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கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2021 ஓகஸ்ட்
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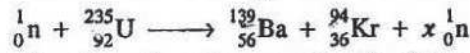
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பௌதிகவியல் I
Physics I

Advanced Level Physics
Amith Pussella

Multiple Choice Questions

- Electromagnetic radiation of frequency f is incident on a photosensitive surface of which threshold frequency for emission of photoelectrons is f_0 . Which of the following is **not true**?
 (1) No photoelectrons are emitted when $f < f_0$.
 (2) f_0 is a characteristic feature of the material of the photosensitive surface.
 (3) When $f > f_0$, the rate of the emission of photoelectrons increases as the intensity of incident radiation increases.
 (4) The stopping potential is directly proportional to f^2 .
 (5) The stopping potential is independent of the intensity of the incident radiation.

- A slow neutron is absorbed by a $^{235}_{92}\text{U}$ nucleus and results in a fission process as follows.



The value of x (number of neutrons produced) of the above fission process is

- (1) 1 (2) 2 (3) 3 (4) 4 (5) 5

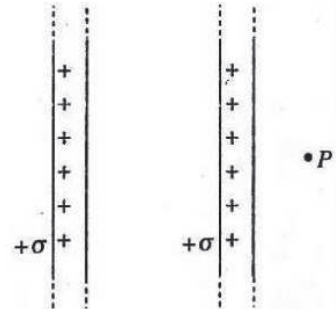
- Consider the following statements made regarding a transformer.
 (A) The core of the transformer is made out of laminated plates of soft iron.
 (B) Both Joule heating and eddy currents contribute to the energy loss of a transformer.
 (C) Power can be amplified using a transformer.

Of the above statements

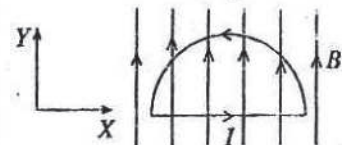
- (1) only (A) is true. (2) only (B) is true.
 (3) only (A) and (B) are true. (4) only (B) and (C) are true.
 (5) all (A), (B) and (C) are true.

- Two large non-conducting plane sheets, each having a uniform surface charge density $+\sigma$ on one side, are situated parallel to each other as shown. The electric field intensity at a point P is

- (1) $\frac{2\sigma}{\epsilon_0}$ (2) $\frac{\sigma}{\epsilon_0}$ (3) $\frac{\sigma}{2\epsilon_0}$
 (4) $\frac{\sigma}{4\epsilon_0}$ (5) 0



- A wire bent into the shape of a semicircle forms a closed loop and carries a current I as shown in figure. The loop lies in the XY plane and a uniform magnetic field is present along the Y direction. Which of the following is true regarding the forces acting on the circular and the straight portions of the loop due to the magnetic field?

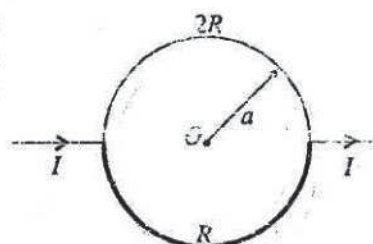


	Force on the circular portion	Force on the straight portion
(1)	zero	into the paper
(2)	zero	out of the paper
(3)	into the paper	into the paper
(4)	into the paper	out of the paper
(5)	out of the paper	into the paper

6. Small amount of powdered pepper was sprinkled on the surface of water in a cup and the water surface was touched with a clean dry finger tip. Then the finger tip was rubbed with a little soap and the same process was repeated. Which of the following observation is likely to be seen in the above processes?

