PHYSICS

AAKASH INSTITUTE ENGLISH

TEST 5

Example

1. On the opposite sides of vertical vessel filled with water, two identical holes are opened. If area of cross-section for each is a and

difference of height of these two is h and p is density of water, then force on the vessel is

A. apgh/2

B. 3apgh

C. apgh

D. 2apgh

Answer:

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2. A hot body will radiate heat most rapidly if its surface is:

A. White and rough

B. Black and rough

C. White and polished

D. Silver polished

Answer:

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3. The wavelength corresponding to maximum intensity of radiation emitted by a source at temperature $2000K$ is λ, then what is the wavelength corresponding to maximum intensity of radiation at temperature $3000K$?

A. $(4/9)\lambda_m$

B. $(9/4)\lambda_m$

C. $(3/2)\lambda_m$

D. $(2/3)\lambda_m$

Answer:

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4. In heat transfer, which method is based on gravitation?

A. Convection

B. Conduction

C. Radiation

D. All Of these

Answer:

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5. The temperature of a body falls from 40°C to 30°C in 10 minutes. If temperature of surrounding is 15°C, then time to fall the temperature from 30°C to 20°C

A. 20 min

B. 14 min

C. 15 min

D. 8 min

Answer:

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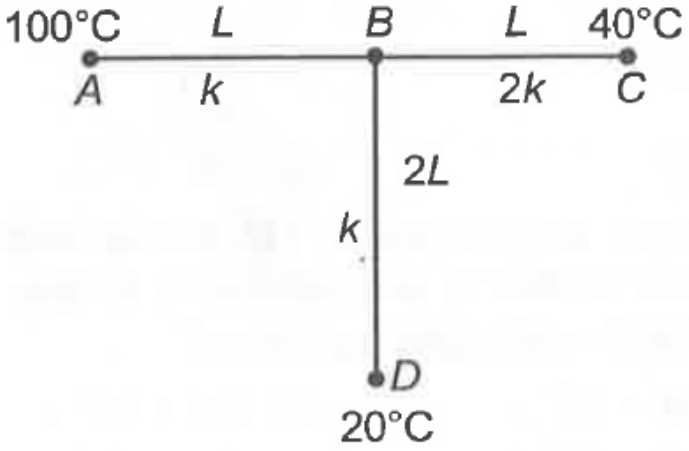
6. Find the temperature of junction at B, if each rod has equal area of cross-section.



A. $\left(\frac{380}{7}\right)^{\circ}$ C

B. $\left(\frac{280}{5}\right)^{\circ}$ C

C. $\left(\frac{90}{7}\right)^{\circ}$C

D. $\left(\frac{50}{7}\right)^{\circ}$C

Answer:

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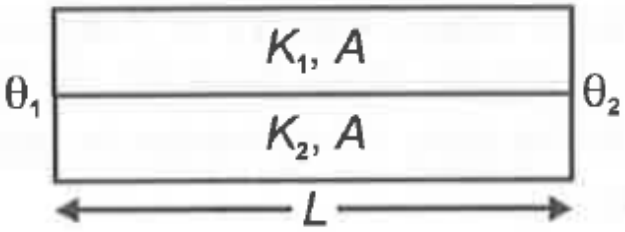
7. Two bar of identical dimensions are kept as shown in figure. If K_1 and $K_2$are their coefficients of thermal conductivities, then

equivalent K



A. $(K_1K_2)/(K_1 + K_2)$

B. $2(K_1K_2)/(K_1 + K_2)$

C. $(K_1 + K_2)/2$

D. $(K_1 + K_2)$

Answer:

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8. Two gases 1 02' and 'He' expand for same volume difference at constant and equal pressure, then

A. $W_O \_ 2$ gt $W_H \_ e$

B. $W_H \_ e$ gt $W_O \_ 2$

C. Equal work

D. All of these

Answer:

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9. A gas undergoes a process in which its pressure P and volume V are related as VP = constant. The bulk modulus of gas for this process

A. P/r

B. r^2p

C. P

D. $P^{\frac{1}{r}}$

Answer:

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10. p-V diagram of a diatomic gas is a straight line passing through origin. The molar heat capacity of the gas in the process will be

A. 5R

B. (5/3)R

C. 4R

D. 2R

Answer:

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11. A Carnot engine takes 10^6 cal of heat from a reservoir at 627° C and exhaust it to sink at 27° C. How much work does it perform?

