

MCQS Chapter No.1 Heat

1. Heat is a form of energy which:
 - a) Is associated with molecular vibrations.
 - b) Produces sense of warmth.
 - c) Can be converted into mechanical work.
 - d) All of them.
2. In the laboratory heat (internal energy) can be measured with the help of a :
 - a) Thermometer.
 - b) Calorimeter.
 - c) Hypsometer.
 - d) Barometer.
3. Properties of a substance that depend on its temperature and that can be reproduced easily under similar conditions are called:
 - a) Physical properties.
 - b) Chemical properties.
 - c) Thermometric properties.
 - d) Kinetic properties.
4. Instead of making a continuous track, gaps are left in a rail road track, these gaps are left because:
 - a) Steel is expansive.
 - b) To compensate for thermal expansions.
 - c) Large tracks become heavy.
 - d) Steel rails cannot produce large tracks.
5. In a bimetallic strip two strips of different metals are firmly joined lengthwise, their combination is based on the idea that:
 - a) Different metals have different densities.
 - b) Different metals have different gravity.
 - c) Different metals have same value of α .
 - d) Different metals have different value of α .
6. $273\text{ K} = \dots\dots\dots$
 - a) 0°F
 - b) 32°F
 - c) -32°
 - d) 212°F
7. Quantity of heat required to raise the temperature of one gram of water from 14.5°C to 15.5°C is called:
 - a) One joule.
 - b) One B.T.U.
 - c) One calorie.
 - d) One foot-pound.
8. Quantity of heat required to raise the temperature of one kilogram of water from 30°C to 40°C is:
 - a) 420 J.
 - b) 4200 J
 - c) 42000 J.
 - d) 420000 J.
9. A tank containing 1000 kg of water at 50°C can supply more heat than another tank containing 10 kg of water at 50°C , because.
 - a) 1000 kg water has higher specific heat.
 - b) 1000-kg water has larger internal energy.
 - c) 1000 kg water has larger heat capacity.
 - d) Molecules of 1000kg water have higher average K. E.
10. In an electric oven bimetallic thermostat is used to control:
 - a) Current.
 - b) Voltage.
 - c) Pressure.
 - d) Temperature.

11. Numerically each division on centigrade scale is equivalent todivisions on Fahrenheit scale.

- a) 9/5.
- b) 5/9.
- c) 32.
- d) 212.

12. Two ends of rod are at temperatures of -10°C and -30°C respectively. Heat will flow from:

- a) End at -10°C to end at -30°C .
- b) End at -30°C to end at -30°C
- c) Heat will not flow because both are very cold.
- d) Some time from end at -10°C to end at -30°C and vice versa.

13 .Average specific heat of water is:

- a) 4200 cal. /g $^{\circ}\text{C}$.
- b) 420 cal. /g $^{\circ}\text{C}$
- c) 4.2 cal. /g $^{\circ}\text{C}$.
- d) 1 cal. /g $^{\circ}\text{C}$

14 .During an isobaric process:

- a) Some work is always done.
- b) No work is done.
- c) Heat cannot be supplied.
- d) There is no change in internal energy.

15 .The coefficient of linear expansion α of a material is.....times the coefficient of volume expansion β :

- a) 3
- b) 3.3
- c) 1/3
- d) 1/6

16 .Absolute zero temperature corresponds to:

- a) About -459.4°F
- b) 273°C
- c) -273°F
- d) 0°F

17. Fractional changes in length per $^{\circ}\text{C}$ change in temperature are called:

- a) Linear expansion.
- b) Thermal expansion.
- c) Coefficient of linear expansion.
- d) Coefficient of volume expansion.

18. Heat supplied during a change of state (solid to liquid, liquid to a gas) of a substance does not change it's:

- a) Pressure.
- b) Volume.
- c) Entropy.
- d) Temperature.

19 .steam burns are more severe than boiling water burns, because:

- a) Steam has higher specific heat.
- b) Temperature of steam is higher than that of boiling water.
- c) Steam transfers more heat to our body in the form of its latent heat.
- d) Steam can come in contact with larger area of our body.

20. The volume of constant mass of a gas is reduced at a constant temperature. The pressure exerted by the gas increases because:

- a) The density of the gas increases.
- b) Gas molecules speed up.
- c) Speed of molecules decreases.
- d) Gas molecules collide with each other more frequently.

