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| **PB1/PHAK/1222/B 05-DEC-2022** | | | | | | | | |
| **PRE-BOARD EXAMINATION (2022-23)** | | | | | | | | |
| **Subject: Physics (ANSWER KEY)**  **Grade:** | | | Max. Marks: 70Time: 3 Hr | | | | | |
|  | **SECTION A** | | | | | |  | |
|  | **Multiple Choice Questions:** | | | | | |  | |
| **1** | A plane area of 100 cm2 is placed in uniform electric field of 100 N/C such that the angle between area vector and electric field is 600. The electric flux over the surface is | | | | | | | |
|  | **A** | 1 Nm2/C | | **B** | | 2 Nm2/C | | |
|  | **C** | 3 Nm2/C | | **D** | | 0.5 Nm2/C | | |
| **2** | Two capacitors of value C each are connected in parallel, when this combination is connected in series with an identical combination, the effective capacitance becomes | | | | | | | |
|  | **A** | C | | **B** | | 4C | | |
|  | **C** | 2C | | **D** | | C/2 | | |
| **3** | If drift velocity of electron is vd and intensity of electric field is E, then the relation obeys the Ohm’s law is: | | | | | | | |
|  | **A** | vd = constant | | **B** | | vd αE | | |
|  | **C** | vd α **√** E | | **D** | | vd αE2 | | |
| **4** | A proton and an alpha particle having the same initial speed enter a region of uniform magnetic field and describe circular paths. If the radii of the circles are R1 and R2respectiely, the ratio R1:R2 is | | | | | | | |
|  | **A** | 1:1 | | **B** | | 1:2 | | |
|  | **C** | 1:4 | | **D** | | 2:1 | | |
| **5** | The examples of diamagnetic, paramagnetic and ferromagnetic materials are respectively | | | | | | | |
|  | **A** | copper, aluminium, iron | | **B** | | aluminium, copper, iron | | |
|  | **C** | copper, iron, aluminium | | **D** | | aluminium, iron, copper | | |
| **6** | The average value of a 12 V peak sine wave over one complete cycle is | | | | | | | |
|  | **A** | 7.64 V | | **C** | | 1.27 V | | |
|  | **C** | 6.37 V | | **D** | | 0 V | | |
| **7** | In R-L-C series resonant circuit magnitude of resonance frequency can be changed by changing the value of | | | | | | | |
|  | **A** | R only | | **C** | | C only | | |
|  | **C** | L only | | **D** | | L or C | | |
| **8** | The optical density of turpentine is higher than that of water while its mass density is lower. Fig 9.2. shows a layer of turpentine floating over water in a container. For which one of the four rays incident on turpentine in Fig 9.2, the path shown is correct | | | | Ray Optics and Optical Instruments | | | |
|  | **A** | 1 | | **B** | | 2 | | |
|  | **C** | 3 | | **D** | | 4 | | |
| **9** | In the Young’s double slit experiment, the two equality bright slits are coherent, but of phase difference is pi/3. If the maximum intensity on the screen is I0, the intensity at the point on the screen equidistant from the slits is | | | | | | | |
|  | **A** | I0 | | **B** | | I0/2 | | |
|  | **C** | I0/4 | | **D** | | 3I0/4 | | |
| **10** | A shunt resistance required to allow 4% of the main current through the galvanometer of resistance 48Ω is | | | | | | | |
|  | **A** | 1 Ω | | **B** | | 2 Ω | | |
|  | **C** | 3 Ω | | **D** | | 4 Ω | | |
| **11** | When an electron jumps from the fourth orbit to the second orbit, one gets the | | | | | | | |
|  | **A** | Second line of Balmer series | | **B** | | First line of Pfund series | | |
|  | **C** | Second line of Paschen series | | **D** | | Second line of Lyman series | | |
| **12** | EM waves can be produced by a charge: | | | | | | | |
|  | **A** | An accelerated charged particle | | **B** | | at rest. | | |
|  | **C** | A charged particle moving with constant speed | | **D** | | either at rest or moving with constant velocity. | | |
| **13** | A half wave rectifier is being used to rectify an alternating voltage of frequency 50 Hz. The number of pulses of rectified current obtained in one second is | | | | | | | |
|  | **A** | 50 Hz | | **B** | | 200 Hz | | |
|  | **C** | 100 Hz | | **D** | | 25 Hz | | |
| **14.** | Find the true statement. | | | | | | | |
|  | **A** | Displacement current and conduction current are never equal | | **B** | | The current that flows through connection wires is called conduction current | | |
|  | **C** | During charging of the capacitor, in the connection wires, conduction current is discontinuous and displacement current is continuous | | **D** | | During charging of the capacitor, in the gap between the capacitor plates, conduction current is continuous and displacement current is discontinuous | | |
| **15** | Choose the pictures which are representing forward bias circuit | | | Description: http://www.dpssharjah.com/DPSSharjah/UserSpace/EEEQuestionBank/46009.jpg | | | | |
|  | **A** | 1,2 | | **B** | | 2,3 | | |
|  | **C** | 3,4 | | **D** | | 4,1 | | |
| **Assertion reason** | | | | | | | | |
| **16** | **Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. a) Both A and R are true and R is the correct explanation of A**  **b) Both A and R are true and R is NOT the correct explanation of A 1**  **c) A is true but R is false**  **d) A is false and R is also false**  **Assertion:** The resistivity of conductor increases with the increasing of temperature. **Reason** : The resistivity is the reciprocal of the conductivity. | | | | | | | |
