + \vec{B}) = \vec{A}.\vec{B}$ then the angle between Vector A and B is
    a) $\Pi/4$
    b) $\Pi/2$
    c) $3\Pi/2$
    d) $3\Pi/4$

2

Total No. of Printed Pages:02

SUBJECT CODE NO:- 2034
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y (Sem-IV)
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper- XII
Solid State Physics

[Time: 01:53 Hours]   [Max. Marks: 50]

Please check whether you have got the right question paper.

N.B
1) Attempt all questions.
2) Use of logarithmic table and electronic pocket calculator is allowed.

Q.1   a) What are Miller indices? Write the procedure for finding Miller indices ʊ a given plane   10
            with example.
       b) Explain in detail the formation of covalent bond and metallic bond. Give properties of   10
            each.

                                    OR

       a) Using Einstein model, derive the expression for the specific heat of a solid.   10
       b) State Hall Effect. Derive an expression for Hall Coefficient.   10

Q.2   a) Obtain an expression for interplanner spacing in cubic crystal.   05
       b) In a tetragonal lattice a=b=0.25nm and c=0.18nm. Deduce the lattice spacing between   05
            (111) planes.
       c) What are the assumptions of Debye theory of lattice heat capacity in solids?   05
       d) Debye temperature of an unknown solid is 1500 K. Compute the highest vibrational   05
            frequency of the solid at 30K.

                                    OR

       a) Define cohesive energy and determine its value for crystals of inert gases.   05
       b) If the potential energy functions is expressed as $U_{(r)} = \frac{-\alpha}{r^6} + \frac{\beta}{r^{12}}$ 05

            Show that the intermolecular distance r_0 for which the potential energy is minimum is

            given by $\left(\frac{2\beta}{\alpha}\right)^{1/6}$
       c) Write short note on thermal conductivity.   05
       d) Find the Fermi energy in copper on the assumption that each copper atom contributed   05
            one free electron to the electron gas. The density of copper is $8.94 \times 10^3 \ kg/m^3$ and its
            atomic mass is 63.5 μ.

Q.3   Attempt all questions.   10

       1) In tetragonal crystal system the angle
           a) $\alpha = 90 \neq \beta \neq \gamma$ b) $\beta = 90 \neq \alpha \neq \gamma$
           c) $\alpha = \beta = \gamma = 90$ d) $\alpha = \beta = \gamma \neq 90°$

1

Total No. of Printed Pages: 02

SUBJECT CODE NO:- 2022
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. S.Y Sem-III
Examination March/April-2022 (To be held in June/July-2022)
Physics -VIII
Modern and Nuclear Physics

[Time: 1:53 Hours]   [Max. Marks:50]

Please check whether you have got the right question paper.

N.B
    i.   Attempt all questions.
    ii.   Use all logarithmic table and electronic pocket calculator is allowed.

Q.1   a) Explain Richardson and Compton experiment to study the relation between velocity of   10
photoelectrons and frequency of light.

      b) Discuss in detail Bragg's X-ray spectrometer.   10

OR

      a) Explain briefly liquid drop model of nucleus.   10
      b) Discuss principal, construction and working of Linear Accelerator.   10

Q.2   a) Write a short note on Binding Energy.   05

      b) Calculate work function of sodium in electron volts if the three shold wavelength is   05
$6800 A^0$ and value of h is $6.625 \times 10^{-34} Js$

      c) Explain photo-emissive cell.   05

      d) Calculate the binding energy of α-particle and express result in both MeV and joule.   05
Given that mass of proton is 1.0072 76 u and mass of neutron is 1.008665.u

OR

      a) Discuss absorption of x-rays.   05

      b) The interplaner spacing for a given (h,k,l) planes of a crystal is 2.82 A^0. It is found that the   05
first order reflection occurs at an angle of 10^0. What is the wavelength of x-rays?

      c) Describe synchrocyclotron   05

      d) A cyclotron in which the flux density is 1.4 wb/m² is employed to accelerate protons. How   05

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rapidly should the electric field between the dees are reversed? Given that mass of the
proton is 1.67×10^{-27} kg and the charge is $1.6 \times 10^{-19} C$

Q.3   Multiple choice questions   10

1) The photo-multiplier cell based on the principle of -------
   a) Secondary emission   b) Absorbtion
   c) Primary emission   d) None of these

2) The process of emission of electrons from emitter plate, when elluminated by light of
suitable wave length is called as ------
   a) Pieze electric effect   b) Photo electric effect
   c) Thermionic emission   d) None of above

3) Who discovered X-rays?
   a) Newton   b) Einstien
   c) Roentgen   d) Planck

4) What is unit of x-rays intensity?
   a) Candela   b) Coulomb
   c) Roentgen   d) None of these

5) One (1) a.m.u is equal to
   a) $1.66 \times 10^{-25} kg$ b) $1.66 \times 10^{-20} kg$
   c) $1.66 \times 10^{-27} kg$ d) None of above

6) Which of the following force is strong force?
   a) Gravitational   b) Nuclear
   c) Electrostatic   d) Magnetic