21. Universal gas constant for one molecule of any gas is called:

- a) Boltzmann constant.
- b) Molar gas constant.
- c) Molecular constant.
- d) Avogadro's number.

22. The quantity of heat required to change the temperature of a body by 1°C is:

- a) Specific heat capacity.
- b) Heat capacity.
- c) Latent heat.
- d) Heat of fusion.

23. The amount of heat required to change the state of unit mass of a substance is called:

- a) Specific heat capacity.
- b) Latent heat.
- c) Heat capacity.
- d) Heat of sublimation.

24. The amount of heat required to change 1 kilogram of a solid into liquid at its melting point is called:

- a) Specific heat capacity.
- b) Latent heat of fusion.
- c) Heat capacity.
- d) Heat of sublimation.

25. C_p and C_v of monatomic gas is less than C_p and C_v of a diatomic gas because:

- a) Diatomic gas molecules have translational + rotational + vibration K.E
- b) Diatomic gas molecules have translational as well as rotational K.E.
- c) Molecules of a diatomic gas have translational K.E only.
- d) Molecules of a diatomic gas have vibration K.E. only

26. The S.I unit of molar specific heat is:

- a) $\text{Cal./g}^{\circ}\text{C}$
- b) $\text{J /mole} - \text{k}$
- c) $\text{J /kg} - \text{k}$
- d) $\text{J / mole} - ^{\circ}\text{C}$

27. The graphs between pressure and volume of a given mass of a gas at constant temperature are:

- a) A straight line passing through the origin.
- b) A straight line passing through the two axes obliquely.
- c) A hyperbolic curve.
- d) A parabolic curve.

28. The pressure exerted by a column of mercury 76-centimeter high at 0°C is called:

(1-a 02)

- a) 1 liter.
- b) 1 cm^3
- c) 1 atmosphere
- d) 1 N/m^2

29. The P-V diagram is parallel to P- axis, and then it is for:

- a) An isothermal change.
- b) An adiabatic change.
- c) An isochoric change.
- d) An isobaric change.

30. The value of C_v for a monatomic gas is:

- a) $3/2 R$
- b) $5/2 R$
- c) $7/2 R$
- d) $9/2 R$

31. An isotherms are:

- a) The name of a thermodynamic process in which temperature of the system is kept constant.
- b) The name of the graph obtained on plotting pressure against volume of a gas at constant pressure.
- c) The name of the graph obtained on plotting pressure against volume of a gas at constant temperature.
- d) The name of the graph obtained on plotting pressure against volume of a gas at constant volume.

31. The value of C_p for a monatomic gas is:

- a) $\frac{3}{2} R$
- b) $\frac{5}{2} R$
- c) $\frac{7}{2} R$
- d) $\frac{9}{2} R$

33. Real gases do not obey gas laws under all conditions, because:

- a) Most of them are polyatomic.
- b) Their molecules have definite size and do not attract each other when their separation is small.
- c) Their molecules have definite size and attract each other when their separation is small.
- d) Their molecules are soft and have inelastic collisions with each other and with the walls the container.

34. For an adiabatic process:

- a) $PV = \text{constant}$.
- b) $PV^\gamma = \text{constant}$.
- c) $P/V = \text{constant}$.
- d) $V/P = \text{constant}$.

35. The changes in entropy of a system are given by:

- a) $\Delta S = T/\Delta Q$
- b) $\Delta S = \Delta Q/T$
- c) $\Delta S = \Delta Q \Delta T$
- d) $\Delta S/T = \Delta Q$

Q.No.36 During an isothermal process the following gas law is applicable:

- a) Boyle's law.
- b) Charles's law.
- c) General gas law.
- d) Law of pressures.

37. for an isobaric process:

- a) $\Delta Q = 0$
- b) $\Delta W = 0$
- c) $\Delta W = P \Delta V$
- d) $\Delta U = 0$

38. For an isothermal process:

- a) $PV = \text{constant}$.
- b) $PV^\gamma = \text{constant}$.
- c) $P/V = \text{constant}$.
- d) $V/P = \text{constant}$.

