PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the conversion of (i) octal number into binary number and (ii) Binary number into octal number.

Or

(b) Explain binary subtraction by 2's complement method with an example.

17. (a) Explain the postulate and theorems of Boolean algebra.

Or

(b) Explain the universality of NAND gate.

18. (a) Explain the working of Full adder.

Or

(b) Explain the working of monostable multivibrator.

19. (a) Explain encoder and decoder with neat diagram.

Or

(b) Using Karnaugh map simplify $Y = F(A, B, C, D) = \sum m(1, 2, 7, 9, 10, 11, 12, 13, 14, 15)$.

20. (a) Explain the working Synchronous counter.

Or

(b) Explain the working of Mod — 10 counter.

———————

Reg. No. :.....

Code No. : 41131 E **Sub. Code : JMPH 61**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Sixth Semester

Physics — Main

DIGITAL ELECTRONICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The binary equivalent for the decimal number 9 is ———————.

(a) 1111 (b) 1001
(c) 1000 (d) none

2. The one's complement of 10010 is ———————.

(a) 01101 (b) 011100
(c) 11111 (d) none

3. According to De Morgan's second theorem, $\overline{A \cdot B} =$

(a) $\overline{A+B}$ (b) $\overline{A} + \overline{B}$
(c) $\overline{A} \cdot \overline{B}$ (d) none

4. The AND gate is equivalent to ———— of inputs.
   (a) Product (b) Sum
   (c) Subtraction (d) none

5. In a full adder the condition for sum is ————.
   (a) $S = Cin \oplus +(A \oplus B)$
   (b) $S = Cin \oplus (A + B)$
   (c) $S = Cin - (A \oplus B)$
   (d) none

6. A flip flop is a bistable electronic device that has ———— stable states.
   (a) three (b) one
   (c) two (d) none

7. For a n-variable problem there can be ———— minterms.
   (a) $2n$ (b) $2/n$
   (c) 2^n (d) none

8. The encoder converts a ———— number into ———— number.
   (a) binary, decimal (b) decimal, binary
   (c) binary, binary (d) none

9. A ripple counter is an ———— counter.
   (a) Asynchronous (b) Synchronous
   (c) Ring (d) none

10. The D/A converter, converts ———— into ————.
   (a) analog, digital (b) digital, analog
   (c) decimal, binary (d) none

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Convert the hexadecimal numbers 2F59 and AB10 into binary numbers.

Or

(b) Explain the usage of Gray-code with an example.

12. (a) State and prove De Morgan's theorems.

Or

(b) Draw the symbols and truth tables for NOT, AND, OR gates.

13. (a) Explain the working of half adder.

Or

(b) Explain the working of frequency divider.

14. (a) Explain three variable karnaugh map.

Or

(b) Explain working of Demultiplexer.

15. (a) What are the types of registers?

Or

(b) Explain the working of binary counter.

(6 pages) **Reg. No. :** .....

Code No. : 41134 E **Sub. Code : JAPH 11/ SAPH 11**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

First Semester

Physics — Allied

PHYSICS – I

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is the unit of young's modulus?

(a) N/m (b) N/m^2

(c) $N - S/m$ (d) $N - m$

2. Twisting couple on a wire per unit lowest is

(a) $\frac{\pi n a^4}{2l}$ (b) $\frac{\pi a^4}{2l}$

(c) $\frac{\pi n a^4}{8l}$ (d) $\frac{2n a^4}{l^n}$

3. Surface tension is the ratio of

(a) $\frac{\text{Force}}{\text{Length}}$ (b) $\frac{\text{Force}}{\text{Valence}}$

(c) $\frac{\text{Length}}{\text{Force}}$ (d) $\frac{\text{Force}}{\text{Area}}$

4. The viscous force between two liquid layers is
   (a) Radial
   (b) Normal to the liquid surface
   (c) Tangential to the liquid surface
   (d) None of the above

5. The amplitude of vibrations of a damped harmonic oscillations ———— with increase in time.
   (a) Increases (b) Decreases
   (c) Constant (d) None

6. Meldi's string under a given tension vibrates in 6 segments in transverse mode. For the same tension, it vibration in longitudinal mode with ————segments.
   (a) 6 (b) 12
   (c) 3 (d) 36

7. The transmission of heat from one place to another without a medium is
   (a) Conduction (b) Convection
   (c) Radiation (d) None of the above

8. Mean free path of a gas molecule is inversely proportional to

   (a) d^{-2} (b) d^2

   (c) d^3 (d) d

9. The condition for the n^{th} order principal maximum of a diffraction grating is

(a) $\sin\theta = \frac{n\lambda}{N}$ (b) $\sin\theta = n\,N\,\lambda$

(c) $\sin\theta = \frac{\lambda}{nN}$ (d) $\sin\theta = \frac{nN}{\lambda}$

10. Light transmitted by a Nicol poison is

(a) Plane polarised

(b) Un polarised

(c) Circularly polarised

(d) Elliptically polarised

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) A steel wire of 2m long and of diameter 3 mm is shortened by a load of 4 kg. Find the elongation of the wire, if young's modulus = 1.2×10^{11} Pascal.

Or

(b) A beam of width 2 cm and thickness 3 mm supported horizontically on knife edges 0.6 m apart is loaded with weight of 10×10^{-2} kg from its ends which projects 0.15 cm beyond the knife edge. If the centre of the beam is thereby elevated by 2 mm. Calculate the young's modulus of the beam.

12. (a) Define surface tension. Give the molecular interpretation of surface tension.

Or

(b) Discuss the analogy between liquid flow and current flow.

13. (a) Explain simple harmonic motion.

Or

(b) Examine the condition under which damped vibrations are

(i) Under damped

(ii) Critically damped and

(iii) Over damped.

14. (a) Obtain an expression for mean free path.

Or

(b) Write notes on :

(i) Conduction.

(ii) Convection

(iii) Radiation.

15. (a) Compare Fresnel and Fraunhoffer diffraction.

Or

(b) Explain interference. What are the conditions for interference to take place?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Derive an expression for the bending moment.

Or

(b) Describe the experiment to find the rigidity modulus of wire using torsion pendulum.

17. (a) Obtain an expression for the excess of pressure inside a curved liquid surface.

Or

(b) Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.

18. (a) Describe the method of determining the frequency of a tuning fork by melde's string experiment in the longitudinal vibration.

Or

(b) Derive an expression for the resultant of two simple harmonic motions at right angles to each others.

19. (a) Obtain an expression for the thermal conductivity of a gas on the bases of kinetic theory of gases.

Or

(b) Describe experimental verification of Newton's law of Cooling.

20. (a) Explain the air wedge method of determining thickness of them wire.

Or

(b) Describe the construction of a Nicol prism. Explain how it can be used to produce and analyse plane polarised light.

Reg. No. : .....

Code No. : 41135 E **Sub. Code : JAPH 21/ SAPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Second Semester

Physics – Allied

ALLIED PHYSICS – II

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The resistance of a conductor is directly proportional
   (a) length (b) Area
   (c) volt (d) current
2. The unit of emf is
   (a) volt (b) joule
   (c) ampere (d) watt
3. Which of the following is ferromagnetic materials
   (a) Tungsten (b) Aluminium
   (c) Copper (d) Nickel
4. Tesla is a unit of
   (a) field strength (b) inductance
   (c) flux density (d) flux meter

5. Convert the following binary number to decimal number $(1010)_2$

(a) 11 (b) 35

(c) 15 (d) 10

6. The output of AND gate is low

(a) All the time

(b) When any input is low

(c) When any input is high

(d) When all inputs are high

7. The S.I unit of radio activity is

(a) Becquerel (b) Curie

(c) Fermi (d) Moles

8. The half life of radioactive nuclei is

(a) $0.693/\lambda$ (b) $0.793/\lambda$

(c) $0.693\,\lambda$ (d) $0.793\,\lambda$

9. Time of flight of body is given

(a) $t = 2\,vi \times \frac{\sin}{g}$ (b) $t = 2vi + \frac{\sin}{g}$

(c) $t = 2vi - \frac{\sin}{g}$ (d) $t = \frac{2vi}{g}$

10. The path of a projectile is called its

(a) Curve (b) Time of action

(c) Orbit (d) Trajectory

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the V-I characteristics of a resistor.

Or

(b) State and explain Kirchoff's first and second law.

12. (a) Write the properties of Dia magnetic materials.

Or

(b) Derive the expression for the self inductance of a long selenoid.

13. (a) Describe the characteristics of a transistor connected in a common emitter mode.

Or

(b) State and explain Demorgan's theorem.

14. (a) Explain binding energy curve with diagram.

Or

(b) Obtain the expression for half life time.

15. (a) Derive the expression for the greatest height attained by the projectile.

Or

(b) Derive Lorentz transformation equation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the color codes in resistors and write the value.

Or

(b) Derive the expression for the condition for bridge balance in wheat stone bridge.

17. (a) State and explain Faraday's law of electro magnetic induction.

Or

(b) Derive the relation between μ and K.

18. (a) Explain the V-I characteristics of zener diode.

Or

(b) Write the symbol truth table for a NOR gate. Explain.

19. (a) Write the properties of nuclear forces.

Or

(b) Explain the law of radioactive disintegration.

20. (a) Derive the expression for horizontal range of a projectile.

Or

(b) Explain time dilation.

(6 pages) **Reg. No. :** .....

Code No. : 41128 E **Sub. Code :JMPH 41**

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2019.

Fourth Semester

Physics — Main

COMPUTER PROGRAMMING IN C++

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. In C++ manipulators are used to format the ———— display.

   (a) Screen

   (b) Data

   (c) Character

   (d) String

2. The ———— statement is used to cause an exit from loop.

   (a) Start (b) Stop

   (c) Go (d) Break

3. A non – member function that can access the private data of class is known as.

   (a) Friend function

   (b) Static function

   (c) Number function

   (d) Library function

4. Which of the following is not true according construct.

   (a) They should be declared in private section

   (b) We can refer their address

   (c) They can be inherited

   (d) All of these

5. Constructor is executed when

   (a) Object is declared

   (b) Object is destroyed

   (c) Both (a) and (b)

   (d) None

6. Copy constructors can pass

(a) any argument

(b) only objects

(c) no argument

(d) two basic arguments

7. ———— operator cannot be overloaded

(a) Size of

(b) +

(c) *

(d) –

8. In C++, >> operator is called as ———— operator.

(a) Mode

(b) Bar

(c) Extraction

(d) Interview

9. The pointer holds

(a) Value of the variable

(b) Address of the variable

(c) Both (a) and (b)

(d) None

10. When a file is opened in read or write mode the file pointer is set

(a) At the beginning of file

(b) At the end of file

(c) In the middle of file

(d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) List control structure in C++ and explain.

