

Student Roll Number

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Sample Roll Number

0	2	4	7	2	5
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**BN-XIIXVII-1**  
**PHYSICS (PART-II)**  
**SECTION -A**  
**(Version-I)**

Time : 20 Minute  
 Marks : 18

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

●	0	0	0	0	0
1	1	1	1	1	1
2	●	2	2	●	2
3	3	3	3	3	3
4	4	●	4	4	4
5	5	5	5	5	●
6	6	6	6	6	6
7	7	7	●	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Sign of Supdt:

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**Q.No.1:** You have four choices for each objective type question as (A), (B), (C) and (D). The choice which you think is correct fill that circle in front of the question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

- i. Ohm law is applicable when \_\_\_\_\_ remains constant.  
 (A) Volume      (B) Current      (C) Temperature      (D) Voltage      (A)    (B)    ●    (D)
- ii. The phase difference between the current and voltage in case of A.C through capacitor is;  
 (A) 0°      (B) 90°      (C) 180°      (D) 160°      (A)    ●    (C)    (D)
- iii. The equation of the frequency of cyclotron is;  
 (A)  $f = qB/2\pi m$       (B)  $f = 2\pi m / qB$       (C)  $f = qBm / 2\pi$       (D)  $f = 2\pi/qBm$       ●    (B)    (C)    (D)
- iv. A positive charge "Q" is divided into two parts "q" and "Q-q" and separated by a distance R, the force of repulsion between them is;  
 (A) Zero      (B)  $kq(Q-q)/R^2$       (C) Maximum      (D)  $q(Q-q)/4\pi\epsilon_0 R$       (A)    ●    (C)    (D)
- v. What is the co-efficient of mutual inductance when the magnetic flux changes by  $2 \times 10^{-2}$  Wb and change in current is 0.01A?  
 ●    2H      (B) 3H      (C) 1/2H      (D) Zero      ●    (B)    (C)    (D)
- vi. Choke absorbs or consumes what amount of power.  
 (A) Large      (B) Small      (C) Infinite      (D) Zero      (A)    (B)    ~~(C)~~    ●
- vii. Which one material is not brittle?  
 (A) Concrete      (B) Ceramic      (C) High carbon steel      (D) Diamond      (A)    (B)    (C)    ●
- viii. In transistor the central region base is doped \_\_\_\_\_  
 (A) Lightly      (B) Heavily      (C) Moderately      (D) Very highly      ●    (B)    (C)    (D)
- ix. The reverse saturation current in a P-N junction diode is only due to;  
 (A) Majority carrier      (B) Minority carrier      (C) Acceptor ions      (D) Doner ions      (A)    ●    (C)    (D)
- x. After emission of  $\beta$ -particles the thorium is transformed into;  
 (A) Protactinium      (B) Palladium      (C) Platinum      (D) Uranium      ●    (B)    (C)    (D)
- xi. Bracket series is obtained when all the transition terminate on;  
 (A) 4<sup>th</sup> orbit      (B) 3<sup>rd</sup> orbit      (C) 2<sup>nd</sup> orbit      (D) 1<sup>st</sup> orbit      ●    (B)    (C)    (D)
- xii. If the energy of a photon is E, it is equivalent to mass;  
 (A) E/c      (B) Ec<sup>2</sup>      (C) E/c<sup>2</sup>      (D) c<sup>2</sup>/E      (A)    (B)    ●    (D)
- xiii. Maximum power is delivered to a load "R" when internal resistance "r" of the source of e.m.f is;  
 (A) r>R      (B) r<R      (C) r=R      (D) r≥R      (A)    (B)    ●    (D)
- xiv. Which one of the following is true relation for capacitor;  
 (A)  $\epsilon_r = \epsilon_{med}/\epsilon_{vac}$       (B)  $\epsilon_r = \epsilon_{vac}/\epsilon_{med}$       (C)  $\epsilon_r = \epsilon_{vac} \times \epsilon_{med}$       (D)  $\epsilon_r = \epsilon_{med} - \epsilon_{vac}$       ●    (B)    (C)    (D)
- xv. Which one of the following has greater range in air?  
 (A)  $\alpha$ -particles      (B) Gamma particles      (C) Beta particles      (D) Helium nuclei      (A)    ●    (C)    (D)
- xvi. Which one of the following relations stands for Steffan-Boltzmann law?  
 (A)  $\lambda T = \text{constant}$       (B)  $E = \infty \frac{1}{T}$       (C)  $E = \sigma T^4$       (D)  $E = p^2/m$       (A)    (B)    ●    (D)
- xvii. The formula  $i/\lambda_n = R(\frac{1}{n^2} - \frac{1}{m^2})$  for which value of "P" gives Bracket series?  
 (A) P=1      (B) P=4      (C) P=3      (D) P=2      (A)    ●    (C)    (D)
- xviii. If a long straight wire carries a current of 1 ampere, then the magnitude of the magnetic field at a distance 1m from it is;  
 (A)  $2 \times 10^{-6}$  Tesla      (B)  $3 \times 10^{-7}$  Tesla      (C)  $2 \times 10^{-7}$  Tesla      (D)  $7 \times 10^{-7}$  Tesla      (A)    (B)    ●    (D)