|  | **A** | (a) | | **B** | | (b) | | |
|  | **C** | © | | **D** | | (d) | | |
| **17** | **Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.**  **a) Both A and R are true and R is the correct explanation of A**  **b) Both A and R are true and R is NOT the correct explanation of A 1**  **c) A is true but R is false**  **d) A is false and R is also false** Assertion : Amperes circuital law holds for steady currents which do not fluctuate with time Reason : Ampere’s circuital law is similar to that of Biot-savart’s law | | | | | | | |
|  | **A** |  | | **B** | | b) | | |
|  | **C** |  | | **D** | |  | | |
| **18.** | **Two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.**  **a) Both A and R are true and R is the correct explanation of A**  **b) Both A and R are true and R is NOT the correct explanation of A 1**  **c) A is true but R is false**  **d) A is false and R is also false**  **Assertion :**Between any two given energy levels, the number of absorption transitions is always less than the number of emission transitions. **Reason :**Absorption transitions start from the lowest energy level only and may end at any higher energy level. But emission transitions may start from any higher energy level and end at any energy level below it. | | | | | | | |
|  | **A** | a | | **B** | | b | | |
|  | **C** | c | | **D** | | d | | |
| **SECTION B** | | | | | | | | |
|  | --------------------1  ---------------------------------1 | | | | | | | 2 |
|  | ------------------------------------2 | | | | | | | 2 |
|  | 1. Principle ---------------------------------1 2. Any two loses and how to reduce --------------1 | | | | | | | 2 |
|  | Fig ------------------------------1/2  Derivation steps --------------1  Final answer ---------------------1/2 | | | | | | | 2 |
|  | 2. TIR wont occur | | | | | | | 2 |
|  | -----------------1  Explanation ------------------------------------------------------------------------------1 | | | | | | | 2 |
|  | What are energy bands? How are these formed? Distinguish between a conductor and a semiconductor on the basis of energy band diagram.  Energy bands and its formation------------------------------1  Distinguish -------------------------------------------------------1 | | | | | | | 2 |
|  | SECTION C | | | | | | |  |
|  | Statement -----------------------------------------1/2  1. Formula ---------------------------------------------------1/2 2. EA = - -------------------------------1   Ec = - --------------------------------1 | | | | | | |  |
|  | 1. ----------2 2. ------------------1 | | | | | | |  |
|  | Statement -----------------------------1  Fig --------------------------------1  Derivation ------------------------1 | | | | | | |  |
|  | Statement ----------------------------------------------1  --1  ---1 | | | | | | | 3 |
|  | 1. ---------------------------1 2. Circuit diagram of half wave rectifier -----------------1/2   Explanation -------------------------------------------1.5 | | | | | | | 3 |
|  | **SECTION D** | | | | | | |  |
|  | 1. Describe schematically the equipotential surfaces corresponding to    * 1. a constant electric field in the z-direction      2. a field that uniformly increases in magnitude but remains in a constant (say, z) direction--------------------1 2. fig -----------------------------------1   derivation ---------------------------1.5  graph ----------------------------1/2 | | | | | | | 5 |
|  | **OR** | | | | | | |  |
|  | ---------------1  ----------1  -------1  -------------1  --------------------1 | | | | | | |  |
|  | ----------2 ----------1  Define Wattless current -------------------------------------1    -----------------------------------------------------------------------------------------------1 | | | | | | | 5 |
|  | **OR** | | | | | | |  |
|  | ------------------------1  ----------------------1  -----------------------1  -----------1  --------------------1 | | | | | | |  |
|  | Fig --------------------1  -derivations with all suitable steps ----------------------1  Final expression ------------1  ----1  ----------------------1 | | | | | | |  |
|  | OR  1. Diagram ------------------------------1.5 2. Explanation -----------------------------1   -----1  -----------1  ---------------0.5 | | | | | | |  |
|  | Case Study :Read the following paragraph and answer the questions. | | | | | | |  |
|  | TWO STATEMENTS ------------- ½+1/2 | | | | | | | 1 |
|  | -----------1 | | | | | | | 1 |
|  | Formula = slope --------------------1/2  6/2 = 3 ohm --------------------------1  1 ohm each cell ----------------------1/2 | | | | | | | 2 |
|  | **OR**  **---------2** | | | | | | |  |
| **35.** | Case study | | | | | | |  |
|  | Any suitable difference --------------------1 | | | | | | | 1 |
|  | if the distance D is very large compared to the fringe width, the fringes will be very nearly straight lines | | | | | | | 1 |
|  | ------------1  81:1.------------------------------------------------1 | | | | | | | 2 |
|  | **OR** | | | | | | |  |
|  | -----------1  ---1 | | | | | | | 2 |

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