Or

(b) What are the advantages of oops?

12. (a) Explain math library function.

Or

(b) Write a program to implement function overloading.

13. (a) Write down the overloading constructors in details.

Or

(b) Differentiate constructor and destructor.

14. (a) What is mean by single inheritance? Explain.

Or

(b) What is polymorphism? What are its types?

15. (a) Write a short notes on file stream classes.

Or

(b) Explain operator in C++ program with example.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain operator in C++ program with example.

Or

(b) Discuss the following terms

(i) data type in C++

(ii) symbolic constant

17. (a) What are member functions and non–member functions? Explain with suitable program segments.

Or

(b) Illustrate the rules for function prototype.

18. (a) With examples, explain the nesting member function.

Or

(b) Discuss in detail about multiple. Constructor with example.

19. (a) Write a C++ program, using Binary operator, overloading to add two given complex number.

Or

(b) Write a program to implement multiple Inheritance.

20. (a) Create a file of objects and write a program to access and create a report of the constants.

Or

(b) Discuss the following:

(i) File pointers and manipulators

(ii) Sequential read and write operations.

———————

(6 pages) Reg. No. : .....

Code No. : 41377 E **Sub. Code : SMPH 31**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Third Semester

Physics — Main

ELECTRICITY

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Electric field E = _____.

(a) Fq^2 (b) F/q

(c) qF (d) qF^2

2. How many Joules are in one electron volt?

(a) 1.69×10^{19} (b) 16.9×10^{-19}

(c) 1.69×10^{-19} (d) 16.9×10^{19}

3. Thermo electric power = _____.

(a) $a+2bT$ (b) $aT+2b$

(c) $bT+c$ (d) $2bT$

4. Thomson co-efficient for lead is

(a) 1 (b) 0

(c) –1 (d) ∞

5. Electro chemical equivalent of a substance (e) is

(a) mIt (b) m/It

(c) It/m (d) m^2It

6. When a thermo-couple is used in a circuit if $a=14\,\mu V/K^2$ and $b=0.08\,\mu V/K^2$, the value of neutral temperature is,

(a) 78.5°C (b) 87.5°C

(c) 57.8°C (d) 70.5°C

7. The time constant in a C-R circuit is

(a) C/R (b) CR

(c) C^2R (d) R/C^2

8. In an LCR circuit, the period of oscillation is,

(a) $2\pi\sqrt{LC}$ (b) $\frac{2\pi}{\sqrt{LC}}$

(c) $\frac{1}{2\pi\sqrt{LC}}$ (d) $\frac{\sqrt{LC}}{2\pi}$

9. The relation between I_0 and I_{rms} is I_0 = _____.

(a) $\sqrt{2} \times I_{rms}$ (b) $\frac{I_{rms}}{\sqrt{2}}$

(c) $\sqrt{3} \times I_{rms}$ (d) $\frac{I_{rms}}{\sqrt{3}}$

10. Power factor in a LCR circuit at resonance is

(a) 1 (b) 0

(c) –1 (d) ∞

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Derive Columb's law from Gauss's law.

Or

(b) Obtain an expression for the electric potential due to a point charge.

12. (a) Explain the thermodynamics of a thermo couple.

Or

(b) Write a note on thermo – milli ammeter.

13. (a) Discuss about the electrical conductivity of an electrolyte.

Or

(b) Give the Arrhenius theory of electrolytic dissociation.

14. (a) Discuss about the Ohm's law in vector form.

Or

(b) Obtain an expression for growth of charge in a C-R circuit.

15. (a) Discuss the use of j operator in an AC circuit with L only.

Or

(b) Write a note on Power in an AC circuit.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) State and prove Gauss's law.

Or

(b) Three charges of magnitude $q, 2q$ and $-4q$ are located at the three corners of an equilateral triangle of side $a = 0.1$ meter. What is the potential energy of the system $q = 1 \times 10^{-7}$ Coulomb.

17. (a) Describe the measurement of thermo e.m.f. using potentiometer.

Or

(b) With diagram describe the working of Boy's radio micrometer.

18. (a) Describe Kohlraush bridge experiment to determine the specific conductivity of an electrolyte.

Or

(b) What are secondary cells? Obtain Gibbs-Helmholtz equation for a reversible cell.

19. (a) Explain the conservation of a galvanometer into a voltmeter and ammeter.

Or

(b) With diagram, describe the determination of high resistance by the method of leakage.

20. (a) When L and R are in series in an AC circuit, discuss its action.

Or

(b) Give the theory a series resonance circuit and its characteristics.

———————

(6 pages) Reg. No. :.....

Code No. : 40304 E **Sub. Code : JMPH 11**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

First Semester

Physics — Main

PROPERTIES OF MATTER AND ACOUSTICS

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. In a torsional pendulum, if the diameter of the wire is doubled, the time period ————————.

(a) will increase (b) will decrease

(c) will not change (d) none

2. The twisting couple per unit angular twist is

(a) $\frac{\pi Ga^4}{l}$ (b) $\frac{\pi Ga^4}{2l}$

(c) $\frac{2\pi Ga^4}{l}$ (d) $\frac{\pi Ga}{2l^4}$

3. For uniform bending the load is added a _____ of the bar.

(a) middle

(b) two ends

(c) one end

(d) none

4. For uniform bending, the relation between the elevation at the centre (y) and the young's modulus (E) is,

(a) $E \alpha y$ (b) $E \alpha \frac{1}{y}$

(c) $E \alpha y^2$ (d) $E \alpha \sqrt{y}$

5. A blotting paper absorbs ink due to _____.

(a) viscosity (b) elasticity

(c) capillary action (d) none

6. Viscosity is due to _____ between two layers of a liquid.

(a) surface tension (b) friction

(c) capillary action (d) none

7. The expression for the vibrating frequency of a string in a sonometer is

(a) $n = \frac{1}{2l}\sqrt{\frac{m}{T}}$ (b) $n = \frac{1}{2m}\sqrt{\frac{T}{l}}$

(c) $n = \frac{1}{2l}\sqrt{\frac{T}{m}}$ (d) None

8. The amplitude of vibration of a damped harmonic oscillations ———— with increase in time.

(a) increases (b) decreases

(c) constant (d) none

9. The direct piezo-electric effect is used for the ———— of ultrasonic waves.

(a) production (b) detection

(c) destroying (d) none

10. In an acoustically good auditorium Echoes should ————.

(a) present

(b) be eliminated

(c) be amplified

(d) none

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define the three modulii of elasticity.

Or

(b) Write short note on I-section girders.

12. (a) Derive the expression for the bending moment of a beam.

Or

(b) Compare uniform bending and non-uniform bending.

13. (a) Discuss the variation of surface tension with temperature.

Or

(b) What are the application of capillary rise?

14. (a) What are free and damped vibrations?

Or

(b) Define intensity level and decibel of a sound.

15. (a) What are the properties of ultrasonic waves?

Or

(b) What are the requirements of a good auditorium?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the experimental determination of Poisson's ratio of rubber.

Or

(b) Explain the determination of rigidity modulus using tensional pendulum.

17. (a) What is a cantilever? Derive the expression for the depression of a cantilever.

Or

(b) Explain the experimental determination of youngs modulus of a beam by uniform bending.

18. (a) Discuss the experimental determination of surface tension by capillary rise.

Or

(b) Explain the determination of co-efficient of viscosity of liquid by capillary flow.

19. (a) State and explain the laws of transverse vibration of strings.

Or

(b) Describe Melde's experiment with necessary theory.

20. (a) Explain the production of ultrasonic waves by piezo-electric method.

Or

(b) Discuss the factors affecting acoustics of buildings and their remedy.

(6 pages) **Reg. No. :** .....

Code No. : 40555 E **Sub. Code : SMPH 11**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

First Semester

Physics — Main

MECHANICS AND RELATIVITY

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. A vector field which can be expressed as gradient of scalar field is called

(a) Lamellar (b) Curl

(c) Non-curl (d) Scalar

2. The integration of vector along a curve is known as

(a) Surface integral (b) Line integral

(c) Volume integral (d) Space integral

3. The working of a rocket is based on

(a) Newton's I law

(b) Newton's II law

(c) Newton's III law

(d) None

4. Kinetics deals with the relationship between the motion of bodies and

(a) time (b) force

(c) position (d) direction

5. The impulse of a constant force is

(a) $m \times a \times t$ (b) $m \times a$

(c) $m \times t$ (d) $m \times f$

6. The unit of change of momentum is

(a) N/S (b) NS

(c) NS^2 (d) N/S^2

7. In pitot tube the velocity of flow of gas is

(a) $V_1 = \frac{2(P_2 - P_1)}{P}$

(b) $V_1 = 2(P_2 - P_1)$

(c) $V_1 = \frac{\sqrt{2}(P_2 - P_1)}{P}$

(d) $V_1 = P_2 - P_1$

8. The centre of pressure of the plane area is

(a) $\frac{\int h^2 \rho g ds}{\int h ds}$ (b) $\frac{h^2 \rho g ds}{h ds}$

(c) $h^2 \rho g ds \times h ds$ (d) $h^2 \rho^2 g^2 ds \times h ds$

9. Acceleration is invariant under

(a) Newton concept

(b) Galileon transformation

(c) Einstein's theory

(d) None

10. Variation of mass with velocity is

(a) $m = m_0$ (b) $m = c^2 - v^2$

(c) $m = \frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$ (d) None

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Express the magnitude $a \times b$ in terms of scalar products.

Or

(b) Write the relation between line integral and curl.

12. (a) State and prove work energy theorem.

Or

(b) Describe the central field motion.

13. (a) Explain moment of inertia of a solid cylinder.

Or

(b) Discuss briefly processional motion.

14. (a) Explain the determination of metacentric height of a ship.

Or

(b) Describe the venturimeter with a diagram.

15. (a) Explain the relativistic addition of velocities.

Or

(b) Discuss briefly gravity waves.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain divergence and curl of vector point function.

Or

(b) State and prove Gauss divergence theorem.

17. (a) State and explain law of conservation of linear momentum.

Or

(b) State and prove Kepler's second and third laws.

18. (a) Explain the moment of inertia and radius of gyration.

Or

(b) Explain the theory of equivalent simple pendulum.

19. (a) Define centre of pressure. Write the determination of centre of pressure.

Or

(b) Explain the Pitot's tube.

20. (a) Explain Michelson Morley experiment.

Or

(b) Prove that $E = mc^2$. Write relation between total energy, restmass energy momentum.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe the star and delta connection of resistors and capacitors.

