PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT

1960 PHYSICS (HINGLISH)

KINETIC THEORY OF GASES

Questions

1. The temperature of a gas at pressure P and volume V is $27^{\circ}C$. Keeping its volume

constant if its temperature is raised to $927^\circ C$, then its pressure will be

A. 2P

B. 3P

C. 4P

D. 6P

Answer: C

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2. 4 moles of an ideal gas is at $0^\circ C$. At constant pressure it is heated to double its volume, then its final temperature will be

A. $0^\circ C$

B. $273^\circ C$

C. $546^\circ C$

D. $136.5^\circ C$

Answer: B

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3. Every gas (real gas) behaves as an ideal gas

A. At high temperature and low pressure

B. At low temperature and high pressure

C. At normal temperature and pressure

D. None of the above

Answer: A

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4. Boyle's law holds for an ideal gas during

A. Isobaric changes

B. Isothermal changes

C. Isochoric changes

D. Isotonic changes

Answer: B

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5. The unit of universal gas constant is

A. $cal\ |^{\circ}\ C$

B. J/mol

C. $Jmol^{-1}K^{-1}$

D. J/Kg

Answer: C

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6. Molecules of a gas behave like

A. Inelastic rigid sphere

B. Perfectly elastic non-rigid sphere

C. Perfectly elastic rigid sphere

D. Inelastic non-rigid sphere

Answer: C

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7. In short wave communication waves of which of the following frequencies will be reflected back by the ionospheric layer, having electron density $10^{12} perm^3$

A. 2 MHz

B. 10 MHz

C. 12 MHz

D. 18 MHz

Answer: A

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8. In an amplitude modulated wave for audio frequency of $500 \text{cycle} / \text{sec} ond$,the appropriate carrier frequency will be

A. 50 cycles/sec

B. 100 cycles/sec

C. 500 cycles/sec

D. 50,000 cycles/sec

Answer: D

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9. AM is used for broad casting because,

A. It is more noise immune than other modulation systems

B. It requires less transmitting power compared with other systems

C. Its use avoids receiver complexity

D. No other modulation system can provide the necessary bandwidth faithful

transmission

Answer: C

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10. Range of frequencies allotted for commercial FM radio broadcast is

A. 88 to 108 MHz

B. 88 to 108 KHz

C. 8 to 88 MHz

D. 88 to 108 GHz

Answer: A

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11. The velocity factor of a transmission line x.

If dielectric constant of the medium is 2.6,

A. 0.26

B. 0.62

C. 2.6

D. 6.2

Answer: B

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12. The process of superimposing signal frequency (i.e. audio wave) on the carrier wave is known as

A. Transmission

B. Reception

C. Modulation

D. Detection

Answer: C

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13. Long distance short-wave radio broadcasting uses

A. Ground wa

B. Ionospheric wave

C. Direct wave

D. Sky wave

Answer: C

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14. A sept index fibre has a relavitive refractive index of 0.88%. What is the critical angle at the core-cladding interface?

A. 60°

B. 70°

C. 45°

D. None of these

Answer: D

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15. The characteristic impedance of a coaxial cable is of the order of

A. 50Ω

B. 200Ω

C. 270Ω

D. None of these

Answer: C

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16. In which frequency range, space waves are normally propagated?

A. HF

B. VHF

C. UHF

D. SHF

Answer: C

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17. If μ and μ_2 are the refractive indices of the materials of core and cladding of an optical fibre, then loss of light due to its leakage can be minimised by having

A. $\mu > \mu$

B. $\mu < \mu$

C. $\mu = \mu$

D. None of these

Answer: A

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18. Through which mode of propagation, the radio waves can be sent from one place to another

A. Ground wave propagation

B. Sky wave propagation

C. Space wave propagation

D. All of them

Answer: D

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19. A laser beam of pulse power 1012 watt is focussed on an object are 10–4 cm . The energy flux in watt|cm at the point of focus is

A. 10^{-}

B. 10^{-}

C. 10^{-}

D. 10^{-}

Answer: B

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20. The carrier frequency generated by a tank circuit containing $1nF$ capacitor and $10\mu H$ inductor is