Time allowed: 2:40 Hrs

Note: Attempt section B &amp; C accordingly.

**SECTION -B**

Marks: 40

Q.No 2. Attempt any (TEN) parts of the following. All parts carry equal marks.

- i. What is the application of electrostatic in the function of Inkjet printer?
- ii. What are the ions which constitute brain electrical current for EEG and how the abnormal behavior in brain is detected?
- iii. The I-V graph of semiconductor and thermistor is non-linear. What is the reason?
- iv. How the direction of the force  $\vec{F} = I(\vec{l} \times \vec{B})$  is determined? Describe the rule.
- v. What is the essential difference between a generator and electric motor?
- vi. Who did unify the subjects of optics and electromagnetism? Give examples of electromagnetic waves.
- vii. Prove that  $P = V_{rms} I_{rms}$  where "P" is the average power dissipated in R.
- viii. What is the technical importance of Stress-Strain graph and describe the applicability of Hook's law in this graph.
- ix. Describe the difference between P-type and N-type extrinsic semiconductor.
- x. Discuss the success and failure of Bohr's atomic model.
- xi. Who solved the problem of distribution of energy of black body radiation successfully, and what were the assumptions?
- xii. What are the elements called, which have same number of protons and different number of neutrons in the atoms of one same element. Give examples of such elements.
- xiii. Describe some characteristics of binding energy per nucleon curve.

**SECTION -C**

Marks: 27

Note: Attempt any (THREE) of the following. All questions carry equal marks.

- Q.No:3 a). State Faraday's law of electromagnetic induction and prove that  $\varepsilon = -N \frac{\Delta \phi}{\Delta t}$ .
- b). What is the co-efficient of mutual inductance when the magnetic flux changes by  $2 \times 10^2$  Wb, and change in current is 0.01A?
- Q.No:4 a). State Gauss's law and prove that  $\vec{E} = \sigma / \epsilon_0 \hat{n}$  where  $\vec{E}$  is the electric field intensity between two oppositely charged parallel plates.
- b). A  $6 \mu F$  capacitor is charged to a P.D of 200V and then connected in parallel with an uncharged  $3 \mu F$  capacitor. Calculate the P.D across the parallel plate capacitors.
- Q.No:5 a). What is black body radiation? Draw the exp-curve. Explain the Wein displacement law and Plank's quantum theory.
- b). The temperature of the skin is  $35^\circ C$ . What is the wave length at which the peak occurs in the radiation emitted from the skin?
- Q.No:6 a). What is a Nuclear Reaction? Describe the difference between Nuclear Fission and Fusion reactions.
- b). Calculate the energy released Q in the reaction i.e;
- $${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow {}_{92}^{236}\text{U} \rightarrow {}_{36}^{92}\text{Kr} + {}_{56}^{141}\text{Ba} + 3{}_0^1\text{n} + Q$$