Or

(b) Explain soldering and desoldering techniques.

17. (a) Explain with the block diagram, the working of CRO.

Or

(b) Explain liquid crystal display in detail.

18. (a) Explain in detail resistive transducers.

Or

(b) Explain RTD measurement of temperature.

19. (a) Explain in detail DTH system.

Or

(b) Discuss in detail about cellular telephone system.

20. (a) Explain in detail tele and wide angle lens.

Or

(b) Explain digital formats and ISO-speed resolution.

Reg. No. : .....

Code No. : 40565 E **Sub. Code : SSPH 4 A**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Fourth Semester

Physics — Core

Skill Based Subject — MAINTENANCE OF ELECTRONIC APPLIANCES

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The value of capacitance is
   (a) $c = q/v$ (b) $c = qv$
   (c) $c = v/q$ (d) None
2. The reciprocal of resistively is called as
   (a) Resistance (b) Conductivity
   (c) Density (d) None
3. The sensitivity of a multimeter is given in
   (a) Ω (b) amperes
   (c) $K\Omega/v$ (d) None

4. LCD operates in the range of

(a) 10-15 V (b) 3-15 V

(c) 5 V (d) 10 V

5. A transducer is one which

(a) Converts one form of energy

(b) Amplifies

(c) Offer resistance

(d) None

6. Piezoelectric transducers use

(a) Quartz crystal (b) Magnet

(c) CRO (d) All the above

7. The function of antenna in receiving mode is

(a) Radiator (b) Converter

(c) Sensor (d) Inverter

8. Modulation is done in

(a) Transmitter (b) Radio receiver

(c) Between them (d) None

9. In camera focusing is done Dn

(a) Lens (b) Film

(c) Both (d) None

10. The amount of light reaching the camera is controlled by

(a) lens (b) film

(c) aperture (d) all the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the characteristics and colour coding of resistors.

Or

(b) Write notes on Printed Circuit Board (PCB).

12. (a) Explain the formation of simple lissajour's figures.

Or

(b) Describe AF oscillator with a diagram.

13. (a) Write the basic requirements of a transducer.

Or

(b) Describe piezo electric,transducers.

14. (a) Describe the characteristics of dipole antenna.

Or

(b) Explain mobile communication system in detail.

15. (a) Write note on different parts of camera.

Or

(b) Explain flash photograph.

(8 pages) **Reg. No. :** .....

Code No. : 41133 E **Sub. Code : JMPH 63**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Sixth Semester

Physics – Main

QUANTUM MECHANICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer.

1. From a black body the value of energy released at any wavelength ———— with increase in temperature.
   (a) constant
   (b) decreases
   (c) increases
   (d) none

2. When the angle of scattering is 90 degree, the Comptom shift $d\lambda$ is = ————.
   (a) $\frac{h}{m_o c^2}$
   (b) $\frac{h}{m_o c}$
   (c) $\frac{h^2}{m_o c}$
   (d) none

3. The wave velocity is also called as ———— velocity.
   (a) angular
   (b) linear
   (c) phase
   (d) group

4. If k is the propagation constant, the momentum p of a particle is given by ————.
   (a) $\frac{\hbar}{k}$
   (b) $\frac{k}{\hbar}$
   (c) $\hbar k$
   (d) none

5. According to Heisenberg Uncertainty principle, _____.

(a) $\Delta x \, \Delta t \geq \hbar$

(b) $\Delta x \, \Delta p \geq \hbar$

(c) $\Delta x \, \Delta E \geq \hbar$

(d) none

6. The value of Planck's constant is _____.

(a) $6.626 \times 10^{-14} JS$

(b) $6.626 \times 10^{14} JS$

(c) $6.626 \times 10^{-34} JS$

(d) none

7. The potential energy of a free particle in a time independent Schrodinger equation is _____.

(a) V

(b) 0

(c) $2V$

(d) none

8. The value of the commutation bracket $[x, p_x] =$

(a) 0

(b) 1

(c) $i\hbar$

(d) $-i\hbar$

9. The energy of a particle in a $1-D$ box is _____.

(a) $\frac{8n^2h^2}{ma^2}$

(b) $\frac{n^2h^2}{8ma^2}$

(c) $\frac{\pi^2h^2}{8ma^2}$

(d) none

10. The alpha particle is a nucleus of _____.

(a) ${}_1^1H$

(b) ${}_2^4He$

(c) ${}_4^2Li$

(d) none

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define Photoelectric effect. Give Einsteins explanation for Photoelectric effect.

Or

(b) State and explain Rayleigh-Jeans law.

12. (a) Derive the expression for group velocity of a wave packet.

Or

(b) Calculate the deBroglie wavelength of electron accelerated by a voltage of 10000 V.

13. (a) Explain the Heisenberg uncertainty relation between energy and time.

Or

(b) What are the consequences of Heisenberg uncertainty principle?

14. (a) What are the basic postulates of quantum mechanics?

Or

(b) Explain the orthogonality of energy Eigen function.

15. (a) Explain Tunnel effect through a rectangular barrier.

Or

(b) Discuss in detail about particle in one dimensional box.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the inadequacy of classical mechanics. What are the observations of black body radiation?

Or

(b) State Compton effect. Derive the formula for shift in wavelength during Compton scattering.

17. (a) Derive the deBroglie relation for wavelength of a moving particle with the velocity. What are the properties of deBroglie waves?

Or

(b) Describe Davison and Germer's experiment on electron diffraction.

18. (a) State and prove Heisenberg Uncertainty principle.

Or

(b) Illustrate Heisenberg uncertainty principle by Thought experiment.

19. (a) Derive time independent $1-D$ Scrodinger wave equation.

Or

(b) Obtain the Schrodinger wave equation for the complex conjugate wave function.

20. (a) Explain the emission of alpha particles from a radioactive element.

Or

(b) Discuss in detail about $1-D$ simple harmonic oscillator in quantum mechanics.

(6 pages) Reg. No. : .....

Code No. : 41127 E **Sub. Code : JMPH 31**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Third Semester

Physics — Main

ELECTRICITY AND MAGNETISM

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The unit for self inductance L is

(a) Ampere

(b) Volts

(c) Henry

(d) Coulomb

2. The self inductance of a long solenoid, L is _____.

(a) $\frac{\mu_0 N^2 A}{l}$ (b) $\frac{\mu_0 N^2}{l}$

(c) $\frac{N^2 A}{l}$ (d) 1

3. The expression for decay of current in a circuit containing L and R is, I =

(a) $I_0 e^{-(R/L)t}$ (b) $I_0 e^{(R/L)t}$

(c) $I_0(1 - e^{-(R/L)t})$ (d) none

4. The frequency of oscillation in a LCR circuit is f = _____.

(a) $2\pi\sqrt{LC}$ (b) $1/(2\pi\sqrt{LC})$

(c) $1/(2\pi\sqrt{LCR})$ (d) none

5. In a parallel resonant circuit the current become _____ at resonant frequency.

(a) minimum (b) maximum

(c) zero (d) none

6. The value of the operator j is

(a) -1 (b) 1

(c) $\sqrt{-1}$ (d) 0

7. Thomson coefficient for lead (Pb) is ———————.

(a) negative (b) positive

(c) zero (d) none

8. The graph drawn connecting thermo e.m.f (E) and temperature (T) is a ———————.

(a) straight line (b) parabola

(c) circle (d) none

9. The relation between the three magnetic vectors M, B and H is ———————.

(a) $B = \mu_0 (H - M)$

(b) $B = \mu_0 (H + M)$

(c) $B = (H + M)$

(d) None

10. The relation connecting magnetic permeability (μ), magnetic induction (B) and the magnetic field intensity (H) is ———————.

(a) $B = \mu H$ (b) $B = \mu / H$

(c) $B = -\mu H$ (d) None

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) State and explain Lenz law for electromagnetic induction.

Or

(b) Derive the mathematical expression for the self inductance of solenoid.

12. (a) Derive the expression for growth of charge in a capacitor through a resistor.

Or

(b) Explain the measurement of high resistance by the leakage method.

13. (a) Explain the use of j operator in the study of A.C circuits.

Or

(b) Derive the expression for power in an A.C circuit containing L, C and R.

14. (a) Explain Seebeck effect.

Or

(b) Prove that Peltier coefficient of a pair of metals is the product of absolute temperature and thermoelectric power.

15. (a) Derive the relation connecting M, B and H.

Or

(b) Define Poynting vector. Obtain an expression for Poynting vector.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe with necessary theory Rayleigh's method of determining self inductance of a coil.

Or

(b) Describe a method of determining mutual inductance between two coils.

17. (a) Derive the expression for growth and decay of current in a circuit containing inductance and resistance.

Or

(b) Discuss in detail the decay of charge in a LCR circuit.

18. (a) Obtain the expression for resonant frequency of a Series resonant circuit.

Or

(b) Obtain the expression for resonant frequency of a parallel resonant circuit.

19. (a) Describe the method of measuring thermo e.m.f of a thermocouple.

Or

(b) What is a Thermo - Electric diagram? Explain any two applications of it.

20. (a) Explain how charge sensitiveness of a capacitor is determined using Ballistic Galvanometer

Or

(b) Give an account of Maxwell's equations in free space.

———————

(6 pages) **Reg. No. :** .....

Code No. : 41142 E **Sub. Code : JNPH 4 A**

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Fourth Semester

Physics

Non Major Elective — BASIC PHYSICS — II

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Energy equivalence of 1 a.m.u is ————

(a) 93.1 MeV (b) 931 MeV

(c) 9.31 MeV (d) 9310 MeV

2. Complete the equation $U_{92}^{238} + n_0^1$ ————

(a) U_{93}^{238} (b) U_{92}^{239}

(c) U_{92}^{238} (d) U_{93}^{239}

3. In a paramagnetic material, the magnetic susceptibility X_m is ————

(a) small positive (b) large positive

(c) negative (d) none

4. In a superconductor, the electrical resistivity is ————

(a) negative (b) large positive

(c) nearly zero (d) none

5. The condition to achieve LASER action is

(a) absorption

(b) spontaneous emission

(c) population inversion

(d) none

6. The output wavelength in a He-Ne laser is ———— A°.

(a) 5893 A° (b) 6328A°

(c) 6000A° (d) 0 A°

7. If a body of length l_0 moving with a velocity v, the new length is, $l =$ _____

(a) $\dfrac{l_0}{\sqrt{1-\dfrac{v^2}{c^2}}}$ (b) $l_0\sqrt{1-\dfrac{v^2}{c^2}}$

(c) $\dfrac{l_0}{1-\dfrac{v^2}{c^2}}$ (d) none

8. The De-Broglie wavelength for an electron of mass m and accelerated by a potential V is, $\lambda =$

(a) $\dfrac{\sqrt{2meV}}{h}$ (b) $\dfrac{h}{\sqrt{2meV}}$

(c) $\dfrac{m}{hV}$ (d) none

9. The binary equivalent for the decimal number $(15)_{10}$, is _____

(a) $(1111)_2$ (b) $(1011)_2$

(c) $(1001)_2$ (d) $(1100)_2$

10. The result of the addition of two binary numbers $(101101)_2$ and $(100111)_2$ is _____

(a) 010100 (b) 1010100

(c) 111110 (d) none

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions by choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Explain the structure of nucleus.

