

Reg. No.....

Code No: SS30570B

Sub. Code: SNPH4A

UG (CBCS) DEGREE SPECIAL SUPPLEMENTARY EXAMINATION, APRIL 2020

FOURTH SEMESTER

PHYSICS

NON MAJOR ELECTIVE - BASIC PHYSICS -II

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum: 75 marks

Part - A (10 X 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

1 a.m.u - m $E = mc^2$ $E = 931 \text{ MeV}$

- 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}

$U_{92}^{238} + n_0^1$ ----- $U_{92}^{238} + n_0^1 \rightarrow U_{92}^{239} + \gamma$

- a) U_{93}^{238} b) U_{92}^{239} c) U_{92}^{238} d) U_{93}^{239}

3. In a paramagnetic material, the magnetic susceptibility χ_m is

- a) small positive b) large positive c) negative d) none

paramagnetic material, χ_m is positive.

- 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

superconductor resistivity is zero.

- 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

laser action condition is population inversion.

- 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) 6328 A° c) 6000 A° d) 0 A°

He-Ne ~~laser~~ laser output wavelength is -----.

- a) 5893 A° b) 6328 A° c) 6000 A° d) 0 A°

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

- a) $\frac{l_0}{\sqrt{1 - \frac{v^2}{c^2}}}$ b) $l_0 \sqrt{1 - \frac{v^2}{c^2}}$ c) $\frac{l_0}{1 - \frac{v^2}{c^2}}$ d) none

lo length is, v - speed of light, c - speed of light, $\lambda =$ -----.

- a) $\frac{l_0}{\sqrt{1 - \frac{v^2}{c^2}}}$ b) $l_0 \sqrt{1 - \frac{v^2}{c^2}}$ c) $\frac{l_0}{1 - \frac{v^2}{c^2}}$ d) none

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

- a) $\frac{\sqrt{2meV}}{h}$ b) $\frac{h}{\sqrt{2meV}}$ c) $\frac{m}{hV}$ d) none

m - mass, V - potential, h - Planck's constant, $\lambda =$ -----.

- a) $\frac{\sqrt{2meV}}{h}$ b) $\frac{h}{\sqrt{2meV}}$ c) $\frac{m}{hV}$ d) none

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

- a) $(1111)_2$ b) $(1011)_2$ c) $(1001)_2$ d) $(1100)_2$

$(15)_{10}$ binary equivalent 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

$(101101)_2$ and $(100111)_2$ binary addition result is -----.

- a) 010100 b) 1010100 c) 111110 d) none

PART B (5 X 5= 25)

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

Answer should not exceed 250 words.

11. (a) Explain the structure of nucleus.

ප්‍රෝටෝන සහ නියුට්‍රෝන ව්‍යුහය:-

OR

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

α -කිරණය කුමක්? එහි තුනකට වැඩි ගුණ ලිය:-

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

උත්ප්‍රේෂක හා අභ්‍යන්තර ද්‍රව්‍ය අතර වෙනස සඳහන් කර:-

OR

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

අව්‍යවස්ථිත ද්‍රව්‍ය කුමක්? එහි තුනකට වැඩි ගුණ ලිය:-

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

ප්‍රේරණය වන විකිරණය - යනු. ප්‍රේරණය වන විකිරණයේ තුනකට වැඩි ගුණ ලිය:-

OR

- (b) Define population inversion. Give any three methods of producing population inversion.

අති සංඝට්ටනය - යනු. අති සංඝට්ටනය නිපදවීමේ උපාය තුනකට වැඩි ගුණ ලිය:-

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

ඒක විශේෂ සාපේක්ෂතාවේ ප්‍රතිපත්ති තුනකට වැඩි ගුණ ලිය:-

OR

- (b) Explain length contraction due to relativistic motion.

සාපේක්ෂ චලනය හේතුකරවන දිග සංකෝචනය පිළිබඳව පැහැදිලි කර:-

15. (a) Convert the hexadecimal number $BC91_H$ into equivalent binary number.

$BC91_H$ ද්විත්ව අක්ෂරයකින් සමන්විත ඛණ්ඩයක සමතුල්ලත බැවින් පරිවර්තනය කිරීම:-

OR

- (b) Subtract 101101_2 from 100111_2 .

පිළිතුර:- $101101_2 - 100111_2$

PART C (5 X 8 = 40)

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

Answer should not exceed 600 words.

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

Պրոյեկտիվ լույսի օրինակով - օրինակով. Պրոյեկտիվ լույսի օրինակով
OR
Հարցազրույցի ժամանակ:-

- (b) Explain radio carbon dating.

Պրոյեկտիվ լույսի օրինակով լույսի օրինակով:-

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

Ֆերոմագնետիկ նյութերի հատկությունները. Պրոյեկտիվ լույսի օրինակով:-

OR

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

Սուպերհաղորդիչները. Պրոյեկտիվ լույսի օրինակով լույսի օրինակով:-

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

He-Ne լազերի կառուցումը, օրինակով լույսի օրինակով լույսի օրինակով:-

OR

- (b) Explain in detail the applications of Lasers.

Լազերի կիրառությունները. օրինակով լույսի օրինակով:-

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

Է - օրինակով լույսի օրինակով լույսի օրինակով:-

OR

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

Է - օրինակով լույսի օրինակով լույսի օրինակով:-

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

Զուգահեռ լույսի օրինակով, Զուգահեռ լույսի օրինակով լույսի օրինակով:-

OR

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

NOR և NAND լույսի օրինակով լույսի օրինակով լույսի օրինակով:-