39. For an isochoric process:

- a) $\Delta Q = 0$
- b) $\Delta W = 0$
- c) $\Delta W = P \Delta V$
- d) $\Delta U = 0$

40. For a monatomic gas $C_v = \frac{3}{2} R$ and the corresponding value of C_p are:

- a) $\frac{1}{2} R$
- b) $\frac{5}{2} R$
- c) $\frac{7}{2} R$
- d) $\frac{9}{2} R$

41. According to kinetic theory of gases the absolute temperature of a gas is directly proportional to the:

- a) Average translational K.E of a molecule of the gas.
- b) Average K.E of its molecules.
- c) Total K.E of molecules of the gas.
- d)
- e) Sum of K.E and P.E of molecules of the gas.

42. during a complete cycle of thermodynamic processes:

- a) $\Delta Q = 0$
- b) $\Delta W = 0$
- c) $\Delta U = 0$
- d) Internal energy remains constant.

41. The boiling point of pure water under normal atmospheric pressure on Fahrenheit scale is:

- a) 373°F
- b) 273°F
- c) 212°F
- d) 180°F

44. Efficiency of a Comet engine is given by:

- a) $E = \{ 1 - Q_1/Q_2 \}$
- b) $E = \{ 1 - Q_2/Q_1 \}$
- c) $E = \{ Q_1/Q_2 - 1 \}$
- d) $E = \{ Q_2/Q_1 - 1 \}$

45. The efficiency of a Carnot engine cannot be 100% because:

- a) Thermodynamic processes followed during a Carnot cycle are reversible.
- b) There is energy loss due to friction and conduction.
- c) To complete a cycle engine must reject some heat to a sink.
- d) Part of heat supplied during a cycle is used to change internal energy of the system.

46. The change in internal energy of a system:

- a) Depends upon the order of thermodynamic processes.
- b) Depends upon the specific path followed between the initial and the final states of the system.
- c) Independent of the path followed between the initial and final states of the system.
- d) Depends upon pressure and volume of the system.

47. Graph between pressure and volume for an isothermal process is called an isotherm, it also represents.

- a) Constant internal energy.
- b) Increasing internal energy.
- c) Decreasing internal energy.
- d) None of these.

50. For a given amount of heat, a frictionless system performs maximum amount of work during an:

- a) Isobaric expansion.
- b) Adiabatic expansion.
- c) Isothermal expansion.
- d) Isochoric process.

49. Choose the correct statement:

- a) Good emitters of heat are its good absorbers also.
- b) Good emitters of heat are its bad absorbers.
- c) Bad emitters of heat are its good absorbers.

50. An isothermal process must be carried out very slowly so that:

- a) At every stage the internal energy of the system remains constant.
- b) At every stage the internal energy of the system increases slowly.
- c) At every stage the internal energy of the system decreases slowly.
- d) Pressure of the system does not change appreciably.

51. In terms of temperature of source T_1 and temperature of the sink T_2 , the efficiency of a Carnot engine is given by:

- a) $E = \{ 1 - T_1/T_2 \}$
- b) $E = \{ 1 - T_2/T_1 \}$
- c) $E = \{ T_1/T_2 - 1 \}$
- d) $E = \{ T_2/T_1 - 1 \}$

52. Adiabatic processes must be carried suddenly so that:

- a) The effect of friction is minimum
- b) The system may not have time to exchange energy with its surrounding.
- c) More work could be done.
- d) Heat could be supplied to the system without losses.

53. in a thermodynamic process (second law):

- a) Entropy either decreases or remains constant.
- b) Entropy either increases or remains constant.
- c) Entropy neither increases nor decreases.

54. A gases exert pressure on the walls of the container because (1-a 97)

- a) The gas molecules collide with each other.
- b) Gas molecules possess momentum.
- c) The gas has finite volume.
- d) The gas molecules attract each other.

55. The universal gas constant per molecule is called:

- a) Plank's constant.
- b) Avogadro's constant
- c) .Boltzmann's constant.
- d) Stefan's constant.

56. Steam engines A and B have their source at 500°C and 400°C and sink at 300°C and 200°C respectively:

- a) They are equally efficient.
- b) A is more efficient than B.
- c) B is more efficient than A.
- d) None of these.

57. in an isothermal change internal energy of the system:

- a) Increases.
- b) Decreases.
- c) Remains constant.
- d) Becomes zero.