Or

(b) What are alpha particles.? Give any three properties of alpha particles.

12. (a) Distinguish between Conducting and insulating materials.

Or

(b) What are amorphous materials? Give any three properties of amorphous materials.

13. (a) Define stimulated emission. Give any three properties of stimulated emission.

Or

(b) Define Population inversion. Give any three methods of Producing population inversion.

14. (a) What are the Postulates of special theory of relativity?

Or

(b) Explain length contraction due to relativistic motion.

15. (a) Convert the hexadecimal number BC91H into equivalent binary number.

Or

(b) Subtract 101101_2 from 100111_2.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b) each.

Answer should not exceed 600 words.

16. (a) Define nuclear fusion. Explain with an example, how energy is released during nuclear fusion.

Or

(b) Explain radio carbon dating.

17. (a) What are ferromagnetic materials? Give their properties.

Or

(b) What are superconductors? Explain any two properties of superconductors.

18. (a) Explain the construction and working of He-Ne laser.

Or

(b) Explain in detail the applications of Lasers.

19. (a) What are the properties of De-Broglie waves?

Or

(b) Derive the expression for the wave length of a moving particle.

20. (a) Explain, with an example, the methods of conversion of decimal into binary and binary into decimal.

Or

(b) Give the block diagrams and the truth tables of NOR and NAND gates.

———————

(6 pages) Reg. No. : .....

Code No. : 40566 E **Sub. Code : SNPH 3 B**

U.G. (CBCS)DEGREE EXAMINATION,
NOVEMBER 2019.

Third Semester

Physics — Core

Non major Elective – APPLIED PHYSICS

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Which of the following is non–conventional source of energy?

   (a) Wind energy (b) Solar energy

   (c) Bio gas (d) All of the above

2. The natural resource among the following which is a renewable resource is

   (a) Fossil fuel

   (b) Metallic minerals

   (c) Nonmetallic minerals

   (d) Forests

3. Greenhouse effect is related to

(a) Green trees on house

(b) Global warming

(c) Grass lands

(d) Greenery in country

4. Fossil fuel is also know as

(a) Lubricating fuel (b) Liquid fuel

(c) Solid fuel (d) Mineral fuel

5. Which of the following is not a green house ——————?

(a) CO_2 (b) CH_4

(c) CFC (d) H_2

6. Solar radiation consist of

(a) Infra–red region (b) Ultraviolet region

(c) Both (a) and (b) (d) None of the these

7. "Earth day" is celebrated on

(a) 1st December (b) 5th June

(c) 22nd April (d) 1st January

8. Plants use ———— gas for photosynthesis

(a) Oxygen (b) Methane

(c) Nitrogen (d) Carbon dioxide

9. TajMahal at Agra may be damaged by

(a) Sulphur dioxide (b) Chlorine

(c) Hydrogen (d) Oxygen

10. Geothermal energy is a ————

(a) Heat energy (b) Current energy

(c) Wind energy (d) Solar energy

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain new energy resources in India?

Or

(b) Discuss in details about the energy resources?

12. (a) What are the types of power in Fossil fuels?

Or

(b) Write briefly statistical details in fossil fuels.

13. (a) Write a short note on Biomass energy.

Or

(b) Write any five advantages and disadvantages of biomass energy.

14. (a) What are the main applications of a solar pond?

Or

(b) What are the principle for a solar cell?

15. (a) Explain the advantages of Geothermal energy.

Or

(b) Explain the Geothermal sources?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the energy needs of future India and the problems in energy requirements for that is brief?

Or

(b) Explain in categories and classification of energy resources.

17. (a) Discuss about the various availability of energy resources.

Or

(b) Write briefly application of Fossil fuels.

18. (a) Explain various techniques used for Biomass conversion into another forms of energy.

Or

(b) Explain the constructional and working of Deenbandhu Biogas plants with diagram.

19. (a) Write briefly notes for applications of solar energy.

Or

(b) Explain in merits and limitations for a solar cooker.

20. (a) Explain the various categories of Geothermal sources.

Or

(b) Explain the estimates of geothermal power and nature of geothermal fields .

Reg. No. : .....

Code No. : 40305 E **Sub. Code : JMPH 12**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

First Semester

Physics – Main

OPTICS

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. Focal length of the thin lens is

(a) $\frac{1}{f} = \frac{1}{V} = \frac{1}{U}$ (b) $\frac{1}{f} = \frac{1}{U} - \frac{1}{V}$

(c) $u + v$ (d) $u - v$

2. Unit of power is

(a) Ohm (b) Volt

(c) Dioptre (d) None

3. Bandwidth is

(a) $\beta = \frac{D\lambda}{d}$ (b) $\beta = \frac{D}{d}$

(c) $\beta = \frac{d\lambda}{D}$ (d) $\beta = D\lambda d$

4. For constructive interference the path difference is

(a) λ (b) π

(c) $n\lambda$ (d) $\frac{n}{\lambda}$

5. Diffractionis a characteristic property of

(a) light (b) waves

(c) reflection (d) none

6. The condition for maximum intensity is

(a) $(a+b)\sin\theta = m\lambda$ (b) $(a+b) = m\lambda$

(c) $\sin\theta = m\lambda$ (d) $\lambda = \frac{\sin\theta}{m}$

7. Intensity of polarised light can be explained by

(a) Nicol (b) Maulus

(c) Brewster (d) Newton

8. Numerical aperature is

(a) $n_1^2 - n_2^2$ (b) $n_1 - n_2$

(c) $\sqrt{n_1^2 - n_2^2}$ (d) None

9. In metastable state the life time atom is

(a) 10^{-3}S (b) 10^{-6}S

(c) 10^{-7}S (d) 10^{-9}S

10. Population inversion is

(a) $N_1 > N_2$ (b) $N_2 > N_1$

(c) $N_2 = N_1$ (d) $N_1 = N_2$

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the Dispersive power of a prism.

Or

(b) Discuss briefly Huygen's eye piece.

12. (a) Write the theory of interference fringes.

Or

(b) Write the application of Michelson interferomter.

13. (a) Write a note on resolving power.

Or

(b) Write a note on zone plate.

14. (a) Describe the production and detection of elliptically polarised light.

Or

(b) Describe the numerical aperature.

15. (a) Describe the optical excitation.

Or

(b) Write the applications of Holography.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the deviation without dispersion.

Or

(b) Explain prism binocular.

17. (a) Explain the experimental determination of Airwedge.

Or

(b) Explain Michelson interferometer.

18. (a) Discuss the determination of wavelength of light using plane diffraction grating.

Or

(b) Explain the theory of Fresenl wave front.

19. (a) Explain Quarter wave and Half wave plate.

Or

(b) Explain the structure of an optical fiber.

20. (a) Explain the structure and working of carbon dioxide laser.

Or

(b) Explain how images are recorded using Holography.

(6 pages) **Reg. No. :** .....

Code No. : 40557 E **Sub. Code : SMPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Second Semester

Physics — Core

THERMAL PHYSICS AND STATISTICAL MECHANICS

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The average distance between two successive collision is

(a) Average path (b) Mean free path

(c) RMS velocity (d) Free path

2. The distance between two consecutive collision of a molecule is called as

(a) free path

(b) mean free path

(c) average path

(d) none

3. The coefficient of diffusion $D =$ _____.

(a) $\frac{1}{3}c\lambda$ (b) $\frac{\lambda}{3}$

(c) $\frac{c}{3}$ (d) $\frac{c}{3\lambda}$

4. When a gas is at the temperature of inversion

(a) cooling is observed

(b) no cooling is observed

(c) gas become liquid

(d) none of the above

5. In an adiabatic process

(a) PV^r = constant

(b) PV^{1-r} = constant

(c) PV^{r-1} = constant

(d) PV = constant

6. $C_P - C_V$

(a) $>$ (b) $<$

(c) $\leq$ (d) $\geq$

7. The unit of entropy is

(a) J/K (b) cal/K

(c) K/cal (d) K – cal

8. In an isothermal process, the change in internal energy is

(a) positive

(b) negative

(c) 0

(d) none of these

9. Helmholtz function is

(a) $F = U + TS$ (b) $F = U - TS$

(c) $F = T - US$ (d) $F = T + US$

10. The heat energy is measured in

(a) Joule (b) Watt

(c) Newton (d) Kelvin

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Distinguish between perfect gas and ideal gas.

Or

(b) Derive an expression for mean free path of a molecule of a gas.

12. (a) Write short note on critical constants.

Or

(b) Derive the relation between Boyle temperature, temperature of inversion and critical temperature.

13. (a) Compare heat and work.

Or

(b) Explain adiabatic process. Give two examples.

14. (a) Define reversible process. Give any three conditions of reversibility of a heat engine.

Or

(b) Write short note on Temperature - entropy diagram.

15. (a) Obtain the second T-dS equation.

Or

(b) Derive Maxwell's third thermodynamic relation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Derive the expression for the pressure of a gas.

Or

(b) Derive Maxwell's distribution law of velocities for gas molecules.

17. (a) Explain Joule-Kelvin effect.

Or

(b) Explain Porous-plug experiment with neat diagram.

18. (a) Using first law of thermodynamics show that $C_P - C_V = R$.

Or

(b) Derive the expression for workdone during an isothermal process.

19. (a) Derive the Clausius-Clapeyron's equation.

Or

(b) Explain about T-dS diagram.

20. (a) Derive the Maxwell's thermodynamic relation.

Or

(b) Deduce clapeyron's latent heat equation from Maxwell's thermodynamic relations.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain in details about the conventional and non-conventional energy resources.

Or

(b) Briefly in details about different categories of Energy sources.

17. (a) Explain the different types of solar collectors.

Or

(b) Explain the construction and working of Solar Cooker.

18. (a) What are the advantage and disadvantages of PV Solar energy Conversion?

Or

(b) What are the application of solar photovoltaic systems?

19. (a) Explain the conversion of Biomass energy into other form of energy.