A. 2.8 xx 10^6 J

B. 2.4 xx 10^6 J

C. 4.2 xx 10^6 J

D. 8.4 xx 10^6 J

Answer:

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12. A monoatomic gas is compressed adiabatically to 8/27 of its initial volume, if initial temperature is 27°C, then increase in temperature

A. 475°C

B. 175°C

C. 375°C

D. 275°C

Answer:

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13. A sample of ideal gas (y = 1 .4) is heated at constant pressure. If an amount of 140 J heat is supplied to the gas, then change in internal energy of the gas

A. 100 J

B. 50 J

C. 40 J

D. 120 J

Answer:

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14. If gas expands according to relation P = 4 V, then work done in expansion V_o to $3V_o$

A. $72V_o^2$

B. $18V_o^2$

C. $16V_o^2$

D. $48V_o^2$

Answer:

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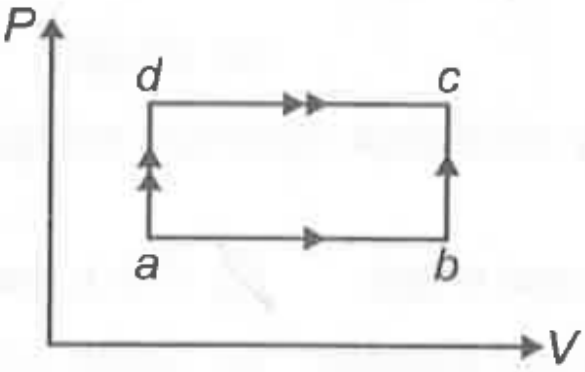
15. When a process is taken from process abc 100 J of heat is absorbed by system and 50 J of work is done by it. If work done in process adc

is 60 J, then heat absorbed in this process



A. 110 J

B. 90 J

C. 200 J

D. 250 J

Answer:

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16. Two moles of an ideal monatomic gas is heated at constant pressure so that its temperature increases from 127°C to 227°C , then work done by gas

A. 1600 J

B. 2660 J

C. 1660 J

D. 1000 J

Answer:

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17. Two liquids at different temperature are mixed in a calorimeter of zero thermal capacity. Which of the following quantity is conserved?

A. Sum of the temperatures

B. Internal energy of each liquid

C. Total internal energy of two liquids

D. All of these

Answer:

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18. Boiling water is changing into steam. Under this condition the specific heat of water is

A. Zero

B. One

C. Infinite

D. All of these

Answer:

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19. A 5 g piece of ice at -20° C is put into 10 g of water at 30° C. The final temperature of mixture is

A. 20° C

B. 50° C

C. 0° C

D. 10° C

Answer:

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20. When water is heated from O°C to 10°C, its density

A. First increases and then decreases

B. First decreases and then increases

C. Decreases

D. Increases

Answer:

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21. A pendulum clock gives correct time at 20° C. How many seconds will it lose per day at 40° C? (alpha = 5×10^{-6}/°C)

A. 2.16 s

B. 1 .6 s

C. 3.2 s

D. 4.32 s

Answer:

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22. A uniform iron wire of cross-section area $0.20 \times 10^{-6} m^2$ is held fixed in between fixed supports. If wire cooled from $100^{\circ}C$ to $O^{\circ}C$, then force of 48 N is exerted on supports by

ends, then expansion coefficient of wire (Young's modulus = 2 $\times$ 10^11 N/m^2)

A. 0.6 $\times$ 10^{-5}/°C

B. 0.3 $\times$ 10^{-5}/°C

C. 1.2 $\times$ 10^{-5}/°C

D. 2.4 $\times$ 10^{-5}/°C

Answer:

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23. The moment of inertia of a rod about its perpendicular bisector is I, when temperature of rod is increased by ΔT, the increase in the moment of inertia of the rod about same axis (γ = temperature coefficient of volume expansion)

A. $\frac{\frac{5\gamma}{3}}{\Delta T}$

B. $\frac{\frac{\gamma}{\Delta T}}{2}$

C. $\frac{\gamma}{\Delta T}$

D. $\frac{\frac{2\gamma}{3}}{\Delta T}$

Answer:

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24. When a drop of water splits up into number of droplets, then which of the following is correct?

A. Area increases

B. Energy is absorbed

C. Energy is liberated

D. All of these

Answer:

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25. Eight drops of equal radius are falling with terminal speed 9 cm/s. If they coalesce to form a single drop, then new terminal speed

A. 27 cm/s

B. 18 cm/s

C. 36 cm/s

D. 32 cm/s

Answer:

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26. A solid sphere falls with a terminal velocity v in air .If it is allowed to fall in vaccum,

A. V

B. gt V

C. lt V

D. Is not defined

Answer:

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27. If liquid of density ρ is filled in an open cylindrical container to height h, then pressure at bottom

A. = hρg

B. (hρg)/2

C. "gt"hρg

D. lt hρg

Answer:

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28. Which of the following device is used to measure the rate of liquid through a pipe ?

A. Manomete

B. Venturimeter

C. Thermometer

D. Barometer

Answer:

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29. The cylindrical tube of a spray pump has a cross-section of 6 cm^2 one of which has 50 holes each of diameter 1 mm. If the liquid flow inside the tube is 1.2 m/min, then speed of ejection of the liquid through the holes is

A. 0.96 m/s

B. 3.4 m/s

C. 2.1 m/s

D. 0.31 m/s

Answer:

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30. To what height should a cyclindrical vessel be filled with a homogeneous liquid to make the force with which the liquid pressure on the sides of the vessel equal to the force

exerted by the liquid on the bottom of the vessel ?

