Space for rough work

CANDIDATE ANSWER BOOKLET JEE

Learn At Quest

CANDIDATE DETAILS

NAME OF STUDENT

DATE OF EXAMINATION ☐☐ / ☐☐ / ☐☐☐☐

CLASS ☐☐

BOARD ☐☐☐☐

TIME DURATION ☐☐ : ☐☐ To ☐☐ : ☐☐

READ THE INSTRUCTIONS CAREFULLY

- Please read these instructions carefully. A candidate who breaches any of the Examination Regulations will be liable to disciplinary action

- Examinations will be conducted during the allocated times shown in the examination timetable.

- Do NOT turn over the question paper until instructed at the time of commencement of the examination.

- Any unauthorised materials or devices found in your possession after the start of the examination will be confiscated, and you will be liable to disciplinary action.

- Handphones brought into the examination hall must be switched off at ALL times. If your handphone is found to be switched on in the examination hall, the handphone will be confiscated and retained for investigation of possible violation of regulations.

- Please check that you have the correct question paper and read the instructions printed on your examination question paper carefully.

- You are not allowed to communicate by word of mouth or otherwise with other candidates (this includes the time when answer scripts are being collected).

- Please raise your hand if you wish to communicate with an invigilator.

- Unless granted permission by an invigilator, you are not allowed to leave your seat.

- Once you have entered the examination hall, you will not be allowed to leave the hall until one hour after the examination has commenced.

QUESTION PAPER FORMAT

- The question paper contains **15 INTEGER TYPE QUESTIONS** (TOTAL: 120 Marks)

- Answer to every question is an integer ranging from **00 to 99**.

- Mark your answer in the boxes alongside the questions (without units).

- Each question carries **8 marks**.

- Marking Scheme:
  Correct answer: +8 marks
  Wrong answer: -2 marks
  No attempt: 0 marks

SCORE CARD

+8 ☐

**0** ☐

-2 ☐

Total Score

Pass Score

Result

Pass/**Fail**

1. The bob of a simple pendulum has a mass of 40 g and a positive charge of 4.0×10^{-6} C. It makes 20 oscillations in 45 s. A vertical electric field pointing upward and of magnitude 2.5×10^4 N/C is switched on. How much time will it now take to complete 20 oscillations ?

Answer: ☐☐

2. What is the magnitude of magnetic field at the centre 'O' of loop of radius $\sqrt{2}$ m made of uniform wire when a current of 1 amp enters in the loop and taken out of it by two long wires as shown in the figure.
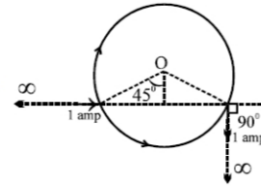
Answer: ☐☐

3. A stationary, circular wall clock has a face with a radius of 15cm. Six turns of wire are wound around its perimeter, the wire carries a current 2.0 A in the clockwise direction. The clock is located, where there is a constant , uniform external magnetic field of 70 mT (but the clock still keeps perfect time) at exactly 1:00 pm, the hour hand of the clock points in the direction of the external magnetic field After how many minutes will the minute hand point in the direction of the torque on the winding due to the magnetic field ?

Answer: ☐☐

4. An electric field of 30 N/C exists along the negative x-axis in space. Calculate the potential difference $V_B - V_A$ where the points A and B are given by, A = (4m, 2m) ; B = (6m, 5m)

Answer: ☐☐

5. Four point charges $+ 8\ \mu C$, $- 1\ \mu C$, $- 1\ \mu C$ and $+ 8\ \mu C$, are fixed at the points,

$-\sqrt{\frac{27}{2}}$ m , $-\sqrt{\frac{3}{2}}$ m, $+\sqrt{\frac{3}{2}}$ m and $+\sqrt{\frac{27}{2}}$ m respectively on the y−axis. A particle of mass

6×10^{-4} kg and of charge $+ 0.1\ \mu C$ moves along the -x direction . Its speed at $x = + \infty$ is v_0 . Find the least value of v_0 for which the particle will cross the origin. Find also the kinetic energy
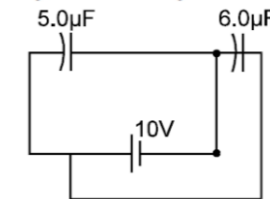
Answer: ☐☐

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6. Magnitude of electric field depends only on the x – coordinate given $\vec{E} = \dfrac{20}{x^2}\hat{i}$ V / m . Find the potential difference between two point A (5m, 0) and B (10m, 0).

Answer:

7. Find the charge supplied by the battery in the arrangement shown in figure on 5μC

Answer:

8. Find the charge supplied by the battery in the arrangement shown in figure on 6μC

Answer:

9. A capacitor with stored energy 4.0 J is connected with and identical capacitor with no electric field in between. Find the total energy stored in the two capacitors finally.
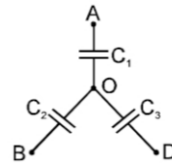
Answer:

10. Five capacitors are connected as shown in figure below. Initially S is opened and all capacitors are uncharged. When S is closed, steady state is obtained. Then find out potential difference between the points M and N.
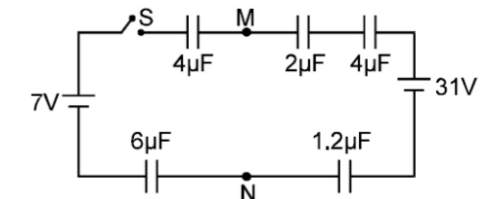
Answer:

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11. Three uncharged capacitors of capacitance $C_1 = 1\mu F$, $C_2 = 2\mu F$ and $C_3 = 3\mu F$ are connected as shown in figure to one another and to points A, B and D potentials $\phi_A = 10$ V, $\phi_B = 25$ V and $\phi_D = 20$ V. Determine the potential (ϕ_0) at point O.

Answer: ☐☐

12. The circular plates A and B of a parallel plate air capacitor have a diameter of 0.1 m and are 2×10^{-3} m apart. The plates C and D of a similar capacitor have a diameter of 0.12 m and are 3×10^{-3} m apart. Plate A is earthed. Plates B and D are connected together. Plate C is connected to the positive pole of a 120 volt battery whose negative is earthed. Calculate
    The combined capacitance of the arrangement in pF

Answer: ☐☐

13. A metal target consist of large number of atoms (with each atom having number of neutrons is 30). The radius ratio of the target nucleus to $_2^4 He$ is $(14)^{1/3}$.

    Find the atomic number of metal

Answer: ☐☐

14. Find the quantum number n corresponding to the excited state of He^+ ion if on transition to the ground state that ion emits two photons in succession with wave lengths 108.5 and 30.4 nm.

Answer: ☐☐

15. A pin of length 2.0 cm lies along the principal axis of a converging lens, the centre being at a distance of 11 cm from the lens. The focal length of the lens is 6 cm. Find the size of the image.

Answer: ☐☐

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