58. The K.E. of molecules of an ideal gas at absolute zero temperature will be:

- a) Infinite.
- b) Very high.
- c) Before zero.
- d) Zero.

59. The pressure exerted by the gas molecules on the walls of a container increases is:

- a) Temperature of the gas is decreased.
- b) Velocity of molecules of the gas decreases.
- c) Collisions of molecules of the gas with walls of the container increases.
- d) None of these.

60. Real gas molecules do not strictly obey gas laws at:

- a) High pressure and low temperature.
- b) Low pressure and high temperature.
- c) High pressure and high temperature.
- d) Low pressure and low temperature.

61. The temperature at which centigrade scale coincides with the Fahrenheit scale is: (1-a 99, 03)

- a) 0
- b) 100
- c) -32
- d) -40

62. According to kinetic theory of gases, the average translational kinetic energy of a molecule of an ideal gas is:

- a) $\frac{1}{3} K T$
- b) $\frac{3}{2} K T$
- c) $\frac{2}{3} K T$
- d) $K T$

63. Adiabatic expansion results in cooling i.e. when a gas is allowed to expand adiabatically its temperature falls, because.

- a) During adiabatic expansion some heat is lost resulting in a fall of temperature.
- b) Work is done a expense of the internal energy of the system.
- c) During an adiabatic expansion work is done on the system.
- d) During this process no work could be done.

64. If a system returns to its initial state after going through a series of thermodynamic processes, irrespective of the path follow, then it is said to have gone through:

- a) A chain reaction.
- b) Reversible process.
- c) Irreversible process.
- d) Cyclic process.

65. Efficiency of a Comet engine can be made 100% only if temperature of its sink could be made:

- a) 0°C
- b) 0°F
- c) 0 K

66. The net changes in the entropy of a system in a natural process is (1-a 2001).

- a) Zero.
- b) Positive.
- c) Negative.
- d) Infinite.

67. In an isothermal process internal energy of the system will be:

- a) Increases.
- b) Decreases.
- c) Remains constant.
- d) Zero.

68. If a substance contracts on freezing (Such as wax), then on increasing the external pressure on it, the freezing point: (1-a 1998)

- a) Rises.
- b) Falls.
- c) Remains constant.

69. If a substance expands on freezing (such as water), then on increasing the external pressure on it, the freezing point:

- a) Rises.
- b) Falls.
- c) Remains constant.

70. In an isobaric process the work done is given by:

- a) $P \Delta V$
- b) $R \Delta T$
- c) $C_v/n \Delta T$
- d) $C_p/n \Delta T$

71. Internal energy of a system depends upon its.

- a) Pressure.
- b) Volume.
- c) Temperature.
- d) Entropy.

72. Entropy of the universe:

- a) Always decreases.
- b) Always increases.
- c) Always remains constant.
- d) Either decreases or remains constant.

73. for an adiabatic process:

- a) $PV = \text{constant}$.
- b) $PV^\gamma = \text{constant}$.
- c) $P/V = \text{constant}$.
- d) $V/P = \text{constant}$.

74. Name of the thermodynamic process in which some work is done at the expense of internal energy of the system is:

- a) Isobaric process.
- b) Isochoric process.
- c) Isothermal process.
- d) Adiabatic process.

75. A thermodynamic processes in which no work is done by or on the system is:

- a) Isobaric process.
- b) Isochoric process.
- c) Isothermal process.
- d) Adiabatic process.

76. Heat can be transferred from a cold body to a hot body:

- a) With the expenditure of K.E only.
- b) With the expenditure of P.E only.
- c) With the expenditure of some of form energy.
- d) Without the expenditure of any form of energy.

77. If heat is removed from a system, the change in internal energy is:

- a) Very high.
- b) Very low.
- c) Positive.
- d) Negative.

78. 1 Calorie =

- a) 0.42 Joules.
- b) 4.2 Joules.
- c) 42.0 Joules.
- d) 420.0 Joules.

79. In winter iron feels colder than wood although both are at the same temperature, because:

- a) Iron is a good conductor of heat.
- b) Wood is a good conductor of heat.
- c) Iron is a bad conductor of heat.

80. A thermodynamic system which cannot exchange matter and energy with its surroundings is called:

- a) An open system.
- b) A closed system.
- c) A homogenous system.
- d) An isolated system.