Or

(b) What are the advantages disadvantages of biological conversion of solar energy?

20. (a) Explain the fuel cells and application of fuel cells.

Or

(b) Define wave energy explain the energy and power from waves.

———————

Reg. No. : .....

Code No. : 41149 E **Sub. Code : JMPH 6 B**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Sixth Semester

Physics — Main

Major Elective — ENERGY PHYSICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is a non-renewable resource?

(a) Coal (b) Forests

(c) Water (d) Wildlife

2. Photovoltaic energy is the conversion of sunlight into

(a) Chemical energy (b) Biogas

(c) Electricity (d) Geothermal energy

3. Horizontal axis and vertical axis are the types of

(a) Nuclear reactor (b) Wind mills

(c) Biogas reactor (d) Solar cell

4. Fuel cells are ————.
   (a) Carbon cell (b) Hydrogen battery
   (c) Nuclear cell (d) Chromium cell
5. Common energy source in Indian Villages is
   (a) Electricity
   (b) Coal
   (c) Sun
   (d) Wood and animal dung
6. Cruid oil is ————.
   (a) Colourless
   (b) Odourless
   (c) Smelly yellow to black liquid
   (d) Odourless yellow to black liquid
7. Boiling water reactor and pressurized water reactors are ————.
   (a) Nuclear reactor (b) Solar reactor
   (c) Thermal reactor (d) Biogas reactor
8. The following type of energy is started as lateant heat
   (a) Thermal energy (b) Chemical energy
   (c) Electrical energy (d) Mechanical energy
9. The value of solar constant is
   (a) 1347 w/m^2 (b) 1357 w/m^2
   (c) 1367 w/m^2 (d) 1377 w/m^2
10. The outermost layer of the earth is
   (a) Magma (b) Mante
   (c) Crust (d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain in details about the Conventional Energy Resource.

Or

(b) Write any five differences between renewable and non-renewable sources.

12. (a) Briefly explain Flate plate collectors.

Or

(b) Write a short notes on Solar water heater.

13. (a) What are the types of solar cell?

Or

(b) Explain in details about the Hybrid system.

14. (a) Explain the construction and working of biogas.

Or

(b) What are the advantages and disadvantages of Biomass energy?

15. (a) What is the basic principle of wind energy conversion and mention the any three application?

Or

(b) What are the advantages and limitation of tidal power generation?

(6 pages) Reg. No. : .....

Code No. : 41140 E **Sub. Code : JNPH 3 A/ SNPH 3 A**

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Third Semester

Physics – Main

Non Major Elective — BASIC PHYSICS

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Velocity is defined as

(a) $\frac{\text{displacement}}{\text{time}}$

(b) distance × time

(c) $F \times t$

(d) $F \times at$

2. Change of momentum is

(a) pressure (b) impulse

(c) force (d) none

3. Pressure is defined as

(a) F / A (b) $F \cdot A$

(c) FA / l (d) FA / Vl

4. The co-efficient of viscosity η =

(a) $\frac{F / A}{V / l}$ (b) $\frac{FA}{Vl}$

(c) $\frac{F / A}{lV^2}$ (d) $\frac{FA^2}{l^2 V^2}$

5. Thermometer was invented in Italy about

(a) 1639 (b) 1633

(c) 1670 (d) 1593

6. A device which convert heat energy into mechanical energy is called

(a) heat engine

(b) source

(c) steam engine

(d) sink

7. The path difference for destructive interference is ———— $(n = 0, 1, 2, ...)$.

(a) $(2n+1)\frac{\lambda}{2}$

(b) $n\lambda$

(c) $(n+1)\frac{\lambda}{2}$

(d) none

8. By the law of reflection angle of incidence is equal to angle of ————.

(a) reflection

(b) glancing angle

(c) deviation

(d) none

9. The other name of Kirchoff's first law

(a) Voltage law

(b) Current law

(c) Ohm's law

(d) None

10. The unit of Electric field intensity

(a) V/m

(b) N/C

(c) Both (a) and (b)

(d) None

PART B — $(5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Distinguish between speed and velocity of a body.

Or

(b) State and explain energy and power.

12. (a) Write a short notes on binding force of liquid.

Or

(b) State and prove Pascal's law.

13. (a) Write a short notes on clinical thermometer.

Or

(b) Write a short notes on acoustics of building.

14. (a) Write a short notes on convex lens.

Or

(b) Distinguish between interference and diffraction.

15. (a) State and explain Kirchoff's law.

Or

(b) Derive the relation between electric field intensity and electric potential.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Prove the work-energy theorem.

Or

(b) Explain Newton's law of motion.

17. (a) Explain the working of Venturimeter.

Or

(b) State and explain Archimedes principle.

18. (a) Explain the effect of pressure on boiling point and melting point of a liquid.

Or

(b) Derive the expression for the efficiency of a Carnot engine.

19. (a) Write a short notes on optical activity.

Or

(b) Explain double refraction.

20. (a) Derive the expression for resistance connected in series and parallel.

Or

(b) Write a short notes on different types of resistance.

———————

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain types of capacitors.

Or

(b) Explain soldering and desoldering techniques.

17. (a) What is digital multimeter? Write the uses of digital multimeter.

Or

(b) Explain LCD Liquid Crystal Display.

18. (a) Explain capacitive transducer.

Or

(b) Explain RTD measurement of temperature.

19. (a) Explain DTH system.

Or

(b) Explain cellular telephone system.

20. (a) Explain tele and wide angle lens.

Or

(b) Explain digital formats.

Reg. No. : .....

Code No. : 41379 E **Sub. Code : SSPH 4 A**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Fourth Semester

Physics

Skill Based Subject — MAINTENANCE AND ELECTRONIC APPLIANCES

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. More resistors to a circuit the
   (a) Lower the resistance
   (b) Higher the resistance
   (c) Same the resistance
   (d) Resistance may vary

2. Electric energy / time is equal to
   (a) Potential difference
   (b) Flow of light
   (c) Flow of heat
   (d) Electric power

3. LCD operate from a voltage range from
   (a) 3 – 15 V (b) 10 – 15 V
   (c) 10 V (d) 5 V

4. A CRO can be used to measure
   (a) AC voltage only (b) DC voltage only
   (c) Frequency (d) Any of the above

5. The transducers used for the measurement is
   (a) RTD (b) Thermistor
   (c) Ultrasonic (d) All of these

6. LVDT is
   (a) Inductive transducer
   (b) Non-inductive transducer
   (c) Capacitive transducer
   (d) Resistive transducer

7. What is the function of antenna in receiving mode?
   (a) Radiator (b) Converter
   (c) Sensor (d) Inverter

8. The reference noise level for Telephony
   (a) 1 mv (b) OdBm
   (c) 1 pW (d) Od

9. In a photography enlarger object is placed
   (a) between F & 2F (b) beyond 2F
   (c) at F (d) less than F

10. The total amount of light that is captured
    (a) Aperture (b) Shutter speed
    (c) Exposure (d) Focus

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe Wattage rating in brief.

Or

(b) Write a note on printed circuit board.

12. (a) Write the uses of analog multimeter.

Or

(b) Describe AF oscillator with a diagram.

13. (a) Write the basic requirements of tranducer.

Or

(b) Write a note on photoresistor.

14. (a) Write the characteristics of resonance Antenna.

Or

(b) Discuss the principle of operation of mobile phone.

15. (a) Outline the parts of camera.

Or

(b) Describe the resolution of a camera.

(6 pages) **Reg. No. :**.....

Code No. : 40042 E **Sub. Code : GMPH 12**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

First Semester

Physics — Main

OPTICS

(For those who joined in July 2012-2015)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. Lens makers formula is

(a) $\frac{1}{f} = \left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

(b) $\frac{1}{f} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)$

(c) $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

(d) $\frac{1}{f} = (n+1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

2. Power of a convex lens is

(a) positive (b) negative

(c) zero (d) non-zero

3. In Michelson's interferometer, two interfering beams are formed by

(a) division of phase

(b) division of amplitude

(c) division of wavelength

(d) none

4. Incoherent light sources, the phase difference is

(a) varying with respect to time

(b) either zero or constant

(c) maximum

(d) π

5. In Fresnel diffraction, shape of the wave fronts are

(a) plane

(b) elliptical

(c) either spherical or cylindrical

(d) circular

6. In Fraunhoffer diffraction at a single slit, width of the central maximum is

(a) directly proportional to wavelength

(b) inversely proportional to wavelength

(c) directly proportional to amplitude

(d) inversely proportional to amplitude

7. The velocity of ordinary ray is constant

(a) at right angle to the optic axis

(b) along the optic axis

(c) in all directions

(d) along the crystal axis

8. The velocity of extraordinary ray is maximum

(a) at right angle to the optic axis

(b) along the optic axis

(c) in all directions

(d) along the crystal axis

9. Numerical Aperture =

(a) sin (acceptance angle)

(b) cos (acceptance angle

(c) tan (acceptance angle)

(d) cot (acceptance angle)

10. The diameter of core of a optic fibre is of the order of

(a) 250 μm (b) 900 μm

(c) 8.5 μm –62.5 μm (d) 8.5 nm –62.5 nm

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the construction and working principle of Direct Vision Spectroscope.

Or

(b) A double convex lens has faces of radii 20 cm each. The refractive index of the lens is 1.5. Calculate its focal length and power when it is immersed in carbon disulphide of refractive index 1.63

12. (a) Derive the expression for radii of the Newton rings.

Or

(b) Describe the circular fringes observed in Michelson's interferometer.

13. (a) How does a plane wavefront of monochromatic light been subdivided into a number of half period zones? Find their radii and area.

Or

(b) A plane transmission diffraction grating has 0.15 m of surface ruled with 6×10^5 lines/meter. Calculate the resolving power in first order?

14. (a) What is called Half wave plate? How do you calculate its thickness?

Or

(b) Calculate the thickness of a quarter wave plate for light of wavelength 5.9×10^{-7} m. Principal refractive indices are $n_o = 1.544$ and $n_e = 1.533$.

15. (a) Describe the structure of an optical fibre.

Or

(b) Summarize the applications of Holography.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the longitudinal and the lateral chromatic aberrations in a lens.

Or

(b) Analyze the Refraction through a thin lens.

17. (a) How do you determine the wavelength of a monochromatic light by using a biprism?

Or

(b) How will you form a Air-wedge? Calculate the diameter of a thin wire.

18. (a) Explain the Diffraction at a circular aperture.

Or

(b) Explain the Fraunhoffer diffraction at single slit.

19. (a) Determine the specific rotation of sugar solution by using Laurent's half shade polarimeter.

Or

(b) Describe the principle, construction and working and uses of Nicol prism.

20. (a) Describe the geometry for calculation of acceptance angle of a optic fibre.

Or

(b) Explain the principle construction and working of Ruby LASER.

(6 pages) Reg. No. : .....

Code No. : 40559 E **Sub. Code : SMPH 31**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Third Semester

Physics – Main

ELECTRICITY

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The unit for electric flux is ———— .

(a) NmC^{-2} (b) Nm^2C^{-1}

(c) $N^{-1}mC$ (d) None

2. The electric potential energy W = ———— .

(a) qV (b) q^2V

(c) q/V (d) V/q

3. According to Peltier effect, the heat (H) evolved or absorbed is ———— to the charge passing through the junction.

(a) directly proportional

(b) inversely proportional

(c) independent

(d) none

4. The Thomson coefficient (σ) is ————.

(a) Constant (b) Dont vary

(c) Not a constant (d) none

5. The ionic dissociation if potassium chloride is given by KCl ————>

(a) $K^+ + Cl^-$ (b) $K^- + Cl^+$

(c) $2K^+ + Cl^-$ (d) None

6. In secondary cells chemical reactions are ————.

(a) reversible (b) irreversible

(c) partly reversible (d) none

7. The time constant for a L – R circuit is

(a) R/L (b) L/R

(c) L^2/R (d) None

8. If two resistances 50 ohm and 150 ohm are connected in series, the net resistance =

(a) 100 ohm (b) 37.5 ohm

(c) 200 ohm (d) None

9. The value of the operator j is ———— .

(a) -1 (b) $\sqrt{-1}$

(c) $\sqrt{1}$ (d) None

10. In a purely inductive circuit , the current ———— the applied emf by ———— .

(a) leads, 180° (b) leads, 90°

(c) lags behind, 90° (d) None

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) State and prove Gauss law in electrostatics.

Or

(b) State and explain Coulombs law in electrostatics.

12. (a) State and explain Seebeck effect.

Or

(b) Explain Thomson effect. Define Thomson coefficient.

13. (a) State Faraday's laws of electrolysis.

Or

(b) Define electrical conductivity of an electrolyte. Define specific conductivity.

14. (a) Derive expression for the growth of charge in a capacitor through a resistance.

Or

(b) Derive expression for the decay of charge in a capacitor through a resistance.

15. (a) Give the applications of j – operator in studying the A.C circuits.

Or

(b) Compare series resonance and parallel resonance circuits.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Using Gauss law, find the electric field intensity due to a line of charge.

Or

(b) Find the relation connecting electric field and electric potential.

17. (a) Describe the method of measuring thermo emf using potentiometer.

Or

(b) Prove that the Peltier Coefficient of a pair of metals is the product of the absolute temperature and thermo electric power.

18. (a) Explain the Arrhenius theory of electrolytic dissociation.

Or

(b) Derive Gibbs-Hemholtz equation for a reversible cell.

19. (a) Explain in detail the working of Wheatstone network.

Or

(b) Describe the method of measuring a high resistance by leakage method.

20. (a) Derive the expression for the variation of current in a LCR circuit connected in series.

Or

(b) Derive the expression for the variation of current in a LCR circuit connected in parallel.

(6 pages) **Reg. No. :** .....

Code No. : 40561 E **Sub. Code : SMPH 52**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

Fifth Semester

Physics — Main

COMPUTER PROGRAMMING IN C++

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The smallest individual units in a program are known as ————————.

   (a) System (b) Token
   (c) Array (d) Bytes

2. ANSI C++ all character in a name are ————————.

   (a) Significant (b) Insignificant
   (c) Identical (d) None

3. In C++ the main( ) returns a value of type ———————— to the operating system.

   (a) Istream (b) Ostream
   (c) int (d) None

4. Default arguments are useful in situation when some argument always have ———————— value.

   (a) same (b) smaller
   (c) higher (d) different

5. Class function describe how the class function are ————————.

   (a) activated (b) increase
   (c) implemented (d) decrease

6. A private function object cannot invoke using a ———————— Operator.

   (a) System (b) Dot
   (c) Point (d) Program

7. The unary minus when applied to an object should change the ———————— of each of its data item.

   (a) Sign (b) Length
   (c) Bytes (d) Character

8. A class an inherit properties form more than one class which is known a ———— inheritance.

(a) Multiple (b) Single

(c) Multilevel (d) None

9. A stream is a sequence of ————.

(a) Unit (b) System

(c) Bytes (d) Token

10. To clear specified flags related function ————.

(a) Unsetf( ) (b) Istream

(c) Ostream (d) Main( )

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the various user defined data types, such as structure and classes.

Or

(b) Discuss declaring variables.

12. (a) Explain function with no argument and no return values.

Or

(b) Demonstrate how function overloading is used in a C++ program.

13. (a) Explain the term of static class member.

Or

(b) Explain the parameterized constructor.

14. (a) Demonstrate how unary and binary operator are overloaded.

Or

(b) Explain the term virtual base class.

15. (a) Explain the overview of stream in C++.

Or

(b) Illustrate the use of manipulators for managing output.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Outline the various types of expression used in a C++ program.

Or

(b) Explain the various variables used in C++ program.

17. (a) Briefly explain term calling by reference and return by reference.

Or

(b) Describe the usage of Main( ) function in a C++ program.

18. (a) Describe the concept of nesting of member function.

Or

(b) Interpret the usage of multiple constructors in a class.

19. (a) Illustrate the concept of multilevel inheritance.

Or

(b) Briefly explain the term arithmetic operation on pointer.

20. (a) Describe unformatted and formatted I/O operations.

Or

(b) Illustrate the use of file pointers and their manipulators.

———————

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Define electric charge, current and potential and give their units.

Or

(b) Explain the conversion of galvanometer into voltmeter and ammeter.

17. (a) Explain the construction and applications of autotransformers.

Or

(b) Explain the different types of losses in transformers.

18. (a) Explain the working of microwave oven.

Or

(b) Explain the working of air-conditioner.

19. (a) Explain house wiring.

Or

(b) Explain in detail the earthing.

20. (a) Explain the usage of circuit breakers in electric circuits.

Or

(b) Explain the working of an inverter.

———————

Reg. No. : .....

Code No. : 41136 E **Sub. Code : JSPH 3 A/ SSPH 3 A**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Third Semester

Physics

Skill Based Subject — MAINTENANCE OF ELECTRICAL APPLIANCES

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. According to Ohms law, V = ————————

(a) I/R (b) I^2R

(c) IR (d) none

2. The unit of charge is ————————

(a) Volts (b) Ampere

(c) Coulomb (d) None

3. In a step up transformer number of turns in the primary is ———— than that in the secondary.
   (a) Smaller (b) Greater
   (c) Equal (d) None

4. Which among the following is used to minimize the eddy current loss?
   (a) lamination
   (b) selecting high resistance material
   (c) insulation
   (d) all

5. Carbon arc lamps are used in————
   (a) domestic lighting (b) street lighting
   (c) cinema projector (d) none

6. The handle of iron box is madeup of ————
   (a) bakelite (b) aluminium
   (c) chromium (d) none

7. Which of the following is single phase a.c motor?
   (a) induction motor
   (b) dc motor
   (c) capacitor run motor
   (d) none

8. In three phase supply ———— wires carry a.c. current.
   (a) 4 (b) 3
   (c) 2 (d) none

9. Which among the following factors affect the cost of motor?.
   (a) reliability (b) installation
   (c) running cost (d) all

10. Insulation resistance of high volt circuit breaker is more than
    (a) 4000 M ohm (b) 3000 M ohm
    (c) 2000 M ohm (d) none

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 Words.

11. (a) State and explain Ohms law.

    Or

    (b) Explain the calculation of consumption of electric power of a electric device.

12. (a) Explain the classification of transformers.

    Or

    (b) Explain the cooling of transformers.

13. (a) Explain the working of fluorescent lamps.

    Or

    (b) Explain the working of electric fan.

14. (a) Compare AC and DC currents.

    Or

    (b) Explain overloading.

15. (a) What are fuses? How they are used in electric circuits?

    Or

    (b) Explain ground fault protection.

(6 pages) Reg. No. :.....

Code No. : 40306 E **Sub. Code : JMPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Second Semester

Physics — Main

MECHANICS AND RELATIVITY

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The line integral is

(a) scalar (b) vector

(c) conserved (d) none.

2. Grad is equal to

(a) $\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)$ (b) $\left(i\frac{\partial}{\partial x}+j\frac{\partial}{\partial y}+k\frac{\partial}{\partial z}\right)\phi$

(c) Both (a) and (b) (d) None.

3. The equation of velocity of the sphere after impact is

(a) $\sin^2\alpha + \cos^2\alpha$

(b) $V^2 = U^2\left(\sin^2\alpha + e^2\cos^2\alpha\right)$

(c) $V^2 = U^2\sin\alpha$

(d) None

4. Product of mass and velocity called

(a) momentum (b) work

(c) acceleration (d) speed

5. If force is applied at center of mass then torque is

(a) maximum (b) zero

(c) 1 (d) unity

6. Unit of torque is

(a) N – m (b) N/m

(c) V (d) N/m^2

7. Kinetic energy per unit mass of liquid is

(a) $\frac{V}{2}$ (b) $2V$

(c) $\frac{V^2}{2}$ (d) none.

8. Unit of pressure is

(a) N/m^2 (b) $\frac{m^2}{N}$

(c) $Nm^{\frac{2}{7}}$ (d) Nm

9. The length of the moving body is contracted by factor

(a) $\sqrt{1-\frac{V^2}{C^2}}$ (b) $\sqrt{\frac{C^2-V^2}{l}}$

(c) $l_0\sqrt{1-\frac{V^2}{C^2}}$ (d) None.

10. Mass of electron increase with

(a) time (b) velocity

(c) acceleration (d) none.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Discuss briefly components of a vector.

Or

(b) Derive expression for surface integrals.

12. (a) Obtain an expression for work done by gravitational force.

Or

(b) Discuss briefly central field motion.

13. (a) Derive an expression for moment of inertia of diatomic molecules.

Or

(b) Derive expression for power during rotation.

14. (a) Determine the position of centre of pressure in a triangular lamina.

Or

(b) Discuss briefly Venturimeter.

15. (a) Write a note on frames of reference.

Or

(b) Discuss about Relativistic mass.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Deduce the expression for work and power.

Or

(b) State and prove Gauss divergence theorem.

17. (a) Explain Angular momentum.

Or

(b) State and explain Kepler's II and III laws.

18. (a) Discuss Moment of Inertia and Radius of Gyration.

Or

(b) Explain the Gyroscopic top.

