



## PHYSICS

### BOOKS - AIIMS PREVIOUS YEAR PAPERS

#### AIIMS 2019 25 MAY MORNING SHIFT

#### Physics

1. A person wear normal spectacles in which the distance of glasses and eyes is approximately 2 cm. then power required is  $-5D$  if the wears contact lens, then the requires power is

- A.  $-5.2D$
- B.  $-4.54D$
- C.  $+5.2D$
- D.  $+4.7D$

**Answer: B**



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2. If radius of the earth is 6347 km, then what will be difference between acceleration of free falls and acceleration due to gravity near the earth's surface?

- A. A. 0.34
- B. B. 0.034
- C. C. 0.0034
- D. D. 0.24

**Answer: B**



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3. A semi circular arc of radius  $r$  and a straight wire along the diameter, both are carrying same current  $i$  find out magnetic force per unit length on the small element  $P$ , which is at the centre of curvature.



A.  $\left(\frac{\mu_0 i^2}{4r}\right)$

B.  $\left(\frac{\mu_0 i^2}{2r}\right)$

C.  $\left(\frac{\mu_0 i^2}{r}\right)$

D.  $\left(\frac{2\mu_0 i^2}{r}\right)$

**Answer: A**



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4. Find the charge in steady state of the capacitor



A.  $10nC$

B.  $20nC$

C.  $30nC$

D.  $40nC$

**Answer: A::C**



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5. A current of 10 amp is passing through a metallic wire of cross sectional area  $4 \times 10^{-6} m^2$ . If the density of the aluminium conductor is 2.7 gm/cc considering aluminium gives 1 electrons per atom for conduction find the drift speed of the electrons if molecular weight of aluminium is 27 gm.

A.  $1.6 \times 10^{-4} m/s$

B.  $3.6 \times 10^{-4} m/s$

C.  $2.6 \times 10^{-4} m/s$

D.  $1.5 \times 10^{-4} m/s$

**Answer: C**



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6. If speed of sound in air is 330 m/s then find the number of tones present in an open organ pipe of length 1 m whose frequency is  $\leq 1000$ .

A. 2

B. 4

C. 8

D. 6

**Answer: D**



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7. An electron is revolving in  $n=3$  orbit. What will be the magnetic field at the centre of hydrogen atom.

A. a) 0.1 T

B. b) 5T

C. c) 0.5T

D. d) 0.05T

**Answer: D**



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8. A light of wavelength 500 nm is incident on a young's slit. The distance between slits and screen is  $D=1.8\text{m}$  and distance between slits is  $d=0.4\text{ mm}$ . if screen moves with a speed 4m/s, with what speed first maxima will move?

A. a. 5mm/s

B. b.4mm/s

C. c.3mm/s

D. d.2mm/s

**Answer: A**



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9. An electron collides with a hydrogen atom in its ground state and excites it to  $n = 3$  . The energy gives to hydrogen atom in this inelastic collision is [Neglect the recoiling of hydrogen atom]

- A. 12.1 eV
- B. 10.2 eV
- C. 12.75 eV
- D. 10 eV

**Answer: A**



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10. A transformer with turns ratio  $\frac{N_1}{N_2} = \frac{50}{1}$  is connected to a 120 volt AC supply. If primary and secondary circuit resistance are  $1.5k\Omega$  and  $1\Omega$  respectively then find out power out put.

A. 5.76 W

B. 11.4 W

C. 2.89 W

D. 7.56 W

**Answer: A**



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11. Modern treatment method P.E.T is based on !

A. proton emission

B. positron emission

C.  $\beta^-$  emission



D. particle emission

**Answer: B**

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12. A gun applies a force  $F$  on a bullet which is given by  $F = (100 - 0.5 \times 10^5 t) N$ . The bullet emerges out with speed 400 m/s. then find out the impulsive exerted till force on bullet becomes zero.

A. 0.2N-s

B. 0.3N-s

C. 0.1N-s

D. 0.4N-s

**Answer: C**

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13. A proton is projected with velocity  $\vec{V} = 2\hat{i}$  in a region where magnetic field  $\vec{B} = (\hat{i} + 3\hat{j} + 4\hat{k})\mu T$  and electric field  $\vec{E} = 10\hat{i}\mu V/m$

. Then find out the net acceleration of proton:

A.  $1400m/s^2$

B.  $700m/s^2$

C.  $1000m/s^2$

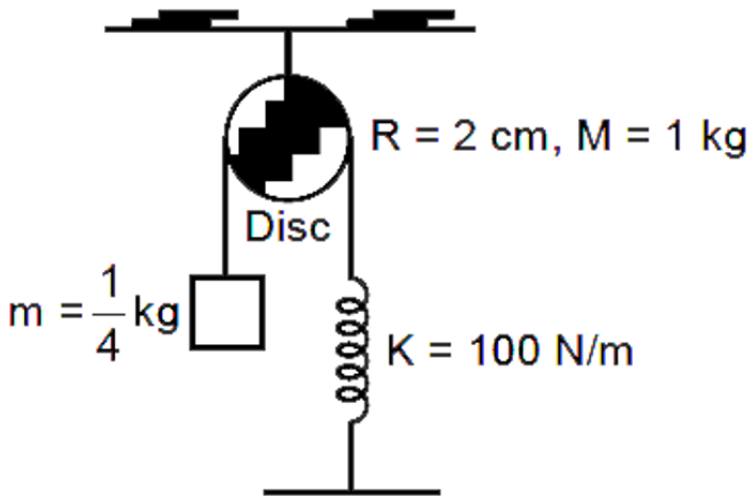
D.  $800m/s^2$

**Answer: A**



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14. For the system given below, find the angular frequency of oscillation?



A.  $\frac{10}{\sqrt{3}}$

B.  $10\sqrt{3}$

C.  $\frac{20}{\sqrt{3}}$

D.  $20\sqrt{3}$

Answer: C



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15. For a telescope, focal length of objective lens is 15 cm and focal length of eye piece is 10 mm. if tube length is 16 cm, then find the magnification.

A. 150

B. 15

C. 1.5

D. 10

**Answer: B**



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16. If sink and source temperature of a refrigerator are  $4^{\circ}C$  and  $15^{\circ}C$  respectively. Then efficiency of refrigerator is:

A. 0.076

B. 0.0382

C. 0.019

D. 1

**Answer: B**



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17. In an isothermal process 2 water drops of radius 1 mm are combined to form a bigger drop. Find the energy change in this process if  $T=0.1 \text{ N/m}$

A.  $1\mu F$

B.  $0.5\mu J$

C.  $0.25\mu F$

D.  $0.75\mu F$

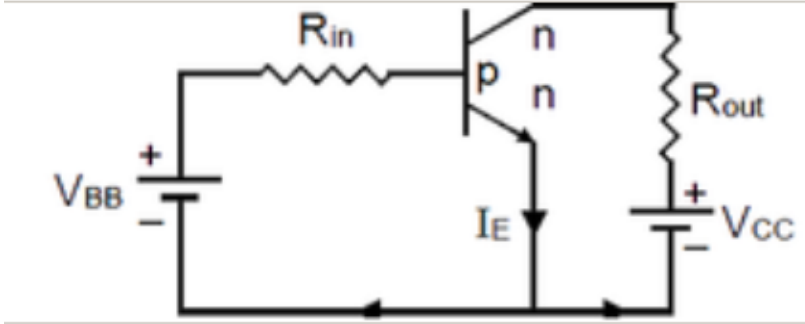
**Answer: B**



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18. The given transistor operates in saturation region then what should be the value of  $V_{BE}$

( $R_{out} = 200\Omega$ ,  $R_{in} = 100K\Omega$ ,  $V_{CC} = 3\text{volt}$ ,  $V_{BE} = 0.7\text{volt}$ ,  $V_{CE} = 0$ ,  $\beta = 2$ )



- A. 4.1 volt
- B. 7.5 volt
- C. 8.2 volt
- D. 6.8 volt

Answer: C



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19. Body  $A$  of mass  $4m$  moving with speed  $u$  collides with another body  $B$  of mass  $2m$  at rest, the collision is head on and elastic in nature. After the collision the fraction of energy lost by colliding body  $A$  is :

A.  $\frac{5}{9}$

B.  $\frac{1}{9}$

C.  $\frac{8}{9}$

D.  $\frac{4}{9}$

**Answer: C**



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20. A disc of radius 20 cm and mass half kg is rolling on an inclined plane. Find out friction force so that disc performs pure rolling.



A.  $\frac{5\sqrt{2}}{3} N$

B.  $\frac{5}{3\sqrt{2}}N$

C.  $\frac{5}{\sqrt{2}}N$

D.  $\frac{5}{2\sqrt{3}}N$

**Answer: B**



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21. If temperature of Sun=6000K, radius of Sun is  $7.2 \times 10^5 Km$ , radius of earth=6000 Km & distance between earth and Sun =  $15 \times 10^7 Km$ . find intensity of light on earth.

A.  $38.4 \times 10^{16}$

B.  $12.2 \times 10^{16}$

C.  $18.3 \times 10^{16}$

D.  $8.2 \times 10^{16}$

**Answer: A**





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22. If radius of  $O_2$  molecule =  $40\text{\AA}$ .  $T = 27^\circ C$  and  $P=1\text{atm}$ . Find the time of relaxation.