81. Which of the following is not a good conductor of heat?

- a) Silver.
- b) Gold.
- c) Mica.
- d) Mercury.

82. Choose the correct statement:

- a) The boiling point of pure water increases if external pressure on it is increased.
- b) The boiling point of pure water increases if external pressure on it is decreased.
- c) The boiling point of pure water decreases if external pressure on it is decreased.
- d) The boiling point of pure water decreases if external pressure on it is increased.

83. 100°C is equal to:

- a) 273 K
- b) 32°F
- c) 373 K
- d) 104°F

84. The pressure and volume formula of a gas undergoing an adiabatic change is: (1-a 1996)

- a) $PV = \text{constant}$.
- b) $P^{\gamma} V = \text{constant}$.
- c) $(PV)^{\gamma} = \text{constant}$.
- d) $PV^{\gamma} = \text{constant}$.

85. If the temperature of the cold body is decreased the efficiency of Carnot engine: (2-a, 1998)

- a) Decreases.
- b) Increase.
- c) Remains constant.

86. The average K.E of a molecule of a perfect gas is (1-a 1999)

- a) $\frac{1}{3} K T$
- b) $\frac{3}{2} K T$
- c) $\frac{2}{3} K T$

87. $273\text{ K} = \dots\dots\dots$ (1-a, 2000)

- a) 0°F
- b) -32°F
- c) 32°F

88. The pressure exerted by the gas molecule on the walls of a vessel increases if the: (1-a, 2001)

- a) Temperature of the gas decreases.
- b) Velocity of the molecules of the gas decreases.
- c) Collision of the molecules of the gas with its walls increases.
- d) None of the above happens.

89. The kinetic energy of the molecules of an ideal gas at absolute zero temperature will be (2-a, 2001)

- a) Infinite.
- b) Zero.
- c) Very high.
- d) Below zero.

90. As the temperature of a black body is raised, the wavelength corresponding to the maximum intensity: (7-a, 2001)

- a) Shifts towards longer wave length.
- b) Shifts towards shorter wave length.
- c) Remains the same.
- d) None of the above.

91. The P-V diagram shown in the figure is for: (2-a, 2002, P.M)

- a) An isothermal change.
- b) An adiabatic change.
- c) An isochoric change.
- d) None of these

92. In an isobaric process the work done is equal to: (2-a, 2002, P.M)

- a) $C_v/n \Delta T$
- b) $C_p/n \Delta T$
- c) $R \Delta T/n$
- d) $N R \Delta T$

93. Choose the correct option. (1-a, 2002, P.E)

- a) The product of P and T is constant if volume is constant.
- b) The ratio of P and V is constant if the temperature is constant.
- c) The product of P and V is constant if the temperature is constant.
- d) The product of V and T is constant if the pressure is kept constant.

94. The S.I unit of heat is: (1-a 02 P.E)

- a) Joule.
- b) Calorie.
- c) Centigrade.
- d) Fahrenheit.

95. Zero on the Celsius scale is equal to: (1-a, 2002, P.E)

- a) 273 K
- b) 32 K
- c) 100 K
- d) 212 K

96. The entropy of the universe:

110 Two steam engines A and B have their sources at 600°C and 400° and their sink at 300°C and 200°C respectively.

- a) They are equally efficient.
- b) A is more efficient than B.
- c) B is more efficient than A.
- d) If their sinks are interchanged their efficiencies will change.