19. (a) State and explain laws of floatation.

Or

(b) Obtain an expression for equation of continuity.

20. (a) Explain Lorentz fitzgerald contraction.

Or

(b) Derive velocity addition theorem.

(6 pages) **Reg. No. :** .....

Code No. : 40562 E **Sub. Code : SMPH 53**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

Fifth Semester

Physics — Main

ATOMIC PHYSICS

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The electrical conductivity σ =

(a) $\frac{ne^2\lambda v}{2k_BT}$ (b) $\frac{ne^2\lambda v}{4k_BT}$

(c) $\frac{ne^2\lambda v}{6k_BT}$ (d) $\frac{ne^2\lambda v}{8k_BT}$

2. The Hall coefficient R_B is

(a) $R_H = ne$ (b) $R_H = n + e$

(c) $R_H = 1/ne$ (d) $R_H = ne/2$

3. The speed of the electron in the circular path is given by $v =$ ————————.

(a) Be/m (b) Bev/m

(c) Bm/e (d) Bmr/e

4. The velocity of the positive rays ranges from ————————.

(a) $10^4 - 10^5\ ms^{-1}$ (b) $10^5 - 10^6\ ms^{-1}$

(c) $10^{-4} - 10^{-5}\ ms^{-1}$ (d) $10^{-5} - 10^{-6} ms^{-1}$

5. Rydberg constant is given as ————————.

(a) $1.097 \times 10^7\ m^{-1}$ (b) $1.096 \times 10^7\ m^{-1}$

(c) $1.097 \times 10^{-7}\ m^{-1}$ (d) $1.096 \times 10^{-6}\ m^{-1}$

6. The electrons which lies in the ultraviolet region is ———————— series.

(a) Lymann (b) Brackett series

(c) Paschen series (d) Balmer series

7. The stern and gerlach experiment is based on the behaviour of ————————.

(a) Electric dipole

(b) Magnetic dipole

(c) both (a) and (b)

(d) None of the above

8. The frequency of the larmor precession is given by $\omega =$ ————————.

(a) $e/2m$ (b) $B/2m$

(c) $B/2me$ (d) $Be/2m$

9. According to Moseley's law the frequency of a spectral line in X-ray spectrum is directly proportional to ————————.

(a) Z (b) Z^2

(c) Z^3 (d) Z^4

10. The short wavelength of the X-rays ranges from ————————.

(a) 1 nm – 0.05 nm

(b) 1 nm – 0.5 nm

(c) 0.5 nm – 0.05 nm

(d) 0.5 nm – 0.25 nm

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain Hall voltage and Hall coefficient.

Or

(b) Explain drift velocity and relaxation time of free electrons in metals.

12. (a) Explain the Thomson's method for positive ray analysis.

Or

(b) Describe the construction, working and theory of a Dempster mass spectrograph.

13. (a) Give the drawbacks of the Bohr atom model.

Or

(b) Explain the classification of elements according to periodic table.

14. (a) Explain L-S coupling and j-j coupling.

Or

(b) State and Explain about Larmor's theorem with the diagram.

15. (a) State and explain Mosley's law. What is its importance?

Or

(b) Explain about the absorption edges of X-rays.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Deduce a mathematical expression for electrical and thermal conductivity of a conducting material.

Or

(b) Based on the band theory of solids explain the nature of conductors semiconductors and insulators.

17. (a) Determine the construction of Aston's mass spectrograph with necessary theory.

Or

(b) Explain how Thomson's parabola method is helpful to determine the mass of the Positive ions.

18. (a) Describe the Sommerfeld's relativistic atom model.

Or

(b) Describe Rutherford's experiments and its theory on scattering of a particles.

19. (a) Describe Stern and Gerlach experiment for the existence of space quantisation.

Or

(b) Derive an expression for Zeeman shift.

20. (a) Describe and explain the Bragg's law of X-ray spectrometer method of determining wavelength of X-rays.

Or

(b) Explain the principle, construction and operation of a scintillation detector.

———————

19. (a) Give any four electrophilic substitution reaction for Isoquinoline.

Or

(b) Explain the following synthesis

(i) Bischler – Napieralski synthesis

(ii) Fischer – Indole synthesis

20. (a) How are dyes classified based on their mode of applications? Explain with examples.

Or

(b) Explain the following dyes with examples

(i) Phthalein dyes

(ii) Azo dyes

(6 pages) **Reg. No. :**.....

Code No. : 40566 E **Sub. Code : SNPH 3 B**

U.G. (CBCS)DEGREE EXAMINATION, NOVEMBER 2019.

Third Semester

Physics — Core

Non major Elective – APPLIED PHYSICS

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Which of the following is non–conventional source of energy?

   (a) Wind energy (b) Solar energy

   (c) Bio gas (d) All of the above

2. The natural resource among the following which is a renewable resource is

   (a) Fossil fuel

   (b) Metallic minerals

   (c) Nonmetallic minerals

   (d) Forests

3. Greenhouse effect is related to

(a) Green trees on house

(b) Global warming

(c) Grass lands

(d) Greenery in country

4. Fossil fuel is also know as

(a) Lubricating fuel (b) Liquid fuel

(c) Solid fuel (d) Mineral fuel

5. Which of the following is not a green house _____?

(a) CO_2 (b) CH_4

(c) CFC (d) H_2

6. Solar radiation consist of

(a) Infra–red region (b) Ultraviolet region

(c) Both (a) and (b) (d) None of the these

7. "Earth day" is celebrated on

(a) 1st December (b) 5th June

(c) 22nd April (d) 1st January

8. Plants use ———— gas for photosynthesis

(a) Oxygen (b) Methane

(c) Nitrogen (d) Carbon dioxide

9. TajMahal at Agra may be damaged by

(a) Sulphur dioxide (b) Chlorine

(c) Hydrogen (d) Oxygen

10. Geothermal energy is a ————

(a) Heat energy (b) Current energy

(c) Wind energy (d) Solar energy

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain new energy resources in India?

Or

(b) Discuss in details about the energy resources?

12. (a) What are the types of power in Fossil fuels?

Or

(b) Write briefly statistical details in fossil fuels.

13. (a) Write a short note on Biomass energy.

Or

(b) Write any five advantages and disadvantages of biomass energy.

14. (a) What are the main applications of a solar pond?

Or

(b) What are the principle for a solar cell?

15. (a) Explain the advantages of Geothermal energy.

Or

(b) Explain the Geothermal sources?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the energy needs of future India and the problems in energy requirements for that is brief?

Or

(b) Explain in categories and classification of energy resources.

17. (a) Discuss about the various availability of energy resources.

Or

(b) Write briefly application of Fossil fuels.

18. (a) Explain various techniques used for Biomass conversion into another forms of energy.

Or

(b) Explain the constructional and working of Deenbandhu Biogas plants with diagram.

19. (a) Write briefly notes for applications of solar energy.

Or

(b) Explain in merits and limitations for a solar cooker.

10. (a) Explain the various categories of Geothermal sources.

Or

(b) Explain the estimates of geothermal power and nature of geothermal fields .

(6 pages) **Reg. No. :**.....

Code No. : 40316 E **Sub. Code : JAPH 21/ SAPH 21**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Second Semester

Physics — Allied

ALLIED PHYSICS – II

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. If two resistors (R_1, R_2) are connected in series, the resultant resistance (R) will be

(a) $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ (b) $R = R_1 - R_2$

(c) $\frac{1}{R} = \frac{1}{R_1} - \frac{1}{R_2}$ (d) $R = R_1 + R_2$

2. A galvanometer can be converted into an ammeter by connecting a ———— to the galvanometer.

(a) low resistance in series

(b) low resistance in parallel

(c) high resistance in series

(d) high resistance in parallel

3. The unit of self inductance is

(a) Henry (b) Faraday

(c) Weber (d) Tesla

4. The maximum value of coefficient of coupling is

(a) 100 (b) 10

(c) 2 (d) 1

5. The 2's complement of $(1101)_2$ is

(a) 0010 (b) 1110

(c) 0011 (d) 1100

6. The decimal equivalent for the binary number $(1111)_2$ is

(a) 12 (b) 8

(c) 16 (d) 15

7. The number of neutrons in the nucleus ${}_8O^{15}$ is

(a) 8 (b) 15

(c) 7 (d) 23

8. In the nuclear reaction ${}_{92}U^{234} + X \rightarrow {}_{92}U^{235} + \gamma$, X stands for

(a) neutron (b) electron

(c) proton (d) none

9. The theory of relativity was proposed by

(a) Einstein (b) Newton

(c) Raman (d) Plank

10. The horizontal distance covered by a projectile is large, if it is projected with an angle

(a) 30° (b) 45°

(c) 60° (d) 90°

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the conversion of galvanometer into a voltmeter.

Or

(b) Explain the conversion of galvanometer into an ammeter.

12. (a) Give any five properties of diamagnetic materials.

Or

(b) Give any five properties of paramagnetic materials.

13. (a) Draw the symbol and truth table for NOR and EX-OR gates.

Or

(b) Convert the decimal number $(49.75)_{10}$ into binary number.

14. (a) Define half life period and derive an expression for it.

Or

(b) Derive an expression for mean life of a radioactive substance.

15. (a) Explain length contraction.

Or

(b) A rod 1 m long is moving along its length with a velocity 0.6 C (*C*-speed of light). Calculate its length as it appears to an observer on the earth.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the I-V characteristics of a resistor.

Or

(b) State and explain Kirchoff's first and second laws.

17. (a) Define magnetic permeability and magnetic susceptibility. Obtain the relation between them.

Or

(b) Define M, B and H. Obtain the relation connecting them.

18. (a) Explain the working of OR gate, giving its symbol, truth table and Boolean equation.

Or

(b) Explain the working of AND gate, giving its symbol, truth table and Boolean equation.

19. (a) Explain :

(i) Nuclear size.

(ii) Nuclear charge.

(iii) Nuclear mass and

(iv) Nuclear density.

Or

(b) What are nuclear forces? Give its characteristics.

20. (a) Derive the Lorentz transformation equations.

Or

(b) Derive an expression for the range of a projectile on an inclined plane.

(6 pages) **Reg. No. :** .....

Code No. : 40323 E **Sub. Code : JNPH 4 A**

U.G.(CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

Fourth Semester

Physics

Non Major Elective–BASIC PHYSICS-II

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer

1. Neutron and Proton together is usually called

(a) Nucleus (b) neutrino

(c) nucleon (d) nuclide

2. The size of the nucleus is of the order of

(a) $10^{-10}m$ (b) $10^{-9}m$

(c) $10^{-1}m$ (d) $10^{-15}m$

3. In a diamagnetic material, the susceptibility is

(a) Small and positive (b) Small and negative

(c) Large and positive (d) Large and negative

4. Amorphous materials are also called as

(a) Isotropic (b) anisotropic

(c) isomeric (d) none of the above

5. Meta stable states have

(a) Longer life time

(b) Shorter life time

(c) Two energy states merged together

(d) None of the above

6. The function of lithium in He-Ne laser is

(a) To increase the excitation of neon atom

(b) To increase the speed of neon atom

(c) To produce light

(d) None of the above

7. The theory of relativity was proposed by

(a) Einstein (b) Newton

(c) Raman (d) Heisenberg

8. A photon of frequency v has energy

(a) h/v (b) hv

(c) v (d) hv^2

9. The number of digits in a binary number system

(a) 8 (b) 6

(c) 10 (d) 2

10. The binary equivalent of the decimal (15) is

(a) 1001 (b) 1100

(c) 1111 (d) 1010

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What are nuclear forces? Enumerate th characteristics of nuclear forces.

Or

(b) Define binding energy. Explain the bindin energy curve.

12. (a) What are diamagnetic materials? Give the properties also.

Or

(b) Differentiate the properties of conductors and insulators.

13. (a) What is laser? Explain the principle of laser.

Or

(b) Explain any two applications of laser.

14. (a) What are inertial and non-inertial frames.

Or

(b) State the basic postulates of special theory of relativity.

15. (a) Convert the following decimal into binary.

(i) 13 (ii) 37 (iii) 52

Or

(b) Explain the function of OR gate using diodes with neat sketch.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Derive the expression for Half life period and Mean life.

Or

(b) Enumerate the properties of α, β and γ particles.

17. (a) What are paramagnetic & ferromagnetic materials. Give their properties with example.

Or

(b) With neat sketch explain the properties of crystalline and amorphous materials.

18. (a) With neat sketch explain the construction of He-Ne laser and its working.

Or

(b) What is LASER? Give the basic principle of LASER and also explain population inversion.

19. (a) Explain length contraction & time dilation in relativity.

Or

(b) Give the postulates of quantum mechanics and explain De Broglie theory of matter waves.

20. (a) Add the following

(i) 1111+1101

(ii) 10011+10111

(iii) 111000 + 111101

(iv) 10101+10111

Or

(b) Explain 1's complement method of subtraction with examples.

(6 pages) Reg. No. : .....

Code No. : 40309 E **Sub. Code : JMPH 41**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Fourth Semester

Physics – Main

COMPUTER PROGRAMMING IN C++

(For those who joined in July 2016 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Cout is a/an ————————.

(a) operator (b) function

(c) object (d) macro

2. Which of the following is an abstract data type?

(a) int (b) double

(c) string (d) class

3. Which of the following is not the member of class?

(a) static function

(b) friend function

(c) const function

(d) virtual function

4. How many instances of an abstract class can be created?

(a) 1 (b) 5

(c) 13 (d) 0

5. Which of the following cannot be friend?

(a) function

(b) class

(c) object

(d) operator function

6. Which of the following cannot be used with the keyword virtual?

(a) class

(b) member function

(c) constructor

(d) destructor

7. Which of the following operators cannot be overloaded?

(a) .
(b) ?
(c) ::
(d) all the above

8. _____ is the process of creating new classes from an existing class.

(a) base class
(b) derived class
(c) inheritance
(d) operator overloading

9. Which one provides support for simultaneous I/P and O/P operation?

(a) f stream base
(b) f stream
(c) filebuf
(d) if stream

10. Which of the following is not a type of inheritance?

(a) multiple
(b) multilevel
(c) distributive
(d) hierarchical

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain keywords and identifiers in C++.

Or

(b) Describe memory management operations in C++.

12. (a) Explain main function in C++.

Or

(b) Explain function overloading.

13. (a) Explain the nesting of member function in C++.

Or

(b) Describe the multiple constructors in a class.

14. (a) Outline the rules for overloading the operators.

Or

(b) Write a program in C++ to solve quadratic equation.

15. (a) Discuss classes for file stream operations in C++.

Or

(b) Explain Random access in C++.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain Type cast operators.

Or

(b) Explain C++ Data types in detail.

17. (a) Explain unformatted console I/O operations.

Or

(b) Explain :

(i) Call by reference

(ii) Return by reference.

18. (a) Explain friend function and its advantages.

Or

(b) Explain constructors in Derived classes.

19. (a) Explain overloading binary operators using friends.

Or

(b) Explain Multiple inheritance.

20. (a) Explain Input Output stream in C++.

Or

(b) Explain file modes function Open ( ).

(6 pages) Reg. No. :.....

Code No. : 40312 E **Sub. Code : JMPH 61**

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

Sixth Semester

Physics — Main

DIGITAL ELECTRONICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. If BCD form of the decimal number 362 is

(a) 0101 0111 0011

(b) 0011 0110 0010

(c) 0011 0110 0101

(d) 0010 0110 0101

2. The hexadecimal equivalent of $(11110.111)_2$ is

(a) $(IC.C)_H$ (b) $(DI.D)_H$

(c) $(IE.E)_H$ (d) $(IB.E)_H$

3. The value of $A + 1$ is

(a) zero (b) A

(c) 1 (d) $\overline{A}$

4. A and B are two inputs of NOR gate, its output will be

(a) $A + B$ (b) $A \cdot B$

(c) $\overline{A \cdot B}$ (d) $\overline{A + B}$

5. What will be the action of RS flip flop when $S = 1$ $R = 1$?

(a) No Change (b) Reset

(c) Set (d) Not allowed

6. A half adder

(a) add two bits

(b) add three bits

(c) perform decimal addition

(d) has one output

7. A demultiplexer has ———— inputs and many outputs.

(a) 2 (b) 1

(c) 3 (d) 4

8. The gate used for checking the parity of a binary number is

(a) NOR (b) NAND

(c) EX-OR (d) NOT

9. Decade counter counts

(a) from 0 to 9 (b) from 1 to 10

(c) from 0 to 10 (d) none

10. Register is used to store ———— numbers.

(a) decimal (b) binary

(c) octal (d) hexadecimal

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) (i) Convert the decimal number $(19.65)_{10}$ into binary.

(ii) Convert the binary $(1011.101)_2$ into decimal.

Or

(b) (i) Convert $(3FC.8)_H$ to decimal.

(ii) Convert $(1020)_{10}$ to hexequivalent.

12. (a) State and prove De-Morgan's laws.

Or

(b) Give the symbol, Boolean equation and truth table of OR and EX-OR gates.

13. (a) Explain the action of D flip flop with truth table.

Or

(b) Explain the action of T flip flop with truth table.

14. (a) Explain the Sum Of Product (SOP) with example.

Or

(b) Explain the functioning of parity checker.

15. (a) Explain the working of Serial-in-Serial-out shift register.

Or

(b) Describe Mod-5 counter.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain Gray code with examples.

Or

(b) Explain BCD code with examples.

17. (a) Explain how NAND gate can be realized as universal gate?

Or

(b) Explain how NOR gate can be realized as universal gate?

18. (a) Explain the working of J-K flip flops with the necessary circuit and truth table.

Or

(b) Explain the working of Master Slave J.K. Flipflop with necessary circuit and truth table.

19. (a) Explain 4 variable K-map with examples.

Or

(b) Simplify using K-map

$F(A, B, C, D) = \Sigma m(2, 3, 12, 13, 14, 15)$.

20. (a) Explain the function of binary ladder type D/A converter with neat diagram.

Or

(b) Explain the function of A/D converter with neat diagram.

(6 pages) **Reg. No. :** .....

Code No. : 40330 E **Sub. Code : JMPH 6 B**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2019.

Sixth Semester

Physics

Major Elective – III — ENERGY PHYSICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Fossil fuels refer to

   (a) coal (b) oil

   (c) natural gas (d) all the above

2. Among the four types of coal, the highest rank is for

   (a) Lignite (b) Sub bituminous

   (c) Bituminous (d) Anthracite

3. In solar water heaters, the collector tubes are made of

(a) Glass (b) Polythene

(c) Copper (d) Plastic

4. The temperature required for the fusion is of the order of

(a) 10^{9} K (b) 10^{-9} K

(c) 10^{19} K (d) 10^{7} K

5. The material mainly used in solar photovoltaic device is

(a) Silicon (b) Sodium

(c) Copper (d) Iron

6. Photovoltaic cells have

(a) Internal resistance

(b) No internal resistance

(c) External battery connection

(d) None

7. Most of the biogas plants functioning in India are of the type of

(a) Deena Bhandu (b) Janata

(c) Rotating drum (d) None of the above

8. Pyrolysis is

(a) pressing the cow dung at the bottom of digestor

(b) breaking of H_2O and O_2 by electric current

(c) anaerobic fermentation of cow dung in the pit

(d) thermal breakdown of biomass

9. The principle used in the working of OTEC is

(a) Forced convection (b) Heat engine

(c) Joule Kelvin (d) All the above

10. The tides of the second and fourth quarter moon are known as

(a) Spring tides (b) Neap tides

(c) Lunar tides (d) None of the above

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Give the statistical details on the availability of coal, oil and natural gas in India.

Or

(b) List the merits and demerits of coal.

12. (a) What is solar energy? Give the merits and demerits of solar energy.

Or

(b) With neat sketch, explain the working of solar crop dryer.

13. (a) Give the merits and demerits of Photovoltaic cells.

Or

(b) What is solar cell? Enumerate the advantages and disadvantages of the solar cell system.

14. (a) Explain the biomass conversion processes.

Or

(b) What is biogas? What are biogas plants? Explain the various types of biogas plants.

15. (a) Give the merits, demerits and application of ocean wave energy.

Or

(b) Explain the process of getting energy from tides.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain in detail about the non conventional energy resources.

Or

(b) Write the applications, merits and demerits of coal, oil and natural gas.

17. (a) What is flat plate collector? Explain the basic principle and materials used in flat plate collector.

Or

(b) With neat sketch, explain the functions of solar water heater. Give the advantages and disadvantages of solar water heater.

18. (a) Explain the construction and working of Photovoltaic cell.

Or

(b) What are the main applications of solar photovoltaic system? Describe any two applications briefly.

19. (a) With neat sketch, describe the function of floating dome biogas plant.

Or

(b) Discuss the advantages and disadvantages of biological conversion of solar energy.

20. (a) What is wind energy? Describe how wind energy is harnessed by windmill.

Or

(b) What is ocean wave energy? With neat sketch, explaining the oscillating water column wave energy conversion system to harness ocean wave energy.

———————