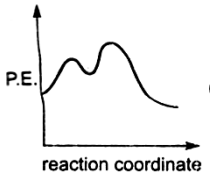
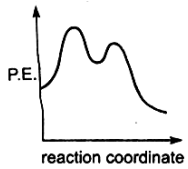
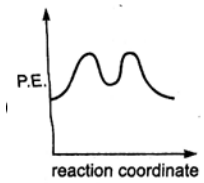
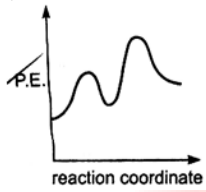
CHEMISTRY

21. Select the correct diagram for an endothermic reaction that proceeds through two steps, with the second step is rate determining

(1) 

(2) 

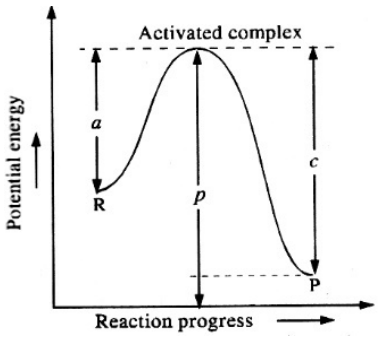
(3) 

(4) 

22. The rate constant, the activation energy and the Arrhenius parameter of a chemical reactions at 25 °C are 3.0×10^{-4} s^{-1}, 104.4 kJ mol^{-1} and 6.0×10^{14} s^{-1} respectively. The value of rate constant at $T \to \infty$ is
(1) 2.0×10^{18} s^{-1}
(2) 6.0×10^{14} s^{-1}
(3) infinity
(4) 3.6×10^{30} s^{-1}

23. For reaction, the activation energy is zero. What is the value of rate constant at 300 K is $k = 1.6 \times 10^{6}$ s^{-1} at 280 K ($R = 8.31$ J K^{-1} mol^{-1})?
(1) 1.6×10^{6} s^{-1}
(2) 3.2×10^{6} s^{-1}
(3) $\frac{1}{1.6 \times 10^{6}\ s^{-1}}$
(4) 4.8×10^{6} s^{-1}

24. The potential energy diagram for reaction R $\to$ P is given below



ΔH^0 of this reaction corresponds to the energy
(1) a (2) b
(3) c – a (4) a + b

25. Copper crystallises in fcc lattice with a unit cell edge of 361 pm. The radius of copper atom is
(1) 181 pm (2) 108 pm
(3) 128 pm (4) 157 pm

26. The edge length of the unit cell of NaCl crystal lattice is 552 pm. If the ionic radius of sodium ion is 95 pm, what is the ionic radius of chloride ion.
(1) 368 pm (2) 190 pm
(3) 276 pm (4) 181 pm

27. The density of KBr is 2.75 g cm^{-3} length of the unit cell is 654 pm. (atomic masses: K = 39 and Br = 80), then what is true about the predicted nature of the solid if $r_{Br^-} = 400$ pm
(1) solid has face centred cubic system with co-ordination number = 6
(2) solid has simple cubic system with co-ordination number = 4
(3) solid has face centred cubic system with co-ordination number = 1
(4) none of these

28. An ionic compound XY has a structure of ZnS type. If the radius of X^+ is 22.5 pm, the ideal radius of Y^- will be
(1) 20 pm (2) 50 pm
(3) 100 pm (4) 30 pm

29. Number of unit cells in 4 g of X(atomic mass = 40) which crystallise is bcc pattern is (N_A = Avogadro number).

(1) $0.1\ N_A$ (2) $2 \times 0.1\ N_A$

(3) $\frac{0.1}{2} N_A$ (4) $2 \times N_A$

30. In a compound XY_2O_4, oxide ions are arranged in CCP and cations X are present in octahedral voids. Cations Y are equally distributed between octahedral and tetrahedral voids. The fraction of the octahedral voids occupied is

(1) $\frac{1}{2}$ (2) $\frac{1}{4}$

(3) $\frac{1}{8}$ (4) $\frac{1}{6}$