A. 1592 Hz

B. 1592 MHz

C. 1592 KHz

D. 159.0 HZ

Answer: C

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21. Broadcasting antennas are generally

A. Omnidirectional type

B. Vertical type

C. Horizontal type

D. None of these

Answer: B

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22. For television broadcasting, the frequency employed is normally

A. 30-300 MHz

B. 30-300 GHz

C. 30-300 KHz

D. 30-300 HZ

Answer: A

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23. The ratio waves of frequency $300MHz$ to $3000MHz$ belong to

A. High frequency band

B. Very high frequency band

C. Ultra high frequency band

D. Super high frequency band

Answer: C

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24. An antenna behaves as resonant circuit only when its length is

A. $\frac{\lambda}{2}$

B. $\frac{\lambda}{4}$

C. λ

D. $\frac{\lambda}{2}$ or intergral multiple $\frac{\lambda}{2}$

Answer: D

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25. Maximum usable frequency (MUF) in F-region layer is x, when the critical frequency is 60 MHz and the angle of incidence is 70°, then x is

A. 150 MHz

B. 170 MHz

C. 175 MHz

D. 190 MHz

Answer: C

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26. The electromagnetic wave of frequency 2 MHz to 30 MHz are

A. In ground wave propagation

B. In sky wave propagation

C. In microwave propagation

D. In satellite communication

Answer: B

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27. A laser is a coherent source because it contains

A. Many wavelenght

B. Uncoordinated wave of a particular wavelength

C. Coordinated wave of many wavelengths

D. Coordinated waves of a particular wavelength

Answer: D

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28. the attenution in optical fibre is mainly due to

A. Absorption

B. Scattering

C. Neither absorption nor scattering

D. Both (a) and (b)

Answer: D

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29. The maximum distance upto which TV transmission from a TV tower of height h can be received is proportional to

A. h

B. h

C. h

D. h

Answer: A

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30. A laser beam is used for carrying our surgery because it

A. Is highly monochromatic

B. Is highly coherent

C. Is highly directional

D. Can be sharply focussed

Answer: D

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31. Laser beams are used to measure long distances because

A. They are monochromatic

B. They are highly polarised

C. They are coherent

D. They have high degree of parallelism 26

Answer: D

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32. An oscillator is producing FM waves of requency $2kHz$ with a variation of $10kHz$. What is modulating index?

A. 0.20

B. 5.0

C. 0.67

D. 1.5

Answer: B

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33. The maximum peak to peak voltage of an AM wire is 24 mV and the minimum peak to peak voltage is 8 m V. The modulation factor is

A. $10\ \%$

B. $20\ \%$

C. $25\ \%$

D. $50\ \%$

Answer: D

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34. Sinusoidal carrier voltage of frequency 1.5 MHz and amplitude 50 V is amplitude modulated by sinusoidal voltage of frequency 10 kHz producing 50% modulation. The lower and upper side-band frequency in kHz are

A. $1490, 1510$

B. $1510, 1490$

C. $\frac{1}{1490}, \frac{1}{1510}$

D. $\frac{1}{1510}, \frac{1}{1490}$

Answer: A

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35. What is the modulation index of an over modulated wave

A. 1

B. Zero

C. < 1

D. > 1

Answer: D

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36. Basically, the product modulator is

A. An amplifier

B. A mixer

C. A frequency separator

D. A phase separator

Answer: B

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37. If f_0 and f_f represent the carrier wave frequencies for amplitude and frequency modulations respectively, then

A. $f_a > f_f$

B. $f_a < f_f$

C. $f_a \approx f_f$

D. $f_a \geq f_f$

Answer: B

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38. Which of the following is the disadvantage of FM over AM

A. Larger band width requirement

B. Larger noise

C. Higher modulation power

D. Low efficiency

Answer: A

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39. If a number of sine waves with modulation indices n,n,n ..... modulate a carrier wave, then total modulation index (n) of the wave is

A. $n + n.... . + 2(n + n.... .)$

B. $\sqrt{n_1 - n_2 + n_3.....}$

C. $\sqrt{n_1^2 + n_2^2 + n_3^2..... .}$

D. None of these

Answer: C

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40. An AM wave has 1800 watt of total power content, For 100% modulation the carrier should have power content equal to

A. 1000 watt

B. 1200 watt

C. 1500 watt

D. 1600 watt

Answer: B

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41. The frequency of a FM transmitter without signal input is called

A. Lower side band frequency

B. Upper side band frequency

C. Resting frequency

D. None of these

Answer: C

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42. What type of modulation is employed in india for radio transmission

A. Amplitude modulation

B. Frequency modulation

C. Pulse modulation

D. None of these

Answer: A

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43. When the modulating frequency is doubled, the modulation index is halved and the modulating voltage constant the modulation system is

A. Amplitude modulation

B. Phase modulation

C. Frequency modulation

D. All of the above

Answer: C

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44. An antenna is a device

A. That converts electromagnetic energy into radio frequency signal

B. That converts radio frequency signal into electromagnetic energy

C. That converts guided electromagnetic waves into free space electromagnetic waves and vice-versa

D. None of these

Answer: C

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45. While tuning in a certain broad cast station with a receiver, we are actually

A. Varying the local oscillator frequency

B. Varying the frequency of the radio signal to be picked up

C. Tuning the antenna

D. None of these

Answer: A

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46. Indicate which one of the following system is digital

A. Pulse position modulation

B. Pulse code modulation

C. Pulse width modulation

D. Pulse amplitude modulation

Answer: B

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47. In a communication system, noise is most likely to affect the signal

A. At the transmitter

B. In the channel or in the transmission line

C. In the information source

D. At the receiver

Answer: B

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48. The waves used in telecommunication are

A. IR

B. UV

C. Microwave

D. Cosmic rays

Answer: C

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49. In an FM system a $7kHz$ signal modulates $108MHz$ carrier so that frequency deviation is $50kHz$. The carrier swing is

A. 7.143

B. 8

C. 0.71

D. 350

Answer: A

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50. Consider telecommunication through optical fibres. Which of the following statements is not true?

A. Optical fibres may have homogeneous core with a suitable cladding

B. Optical fibres can be of graded refractive index

C. Optical fibres are subject to electromagnetic interference from outside

D. Optical fibres have extremely low transmission loss

Answer: C

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51. The phenomenon by which light travels in an optical fibres is

A. Reflection

B. Refraction

C. Total internal reflection

D. Transmission

Answer: C

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52. Television signal on earth cannot be recevied at distances greater than $100km$ from the transmission station. The reasion behind this is that

A. The receiver antenna is unable to detect the signal at a distance greater than 100 km

B. The TV programme consists of both audio and video signals

C. The TV signals are less powerful than radio signals

D. The surface of earth is curved like a sphere

Answer: D

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53. Advantage of optical fibre

A. High bandwidth and EM interference

B. Low bandwidth and EM interference

C. High band width, low transmission capacity and no EM interference

D. High bandwidth, high data transmission capacity and no EM interference

Answer: D

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54. In frequency modulation

A. The amplitude of modulated wave varies as frequency of carrier wave

B. The frequency of modulated wave varies as amplitude of modulating wave

C. The amplitude of modulated wave varies as amplitude of carrier wave

D. The frequency of modulated wave varies as frequency of modulating wave

Answer: B

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55. Audio signal cannot be transmitted because

A. The signal has more noise

B. The signal cannot be amplified for distance communication

C. The transmitting antenna length is very small to design

D. The transmitting antenna length is very large and impracticable

Answer: D

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56. In which of the following remote sensing technique is not used?

A. Forest density

B. Pollution

C. Wetland mapping

D. Medical treatment

Answer: D

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57. For sky wave propagation of a $10MHz$ signal, what should be the minimum electron density in ionosphere?

A. ~$1.2 \times 10^{12} m^{-3}$

B. ~$10^{6} m^{-3}$

C. ~$10^{14} m^{-3}$

D. ~$10^{22} m^{-3}$

Answer: A

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58. What should be the maximum acceptance angle at the aircore interface of an optical fibre if 1 n and 2 n are the refractive indices of the core and the cladding, respectively

A. $\sin^{-1}(n_2/n_1)$

B. $\sin^{-1}\sqrt{n_1^2 - n_2^2}$

C. $\left[\frac{\tan^{-1} n_2}{n_1}\right]$

D. $\left[\frac{\tan^{-1} n_1}{n_2}\right]$

Answer: B

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59. A sky wave with a frequency 55 MHz is incidnet on D-region of earth's atmosphere at 45°, The angle of refraction is (electron density for D-region is 400 electron/c.c.

A. 60°

B. 45°

C. 30°

D. 15°

Answer: B

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60. In a diode AM- detector, the output circuit consist of $R = 1k\Omega$ and $C = 10pF$. A carrier signal of $100kHz$ is to be detected. Is it good?

A. Yes

B. No

C. Information is not sufficient

D. None of these

Answer: B

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61. Consider an optical communication system operating at $\lambda = 800nm$. Suppose, only $1\,\%$ of the optical source frequency is the available

channel bandwidth for optical communication. How many channels can be accommondated for transmitting audio signals requiring a bandwidth of $8kHz$

A. 4.8×10^8

B. 48

C. 6.2×10^8

D. 4.8×10^5

Answer: A

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62. A photodetectore is made from a semiconductor. In $_{}(0.53)Ga_{-0.47}As$ with $E_g = 0.73eV$, what is the maximum wavelength which it can detect?

A. 1000 nm

B. 1703 nm

C. 500 nm

D. 173 nm

Answer: B

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63. A transmitter supplies $9kW$ to the aerial when unmodulated. The power radiated when modulated to $40\,\%$ is

A. 5 kW

B. 9.72 kW

C. 10 kW

D. 12 kW

Answer: B

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64. The antenna current of an AM transmitter is $8A$ when only the carrier is sent but increases to $8.96A$ when the carrier is modulated sinusoidally . The percentage modulation is

A. 0.5

B. 0.6

C. 0.65

D. 0.71

Answer: D

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65. The total power content of an AM wave is $1500W$. For 100% modulation, the power transmitted by the carrier is

A. 500 W

B. 700 W

C. 750 W

D. 1000 W

Answer: D

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66. The total power content of an AM wave is 900 W. For 100% modulation, the power transmitted by each side band is

A. 50 W

B. 100 W

C. 150 W

D. 200 W

Answer: C

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67. The modulation index of an FM carrier having a carrier swing of $200kHz$ and a modulating signal $10kHz$ is

A. 5

B. 10

C. 20

D. 25

Answer: B

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68. A 500 Hz modulating voltage fed into an FM generator produces a frequency deviation of 2.25 kHz . If amplitude of the voltage is kept

constant but frequency is raised to 6 kHz then the new deviation will be

A. 4.5 kHz

B. 54 kHz

C. 27 kHz

D. 15 kHz

Answer: B

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69. The audio signal used to modulate $60\sin\left(2\pi \times 10^6 t\right)$ is $15\sin 300\pi t$. The depth of modulation is

A. 0.5

B. 0.4

C. 0.25

D. 0.15

Answer: C

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70. The bit rate for a signal, which has a sampling rate of $8kHz$ and whare 16 quantisation levels have been used is

A. 32000 bits / sec

B. 16000 bits / sec

C. 64000 bits / sec

D. 72000 bits / sec

Answer: A

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71. An amplitude modulated wave is modulated to 50%. What is the saving in power if carrier as well as one of the side band are suppressed?

A. 0.7

B. 0.654

C. 0.944

D. 0.255

Answer: C

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72. In AM, the cent percent modulation is achived when

A. Carrier amplitude = signal amplitude

B. Carrier amplitude $\neq$ signal amplitude

C. Carrier frequency = signal frequency

D. Carrier frequency $\neq$ signal frequency

Answer: A

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73. Statement-I : Diode lasers are used as optical sources in optical communication.

Statement-II : Diode lasers consume less energy.