A.  $10^{-10}$  sec

B.  $10^{-12}$  sec

C.  $10^{-14}$  sec

D.  $10^{-8}$  sec

Answer: B



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23. Frequency of L-C circuit is  $f_1$ . If a resistance  $R$  is also added to it the frequency becomes  $f_2$ . The ratio of  $\frac{f_1}{f_2}$  will be.

A.  $\sqrt{1 + \frac{R^2 C}{4L}}$

B.  $\sqrt{1 - \frac{R^2C}{4L}}$

C.  $\sqrt{1 + \frac{R^2C}{L}}$

D.  $\sqrt{1 - \frac{R^2C}{L}}$

**Answer: B**



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**24.** 

If one mole of an ideal gas goes through the process

$A \rightarrow B$  and  $B \rightarrow C$ . Given that  $T_A = 400K$ , and  $T_C = 400K$ . If

$\frac{P_A}{P_B} = \frac{1}{5}$ , then find the heat supplied to the gas.

A. 2049.2 J

B. 3659.2 J

C. 2225.2 J

D. 2659.2 J

**Answer: D**



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**25.** A capacitor of capacitance 9nF having dielectric slab of  $\epsilon_r = 2.4$  dielectric strength 20 MV/m and P.D.=20V calculate area of plates.

A.  $2.1 \times 10^{-4} m^2$

B.  $4.2 \times 10^{-4} m^2$

C.  $1.4 \times 10^{-4} m^2$

D.  $2.4 \times 10^{-4} m^2$

**Answer: B**



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**26.** In figure two parallel infinitely long current carrying wires are shown.

If resultant magnetic field point A is zero. Then determine current I.



A. 50A

B. 15A

C. 30A

D. 25A

**Answer: C**



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27. A liquid enter at point  $A_1$  with speed 3.5 m/s and leaves at point  $A_2$ .

Then find out the height attained by the liquid above point  $A_2$  .



A. 61.25 cm

B. 51.25 cm

C. 41.25 cm

D. 71.25 cm

**Answer: A**



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28. If potential energy is given by  $U = \frac{a}{r^2} - \frac{b}{r}$ . Then find out maximum force. (given  $a=2, b=4$ )

A.  $-\frac{16}{27}N$

B.  $-\frac{32}{27}N$

C.  $+\frac{32}{27}N$

D.  $+\frac{16}{27}N$

**Answer: A**



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29. Find  $\gamma$  for the mixture of 11 gm  $CO_2$  and 14 gm  $N_2$ ?

A.  $\gamma_{mix} = \frac{7}{5}$

B.  $\gamma_{mix} = \frac{10}{5}$

C.  $\gamma_{mix} = \frac{11}{8}$

D.  $\gamma_{mix} = \frac{4}{3}$

**Answer: A**



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30. The de-Broglie wavelength of electron in 3<sup>rd</sup> orbit of  $He^{+1}$  ion is approximately

A.  $2A^\circ$

B.  $3A^\circ$

C.  $4A^\circ$

D.  $5A^\circ$

**Answer: D**



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**31.** Find ratio of acceleration and angular acceleration of com? If for the above diagram  $m=2\text{kg}$  and  $r=10\text{ cm}$



A.  $\frac{1}{5}$

B.  $\frac{1}{10}$

C.  $\frac{1}{15}$

D.  $\frac{1}{20}$

**Answer: D**



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32. Find total energy,  $PE&KE$  of electron in :

(A)  $2^{nd}$  orbit of  $He^+$  ion.

(B)  $1^{st}$  excited state of  $Be^{+3}$  ion.

A.  $-10.6eV$

B.  $-13.6eV$

C.  $-15.6eV$

D.  $-25.6eV$

**Answer: C**



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33. A toroid having average diameter 2.5 m, number A turns 400 , current=2A and magnetic field has 10T what will be induced magnetic field (in amp/m)

A.  $\frac{10^5}{4\pi}$



B.  $\frac{10^8}{4\pi}$

C.  $\frac{10^8}{2\pi}$

D.  $\frac{10^2}{2\pi}$

**Answer: B**



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**34. Find magnification for lens.**



A. 2

B. 5

C. 7

D. 12

**Answer: B**



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35. Calculate radiationn powe for sphere whose temperature is  $227^{\circ}C$  and radius 2 m and emissivity 0.8.

A. 1425 W

B. 1500W

C. 1255W

D. 1575W

**Answer: A**



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36. Determine efficiency of carnot cycle if in adiabatic expansion volume 3 times of initial and  $r=1.5$ .