111 On Fahrenheit scale the temperature of 50°C will be:

- a) 40°F
- b) 10°F
- c) 122°F
- d) 105°F

ANSWERS

- | | |
|---|--|
| <p>(20) All of them.</p> <p>(21) Calorimeter.</p> <p>(22) Thermometric properties.</p> <p>(23) To compensate for thermal expansions.</p> <p>(24) Different metals have different value of α.</p> <p>(25) 32°F</p> <p>(26) One calorie.</p> <p>(27) 42000 J.</p> <p>(28) 1000 kg water has larger heat capacity.</p> <p>(29) Temperature.</p> <p>(30) $9/5$</p> <p>(31) End at -10°C to end at -30°C</p> <p>(32) $1\text{ cal./g} - ^{\circ}\text{C}$</p> <p>(33) Some work is always done.</p> <p>(34) 3</p> <p>(35) About -459.4°F</p> <p>(36) Coefficient of linear expansion.</p> <p>(37) Temperature</p> <p>(38) Steam transfers more heat to our body in the form of its latent heat.</p> <p>(39) The density of the gas increases.</p> <p>(40) Boltzmann constant.</p> <p>(41) Heat capacity.</p> <p>(42) Latent heat.</p> <p>(43) Latent heat of fusion.</p> <p>(44) Diatomic gas molecules have translational + rotational + vibration K.E</p> <p>(45) $\text{J/mole} - \text{K}$</p> <p>(46) A hyperbolic curve.</p> <p>(47) 1 atmosphere</p> <p>(48) An isochoric change.</p> <p>(49) $3/2\text{ R}$</p> <p>(50) The name of the graph obtained on plotting pressure against volume of a gas at constant temperature.</p> | <p>(1) $5/2\text{ R}$</p> <p>(2) Their molecules have definite size and attract each other when their separation is small.</p> <p>(3) $PV^{\gamma} = \text{constant}$.</p> <p>(4) $\Delta S = \Delta Q/T$</p> <p>(5) Boyle's law.</p> <p>(6) $\Delta W = P \Delta V$</p> <p>(7) $PV = \text{constant}$.</p> <p>(8) $\Delta W = 0$</p> <p>(9) $5/2\text{ R}$</p> <p>(10) Average translational K.E of a molecule of the gas.</p> <p>(11) $\Delta U = 0$</p> <p>(12) 212°F</p> <p>(13) $E = \{ 1 - Q_2/Q_1 \}$</p> <p>(14) To complete a cycle engine must reject some heat to a sink.</p> <p>(15) Independent of the path followed between the initial and final states of the system.</p> <p>(16) Constant internal energy.</p> <p>(17) Isothermal expansion.</p> <p>(18) <u>Good emitters</u> of heat are its <u>good absorbers</u> also.</p> <p>(19) At every stage the internal energy of the system <u>remains constant</u>.</p> |
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- (78) $E = \{ 1 - T_2/T_1 \}$
- (79) The system may not have time to exchange energy with its surrounding.
- (80) Entropy either increases or remains constant.
- (81) Gas molecules possess momentum
- (82) Boltzmann's constant.
- (83) B is more efficient than A.
- (84) Remains constant.
- (85) Zero.
- (86) Collisions of molecules of the gas with walls of the container increases.
- (87) High pressure and low temperature.
- (88) -40
- (89) $3/2 K T$
- (90) Work is done at the expense of the internal energy of the system.
- (91) Cyclic process.
- (92) 0 K
- (93) Positive (law of increase in entropy)
- (94) Remains constant.
- (95) Rises.
- (96) Falls.
- (97) $P \propto V$
- (98) Temperature.
- (99) Either decreases or remains constant.
- (100) $PV^\gamma = \text{constant}$
- (101) Adiabatic process.
- (102) Isochoric process.
- (103) With the expenditure of some of form energy.
- (104) Positive.
- (105) 4.2 Joules.
- (106) Iron is a good conductor of heat.
- (107) An isolated system.
- (51) Mica.
- (52) The boiling point of pure water
Increases if external pressure on it is increased.
- (53) 373 K
- (54) $PV^\gamma = \text{constant}$
- (55) Increase
- (56) $3/2 K T$
- (57) $32^\circ F$
- (58) Collisions of the molecules of the gas with its walls increase.
- (59) Zero.
- (60) Shifts towards shorter wave length.
- (61) An isochoric change.
- (62) $N R \Delta T$
- (63) The product of P and V is constant if the temperature is constant.
- (64) Joule.
- (65) 273 K
- (66) Either remains constant or increases.
- (67) Isochoric.
- (68) $V / T = \text{constant}$
- (69) Specific heat.
- (70) Decreasing the temperature of the sink and increasing the temperature of the source keeping other factors constant.
- (71) 10^6 cm^3
- (72) Reduced to one half of the original volume.
- (73) Isochoric
- (74) R / N_A
- (75) $\text{J Kg}^{-1} \text{ K}^{-1}$
- (76) $1.38 \times 10^{-23} \text{ JK}^{-1}$
- (77) Boltzmann constant.
- (108) Isobaric process
- (109) 373 K
- (110) A is more efficient than B.
- (111) $122^\circ F$

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