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

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

the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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74. Statement-I : Television signals are received through sky-wave propagation

Statement-II : The ionosphere reflects

electromagnetic waves of frequencies greater than a certain critical frequency.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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75. Statement-1: in high latitude one sees colourful curtains of light hanging down from high altitudes.

Statement-2: The high energy charged

particles from the sun are deflected to polar regions by the magnetic field.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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76. Assertion : Short wave bands are used for transmission of radio waves to a large distance.

Reason : Short waves are reflected by ionosphere

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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77. Statemet-1: the electrical conductivity of earth's atmosphere increases with altitude.

Statement -2: The high energy particles (i.e., γ-rays and cosmic rays) coming from outer space while entering our earth's atmosphere cause ionization of the atoms of the gases present in the atmosphere and their energy decreases as they approach to earth.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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78. Assertion: The electromagnetic waves of shorter wavelength can travel longer distances on earth's surface thane those of longer of longer wavelengths.

Reason: Shorter the wavelength, the larger is the velocity of wave propagation. Also, shorter the wavelength, shorter is the velocity of wave propagation.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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79. Assertion: The surface wave propagation is used for medium wave band and for television broadcasting.

Reason: The surface waves travel directly from transmitting antenna to receiver antenna through atmosphere.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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80. Assertion: The television broadcasting becomes weaker with increasing distance.

Reason: The power transmitted from T.V. transmitter varies inversely as the distance of the receiver.

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

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

the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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81. Assertion: The Microwave propagation is better than the sky wave propagation.

Reason: Microwaves have frequency 100 to

`3001 GHz, which have very good directional properties.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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82. Assertion: Satellite is an ideal platform for remote sensing.

Reasion: Satellite in poplar orbit can provide global coverage or continuous coverage of the fixed area in geostationary configuration.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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83. Assertion : Fax is a modulating and demodulating device.

Reason : It is necessary for exact reproduction of a document.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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84. Assertion : A dish antenna is highly directional.

Reason : This is because a dipole antenna is omni directional.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer:

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85. Assertion : In pressure-temperature (P - T) phase diagram of water, the slope of the melting curve is found to be negative.

Reason : Ice contracts on melting to water

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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86. Assertion : For gas atom the number of degrees of freedom is 3.

Reason : $\frac{C_P}{C_V} = \gamma$

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

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

the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

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87. Assertion : A gas have a unique value of specific heat.

Reason : Specific heat is defined as the amount

of heat required to raise the temperature of unit mass of the substance through unit degree.

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

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

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

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88. Assertion : A gas can be liquified at any temperature by increase of pressure alone.

Reason : On increasing pressure the temperature of gas decreases

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: D

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89. Assetion : Equal masses of helium and oxygen gases are given equal quantities of heat. The rise in temperature of helium is greater thant that in case of oxygen.

Reason : The molecular mass of oxygen is more than molecular mass of helium.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

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90. Assertion : Absolute zero is the temperature corresponding to zero energy.

Reason : The temperature at which no molecular motion cease is called absolute zero temperature.

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

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

the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: D

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91. Assertion : The ratio C_P / C_v for a diatomic gas is more than that for a monoatomic gas.

Reason : The moleculess of a monoatomic gas

have more degrees of freedom than those of a diatomic gas.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: D

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92. Assertion : At room temperature, water does not sublimate from water to steam.

Reason : The critical point of water is much above the room temperature.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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93. Assetion : Specific heat of a gas at constant pressure is greater than its specific heat at constant volume.

This is because at constant pressure, some heat is spent in expansion of the gas.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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94. Assertion : The internal energy of a real gas is function of both, temperature and volume.

Reason : Internal kinetic energy depends on temperature and internal potential energy depends on volume

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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95. Assertion : For an ideal gas, at constant temperature, the product of the pressure and volume is constant.

Reason : The mean square velocity of the molecules is inversely proportional to mass.

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

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

the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

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96. Assertion : If a gas container in motion is suddenly stopped, the temperature of the gas rises.

Reason : The kinetic energy of ordered mechanical motion is converted in to the kinetic energy of random motion of gas molecules.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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97. Assertion : Internal energy of an ideal gas does not depend upon volume of the gas.

Reason : This is because internal energy of ideal gas depends only on temperature of gas.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: B

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98. Assertion : At low density, variables of gases P, V and T follows the equation $PV = \mu RT$

Reason : At low density real gases are more closely to ideal gases

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: A

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99. Statement-1 : Maxwell speed distribution graph is

asymmetric about most probable speed.

Statement-2 : rms speed of ideal gas, depends upon it's type

(monoatomic, diatomic and polyatomic).

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false

Answer: D

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100. An ideal gas has an initial pressure of 3 pressure units and an initial volume of 4 volume units. The table gives the final pressure and volume of the gas (in those same units) in four, processes. Which processes start and end on the same isotherm

A. A

B. B

C. C

D. D

Answer:

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101. Suppose ideal gas equation follows $VP^3 = con\tan t.$ Initial temperature and volume of the gas are T and V respectively. If gas expand to $27V$ temperature will become

A. T

B. 9T

C. 27T

D. T/9

Answer: B

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102. One mole of a mono-atomic ideal gas is mixed with one mole of a diatomic ideal gas. The molar specific heat of the mixture at constant volume is .....

A. 8

B. $\frac{3}{2}R$

C. 2R

D. 2.5 R

Answer:

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103. When the temperature of a gas is raised from $27^\circ C$ to $90^\circ C$, the percentage increase in the rms velocity of the molecules will be

A. 0.1

B. 0.15

C. 0.2

D. 0.175

Answer:

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104. A gas is enclosed in a closed pot. On keeping this pot in a train moving with high speed , the temperature of the gas

A. Will increase

B. Will decrease

C. Will remain the same

D. Will change according to the nature of the gas

Answer:

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105. Two spherical vessel of equal volume, are connected by a n arrow tube. The apparatus contains an ideal gas at one atmosphere and 300 K . Now if one vessel is immersed in a bath of constant temperature 600 K and the other in a bath of constant temperature 300 K . Then the common pressure will be

A. 1 atm

B. $\frac{4}{5}$ atm

C. $\frac{4}{3}$ atm

D. $\frac{3}{4}$ atm

Answer:

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106. The r.m.s. velocity of a gas at a certain temperature is $\sqrt{2}$ times than that of the oxygen molecules at that temperature. The gas can be

A. H_2

B. He

C. CH_4

D. SO_2

Answer:

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107. At what tempearature, the mean kinetic energy of O_2 will be same for H_2 molecules at $-73^\circ C$

A. 127°

B. $527^\circ C$

C. $-73^\circ C$

D. $-173^\circ C$

Answer:

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108. The volume of a gas at pressure $21 \times 10^4 N/m^2$ and temperature $27^\circ C$ is

83L. If R=8.3 J/mol/K, then the quantity of gas in g-mol will be

A. 15

B. 42

C. 7

D. 14

Answer: C

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109. The pressure and temparature of an ideal gas in a closed vessel are 720 kPa and 40°C respectively. If $\frac{1}{4}$the of the gas is released from the vessel and the temperature of the remaining gas is raised to $353^\circ C$, the final pressure of the gas is.

A. 1440 kPa

B. 1080kPa

C. 720 kPa

D. 540kPa

Answer: B

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110. An air bubble doubles its radius on raising from the bottom of water reservoir to be the surface of water in it. If the atmospheric pressure is equal to 10 m of water, the height of water in the reservoir is

A. 10 m

B. 20 m

C. 70 m

D. 80 m

Answer:

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111. Root mean square velocity of gas molecules is $300 m / \sec$. The $r. m. s$ velocity of molecules of gas with twice the molecular weight and half the absolute temperature is :

A. 300 m/sec

B. 600 m/sec

C. 75 m/sec

D. 150 m/sec

Answer:

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112. The ratio fo two specific heat $\frac{C_P}{C_V}$ of CO is

A. 1.33

B. 1.40

C. 1.29

D. 1.66

Answer:

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113. The energy of a gas/litre is 300 joule, then its pressure will be

A. $3 \times 10^5 N/m^2$

B. $6 \times 10^5 N/m^2$

C. $10^5 N/m^2$

D. $2 \times 10^5 N/m^2$

Answer:

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114. Pressure versus temperature graphs of an ideal gas are as shown in figure. Choose the wrong statement

A. Density of gas is increasing in graph

B. Density of gas is decreasing in graph (ii)

C. Density of gas is constant in graph (iii)

D. None of these

Answer:

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115. If pressure of CO_2 (real gas) in a container is given by $P = \frac{RT}{2V - b} - \frac{a}{4b^2}$, then mass of the gas in container is

A. 11 gm

B. 22 gm

C. 33 gm

D. 44 gm

Answer:

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116. A cylinder of fixed capacity 44.8 litre. contains a monatomic gas at standard temperature and pressure. The amount of

heat required to cylinder by $10^{\circ} C$ will be.

(R= univerasl gas constant)

A. R

B. 10 R

C. 20 R

D. 30 R

Answer:

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117. A pressure cooker contains air at 1 atm and 30° C . If the safety value of the cooler blows when the inside pressure ≥ 3 atm , then the maximum temperature of the air, inside the cooker can be

A. 90°

B. $636^\circ C$

C. $909^\circ C$

D. $363^\circ C$

Answer: B

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118. One mole of an ideal monatomic gas requires 210 J heat to raise the temperature by 10 K , when heated at constant temperature. If the same gas is heated at constant volume to raise the temperature by 10 K then heat required is

A. 238 J

B. 126 J

C. 210 J

D. 350 J

Answer:

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119. From the followng V-T diagram we can conclude

A. $P = P$

B. $P > P$

C. $P < P$

D. None of these

Answer:

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120. A cylinder contained $10kg$of gas at pressure $10^7 \frac{N}{m^2}$. The quantity of gas taken out of cylinder if final pressure is $2.5 \times 10^6 N/m^2$ is (Assume temperature of gas is constant)

A. 15.2 kg

B. 3.7 kg

C. zero

D. 7.5 kg

Answer:

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121. Certain amount of an ideal gas is contained in a closed vessel. The vessel is moving with a constant velcity v. The

molecular mass of gas is M. The rise in temperature of the gas when the vessel is suddenly stopped is $(\gamma C_P / C_V)$

A. $\frac{Mv^2}{2R(\gamma+1)}$

B. $\frac{Mv^2(\gamma-1)}{2R}$

C. $\frac{Mv^2}{2R(\gamma+1)}$

D. $\frac{Mv^2}{2R(\gamma+1)}$

Answer:

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122. Air is filled at $60^\circ C$ in a vessel of open mouth. The vessle is heated to a temperature T so that $1/4th$ of air escapes. Assuming the volume of vessel remaining constant, the value of T is

A. $80^\circ C$

B. $444^\circ C$

C. $333^\circ C$

D. $171^\circ C$

Answer: D

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123. A partition divides a container having insulated walls into two compartments I and II. the same gas fills the two compartments. The ratio of the number of molecules in compartments I and II is

A. $1:6$

B. $6:1$

C. $4:1$

D. $1:4$

Answer:

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124. Considering the gases to be ideal, the value of $\gamma = \frac{C_P}{C_V}$ for a gaseous mixture consisting of = 3 moles of carbon dioxide and 2 moles of oxygen will be

$(\gamma_{O_2} = 1.4, \gamma_{CO_2} = 1.3)$

A. 1.37

B. 1.34

C. 1.55

D. 1.63

Answer:

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125. A jar has a mixture of hydrogen and oxygen gas in the ratio of 1 : 5. The ratio of mean kinetic energies of hydrogen and oxygen molecules is

A. $1:16$

B. $1:4$

C. $1:5$

D. $1:1$

Answer:

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126. Graph between volume and temperature for a gas is shown in figure. Ifα= volume coefficient of gas $= \frac{1}{273} per^{\circ} C$, then what is

the volume of gas at a temperature of $819^\circ C$

A. $1 \times 10^{-3} m^3$

B. $2 \times 10^{-3} m^3$

C. $3 \times 10^{-3} m^3$

D. $4 \times 10^{-3} m^3$

Answer:

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