A.  $1 - \frac{1}{\sqrt{2}}$

B.  $1 - \frac{1}{\sqrt{3}}$

C.  $1 + \frac{1}{\sqrt{2}}$

D.  $1 + \frac{1}{\sqrt{3}}$

**Answer: B**



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37. Amximum amplitude of SHM so block A will not slip on block B,

K=100N/m



A. 2

B. 4

C. 6

D. 8

**Answer: C**



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38. The temperature of food material in refrigerator is  $4^{\circ}\text{C}$  and temperature of environment is  $15^{\circ}\text{C}$ . If carnot cycle is used in its working gas, then find its carnot efficiency.

A. a.0.038

B. b.0.028

C. c.0.053

D. d.0.072

**Answer: A**



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39. The graph between velocity and position for a damped oscillation will be-

A. Straight line

B. circle

C. ellipse

D. spiral

**Answer: D**



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**40.** Assertion: In  $u_{235}$  fission reaction neutrons are required to be slowed down.

Reason: The probability of capture of slow moving neutrons is high for  $u_{235}$ .

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: A**

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41. Assertion:  $P$  v/s  $\frac{1}{V}$  graph is straight line for adiabatic process.

Reason:  $PV = \text{constant}$  for adiabatic process.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: D**

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42. Assertion: Electron moving perpendicular to  $\vec{B}$  will perform circular motion.

Reason: Force by magnetic field is perpendicular to velocity.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**



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43. Assertion: A glass ball is dropped on concrete floor can easily get broken compared if it is dropped on wooden floor.

Reason: On concrete floor glass ball will take less time to come to rest.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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**44.** Assertion: Distance between position of bright and dark fringe remain same in YDSE.

Reason: Fringe width  $\beta = \frac{\lambda D}{d}$ .



- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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**45.** Assertion: Paramagnetic substances get poorly attracted in magnetic field.

Reason: Because magnetic dipoles are aligned along external magnetic field weakly.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. if assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: A**

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**46.** Assertion: Heavy water is used to slow down neutron in nuclear reactor.

Reason: It does not react with slow speed neutron and mass of deuterium is comparable to the neutron

A. 1. If both assertion and reason are true and reason is the correct explanation of assertion.

B. 2.If both assertion and reason are true but reason is not the correct explanation of assertion.

C. 3.if assertion is true but reason is false.

D. 4. If both assertion and reason are false.

**Answer: A**



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**47.** Assertion: Collisionn between two billiard's ball are inelastic

Reason: Momentum remains conserve during the collision.

A. 1. If both assertion and reason are true and reason is the correct explanation of assertion.

B. 2. If both assertion and reson are true but reason is not the correct explanation of assertion.

C. 3. if assertion is true but reason is false.

D. 4. If both assertion and reason are false.

**Answer: B**

**48.** Assertion: Rayleigh scattering can be considered as elastic collisions of photons with massive particles.

Reason: In Rayleigh scattering. The energy of incident and scattered is same.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reson are true but reason is not the correct explanation of assertion.
- C. if assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**

**49.** Assertion: FM broadcast is better than AM broadcast.

Reason: Noise change is maximum is amplitude of AM waves.

- A. 1.If both assertion and reason are true and reason is the correct explanation of assertion.
- B. 2.If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. 3.If assertion is true but reason is false.
- D. 4.If both assertion and reason are false.

**Answer: A**



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**50.** Assertion: In adiabatic process work is independent of path.

Reason: In adiabatic process work done is equal to negative of change in internal energy.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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**51.** Assertion: Water drops take spherical shape when falling freely.

Reason: Water has minimum surface tension among all liquids.

- A. 1. If both assertion and reason are true and reason is the correct explanation of assertion.

B. 2.If both assertion and reson are true but reason is not the correct explanation of assertion.

C. 3.if assertion is true but reason is false.

D. 4.If both assertion and reason are false.

**Answer: D**

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**52.** Assertion: In ionospheric reflection, phase change does not occurs with the light wave.

Reason: The ionosphere reflection is similar to the total internal reflection is similar to the total internal reflection in miral.

A. 1.If both assertion and reason are true and reason is the correct explanation of assertion.

B. 2.If both assertion and reson are true but reason is not the correct explanation of assertion.

C. 3.if assertion is true but reason is false.

D. 4.If both assertion and reason are false.

**Answer: A**



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**53.** Assertion: There is not loss in energy in elastic collision.

Reason: Linear momentum is conserved in elastic collision.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. if assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: B**



**54.** Assertion: In both radio activity and photoelectric effect electrons may be ejected.

Reason: In photoelectric effect and radio activity emission occurs only of unstable elements.

- A. 1. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. 2. If both assertion and reason are true but reason is not the correct explanation of assertion.
- C. 3. If assertion is true but reason is false.
- D. 4. If both assertion and reason are false.

**Answer: C**