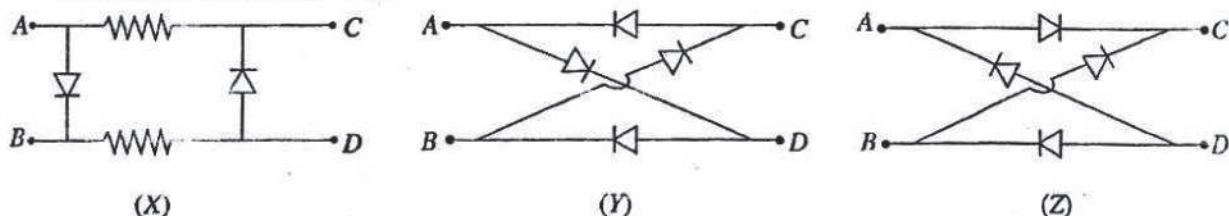
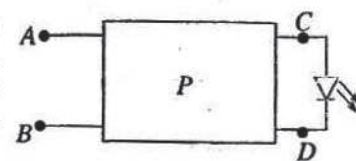
	Cleaned and dried finger tip	Soapy finger tip
(1)	Pepper powder tend to move away from the finger tip.	Pepper powder tend to flock around the finger tip.
(2)	Pepper powder tend to move away from the finger tip.	Pepper powder tend to move away from the finger tip.
(3)	Nothing happens to the distribution of pepper powder.	Pepper powder tend to flock around the finger tip.
(4)	Nothing happens to the distribution of pepper powder.	Pepper powder tend to move away from the finger tip.
(5)	Pepper powder tend to flock around the finger tip.	Pepper powder tend to flock around the finger tip.

7. Lower half of the circular wire loop of radius a , shown in figure is made of a wire of resistance R and the upper half with a wire of resistance $2R$. The magnetic flux density at the center (O) of the wire loop is given by



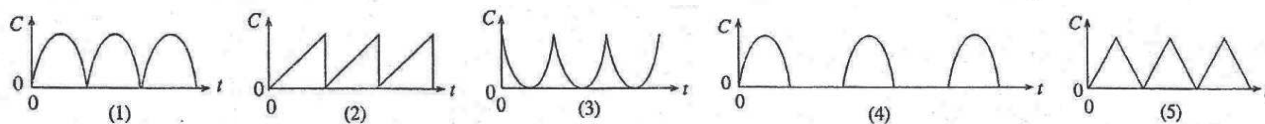
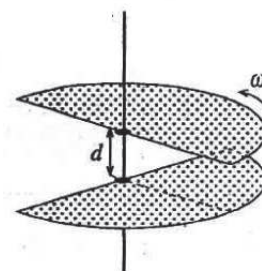
- (1) $\frac{\mu_0 I}{4a}$ (2) $\frac{\mu_0 I}{6a}$ (3) $\frac{\mu_0 I}{12a}$
 (4) $\frac{\mu_0 I}{16a}$ (5) $\frac{\mu_0 I}{18a}$

8. The box P shown contains a circuit and when a battery is connected between A and B , the Light Emitting Diode (LED) connected to the circuit is lit. Which of the following circuit/circuits inside the box P enables/enables the Light Emitting Diode to be lit even when the battery terminals are interchanged between A and B ?

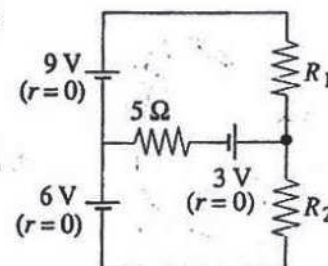


- (1) Only X and Y (2) Only Y and Z
 (3) Only X and Z (4) Only Y
 (5) Only Z

9. A variable parallel plate capacitor is made of two identical semi-circular metal plates that can be rotated about the common axis passing through the centres of each plate and perpendicular to them, as shown in the figure. If one plate rotates with constant angular speed ω , relative to the other, the variation of the capacitance C of the capacitor with time t is best represented by



10. If no current flows through the 5Ω resistor in the circuit shown, what is the value of ratio $\left(\frac{R_1}{R_2}\right)$?



- (1) $\frac{2}{5}$ (2) $\frac{3}{5}$ (3) $\frac{2}{3}$
 (4) 1 (5) $\frac{3}{2}$