7) The energy which an electron aquires when accelerated through a potential difference of 1
volt is known as
   a) 1 electron volt   b) 1 erg
   c) 1 joule   d) 1 watt

8) A cyclotron uses two dees while there is only ------------ dee in a synchrocyclotron
   a) Two   b) Three
   c) One   d) Four

9) The minimum energy required to remove an electron with zero velocity is
   a) Stopping potential   b) Binding energy
   c) Work function   d) None of above

10) Which is Bragg's law?
   a) $n\lambda = 2 \sin \theta$ b) $n\lambda = \sin \theta$
   c) $n\lambda = 2d \sin \theta$ d) $\frac{\lambda}{2} = d \sin^2 \theta$

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[Time: 01:53 Hours]   [Max. Marks: 50]

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       b) Explain in detail the formation of covalent bond and metallic bond. Give properties of   10
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       d) Debye temperature of an unknown solid is 1500 K. Compute the highest vibrational   05
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          atomic mass is 63.5 μ.

Q.3   Attempt all questions.   10

       1) In tetragonal crystal system the angle
       a) $\alpha = 90 \neq \beta \neq \gamma$ b) $\beta = 90 \neq \alpha \neq \gamma$
       c) $\alpha = \beta = \gamma = 90$ d) $\alpha = \beta = \gamma \neq 90°$

2) Crystal structure of material is
   a) A combination of points and space
   b) A combination of lattice and a motif
   c) Dependent on motif
   d) Determined by arrangement of points in space.

3) A primitive unit cell
   a) Always has one formula unit   b) Has at least one formula unit
   c) Has at least one formula unit but   d) Always has more than two formula
       never more than two   units

4) Metalic bonding has following attributes
   a) Electrons are delocalized   b) Free electrons from clouds
   c) Bonds are non-directional in nature   d) All above

5) The bond energy magnitudes in ascending order can be expressed as
   a) Vander waals→Hydrogen bond →Metalic bond→Ionic bond
   b) Hydrogen bond →Vander waals→Metalic bond→Ionic bond
   c) Vander waals bond →Hydrogen bond→Ionic bond →Metalic bond
   d) Hydrogen bond →Vander waals bond →Ionic bond →Metalic bond

6) The expression $C_V = 3R$ represents
   a) Debye's law   b) Planck's law
   c) Dulong and petit's law   d) Wien's law

7) Which of the following is Debye temperature?
   a) $\Theta_D = \frac{\hbar w_D}{K_B}$ b) $\frac{\hbar w_D}{K_\beta}$
   c) $\frac{\hbar^2 w_D}{K_B}$ d) $\frac{\hbar w_D^2}{K_\beta}$

8) At low temperature, C_v of solid is proportional to
   a) T^2 b) T^3 c) T^6 d) $T^{1/2}$

9) Wideman and Franz ratio is $\frac{K}{\sigma} =$
   a) $3\left(\frac{K_B}{e}\right)^2 T$ b) $2\left(\frac{K_B}{e}\right)^2 T$ c) $4\left(\frac{K_B}{e}\right)^2 T$ d) $\left(\frac{K_B}{e}\right) T$

10) The Hall coefficient R_H is
    a) $R_H = ne$ b) $R_H = n + e$ c) $R_H = {}^1/_{ne}$ d) $R_H = {}^{ne}/_2$

Total No. of Printed Pages:2

SUBJECT CODE NO:- 2029
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y. (Sem-VI)
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper-XIX
(Atomic, Molecular Physics & Laser)

[Time: 1:53 Hours]   [Max. Marks:50]

Please check whether you have got the right question paper.

N.B.
    i) Solve all questions.
    ii) Draw the diagram whenever necessary.

Q.1	a)	Discuss the merits and limitations of Bohr's theory.	10
	b)	What is Zeeman shift? Obtain an expression for Zeeman shift.	10

OR

	a)	Discuss the applications of Raman effect for the study of nature of liquid, crystal physics, nuclear physics and chemical effect.	10
	b)	Describe the construction and working of CO_2 laser.	10

Q.2	a)	i) What are drawbacks of Rutherford's atom model?	05
		ii) Calculate the wavenumber, wavelength and frequency of H_α line of Hydrogen. $(R = 1.097 \times 10^7 m^{-1})$	05
	b)	i) What are stokes and anti-stokes lines in Raman Spectrum.	05
		ii) The exciting line in an experiment with Raman effect is 5460 Å. If the stoke line has $\lambda = 5520$ Å. Calculate the wavelength of anti-stoke line.	05

OR

	a)	i) Explain an experimental study of stark effect.	05
		ii) Calculate the wavelength separation between two component lines which are observed in normal Zeeman effect. The magnetic field used in 0.5 Wb/m^3. [Specify charge $= 1.76 \times 10^{11}$ ckg^{-1} and $\lambda = 6000$ Å]	05
	b)	i) Discuss the properties of laser beam.	05
		ii) Find the ratio of population inversion of two states in He-Ne laser that produces a light of wavelength 6328Å at 27°C.	05

Q.3	Choose the correct answer	10

1. Nuclear Model of atom was proposed by –
    (a) Rutherford   (b) Niels Bohr
    (c) J.J. Thomson   (d) Sommerfield

2. If the mass of electron is reduced to half, the Rydberg constant becomes-
    (a) double   (b) half
    (c) one fourth   (d) unchange

1

3. In normal Zeeman effect a level of given l splits into –
   (a) l levels (b) $2\,l$ levels
   (c) $(2\,l + 1)$ levels (d) $(2\,l - 1)$ levels

4. ....coupling scheme holds for light atoms.
   a) L-S b) J – J c) both a & b d) none of these

5. In Raman effect, stoke's lines are observed when
   (a) $\Delta\vartheta$ is positive (b) $\Delta\vartheta$ is negative
   (c) $\Delta\vartheta$ is zero (d) none of these

6. The selection rule for Raman scattering is –
   (a) $\Delta J = \pm 1$ (b) $\Delta J = \pm 2$
   (c) $\Delta J = \pm 3$ (d) $\Delta J = \pm 4$

7. The active centres in Ruby lasers are –
   (a) aluminum ions (b) Chromium ions
   (c) both a & b (d) None of these

8. A laser beam is a –
   (a) Coherent (b) highly directional
   (c) monochromatic (d) all of these

9. In Rayleigh's scattering, the scattered light has _____ Frequency.
   (a) Same (b) different
   (c) less (d) grater

10. The value of spin quantum number of an electron in hydrogen atom is
    a) -1/2 b) +1/2 c) 1 d) 0

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Total No. of Printed Pages:2

SUBJECT CODE NO:- 2030
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. T.Y (Sem-VI)
Examination March/April-2022 (To Be Held In June/July-2022)
Physics Paper-XX
(Non -Conventional Energy Sources and Optical Fiber)

[Time:1:53 Hours]

[Max. Marks:50]

Please check whether you have got the right question paper.

N.B.
    i) Solve all questions.
    ii) Draw the diagram wherever necessary.

Q.1
    a) Explain Biomass energy. Give its advantages and disadvantages.   10
    b) Explain in details the I-V characteristics of solar cell and define fill Factor.   10

OR

    a) Describe -1) A Multimode step Index Fiber
             2) Monomode step Index Fiber   10
    b) Describe -1) External CVD
             2) Axial Vapour Deposition   10

Q.2
    a) 1) Write a short note on Monoblade Horizontal axis Wind turbine (Monoblade HAWT)   05
       2) Calculate the power of wind turbine whose wind power density is 740 w/m² and swept   05
       area 320 m².

    b) 1) Explain 'Halide Fiber', and its characteristics.   05
       2) A step index fiber has a numerical aperature 0.17 core diameter of100μm. What are the   05
       number of modes at operating wavelength 0.85 μm.

OR

    a) 1) State the advantages and disadvantages of storage batteries.   05
       2) A solar cell having fill factor 0.71 gives 0.65 voltage at maximum power point at STC,   05
       the cell gives 3.5 A short circuit current and 0.81 V open circuit voltage. What is the
       current at maximum power point of solar cell?

    b) 1) Explain the standard test to be performed during the fiber cable testing.   05
       2) A Fiber with cladding radius of 200 μm is bent along the curve of radius 4 cm.   05
       Compute the resulting strain on the fiber.

Q.3   Choose the correct answer   10

    1. The power available in winds flowing over the earth surface is estimated as
      (a) 1.6×10^7 MW   (b) 1.6×10^{17} MW
      (c) 1.6×10^{10} MW   (d) None of these

2. Twin blade horizontal axis wind turbine generator unit is of –
    a) 1.5 MW, 2.5 MW, 3.5 MW
    b) 0.5 MW, 1.5 MW, 2.5 MW
    c) 1 MW, 2 MW, 3 MW
    d) None of these

3. Lead acid battery are commonly used as _____ source of energy for SLI.
    (a) Main   (b) Stable
    (c) Permanent   (d) Mobile

4. The typical value of fill factor is in the range of -
    (a) $0.5 - 0.05$ (b) $0.5 - 0.083$
    (c) $0.5 - 0.06$ (d) None of these

5. The cladding material of HPSIR Fiber is _____
    (a) Doped Silica   (b) Plastic
    (c) Glass   (d) Polymer

6. In plastic fiber both core and cladding are made from-
    (a) Silica   (b) Plastic
    (c) Glass   (d) Polymer

7. In external CVD, rate of deposition is
    (a) 1 to 2 gm/sec   (b) 1 to 2 gm/min
    (c) 0.1 to 0.2 gm/min   (d) 1 to 2 milligm/min

8. The useful materials for outer jacket of fiber cable are –
    (a) Polyvinyl chloride   (b) Polyethylene
    (c) Polyethane   (d) All of above

9. Optical fiber are made from-
    (a) Silica glass   (b) Plastic
    (c) Rubber   (d) both a & b

10. The output power of solar cell is a product of –
    a) Current and resistance
    b) Current and charge
    c) Voltage and charge
    d) Current and voltage