A. R/2

B. 4R

C. 2R

D. R

Answer:

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31. A steel wire of length 2L and cross-section area A is stretched, wetl within elastic limit horizontally between two pillars, a mass m is suspended from the mid-point of wire such that depression at the middle is x. Strain in the wire is proportional to

A. X^2/l

B. X/L

C. X^2/L^2

D. X/L^2

Answer:

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32. For a given material, the Young's modulus is 2.4 times that of the modulus of rigidity. Its Poisson's ratio is

A. 0.2

B. 0.1

C. 2.4

D. 0.4

Answer:

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33. wire of length I has a ear mass density λ and area of cross-section A and the Young's modulus y is suspended vertically from rigid support. The extension produced in wire due to its own weight

A. $(2\lambda g l^2)/yA$

B. $(2\lambda g l^2)/3yA$

C. $\lambda g l^2/yA$

D. $\lambda g l^2/2yA$

Answer:

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34. Â The bulk modulus of water if its volume changes fromm 100 litre to 99.5 litre under a pressure of 100 atm is

A. 2×10^8 N/m^2

B. 4×10^9 N/m^2

C. 3×10^9N/m^2

D. 2×10^9N/m^2

Answer:

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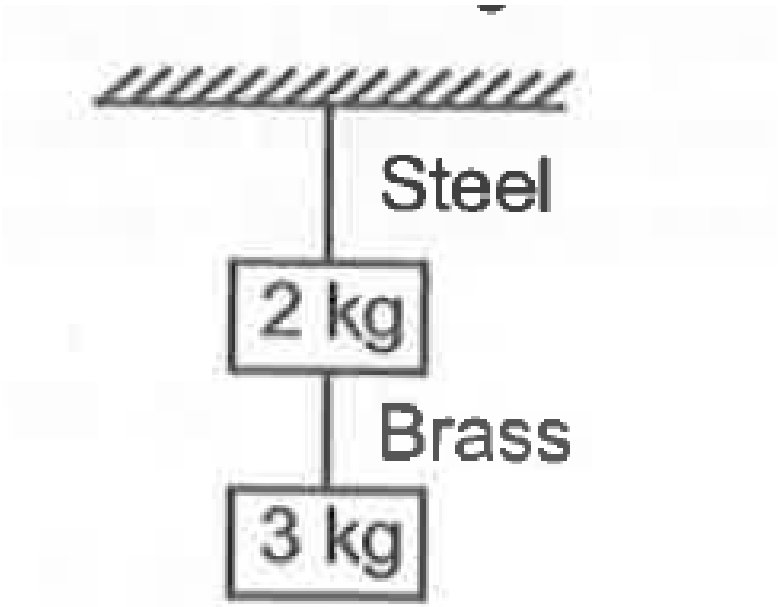
35. If the ratio of diameter, lengths and Young's moduli of steel and brass wires shown in figure are 2 : 1, 2 : 1 and 2 : 1 respectively, then the corresponding ratio of increase in

their lengths would be



A. 4/5

B. 5/4

C. 5/12

D. 12/5

Answer:

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36. The gravitational field intensity at a point 10,000 km from the centre of the earth is $4.8Nkg^{-1}$. The gravitational potential at that point is

A. 4.8×10^6 J Kg^{-1}

B. 3.6×10^6 J Kg^{-1}

C. $-4.8 \times$ 10^7JKg^-1`

D. $-2.4 \times 10\text{^}7 J\text{Kg}\text{^}\text{-}1\text{`}$

Answer:

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37. For a satellite moving in a circular orbit around the earth, the ratio of its total mechanical energy to kinetic energy

A. 2

B. -2

C. 1

D. -1

Answer:

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38. A rocket is fired with a speed v = $2\sqrt{gR}$ near the earth's surface and directed upward, what is intersteller speed of rocket v', where v_e escape speed on the surface of earth

A. $v' = v_e$

B. $v' = \sqrt{2}v_e$

C. v' lt v_e

D. v' gt v_e

Answer:

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39. Object feel weightlessness at equator of earth when angular speed becomes

A. 17 times

B. 25 times

C. 5 times

D. 15 times

Answer:

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40. A projectile is projected with velocity $2/3v_e$ vertically upward direction from ground into

space, then height covered (R = Radius of earth)

A. R/5

B. 2R/5

C. (9/5)R

D. (4/5)R

Answer:

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41. If earth is revolving in elliptical orbit around sun, then which of the following quantity remains constant w.r.t.

A. Angular speed

B. Angular momentum

C. Linear speed

D. Kinetic energy

Answer:

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42. Two bodies of masses m and 4m are placed at a distance r. The gravitational potential at a point due to mass m on the line joining where gravitational field is zero

A. -(3Gm/2r)

B. -(2Gm/r)

C. Zero

D. -(3Gm/r)

Answer:

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43. The density of newly discovered planet is twice that of the earth. The acceleration due to gravity at the surface of the planet is equal to that at the surface of the earth. If the radius of the earth is R, the radius of the planet would be

A. R/4

B. R/8

C. 2R

D. 4R

Answer: