Question 1.

Can a polyhedron have for its faces

(i) 3 triangles?

(ii) 4 triangles?

(iii) a square and four triangles?

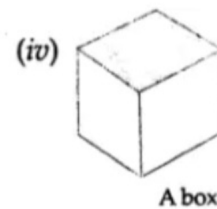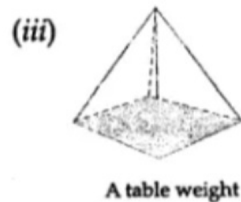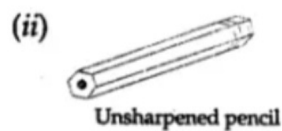Solution:

(i) No

(ii) Yes

(iii) Yes

Question 2.
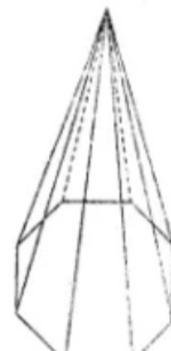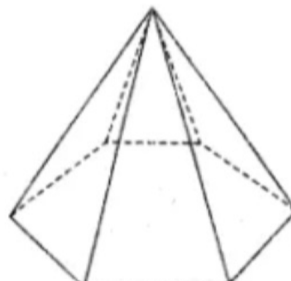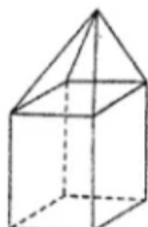
Which are prisms among the following?

(i) A nail (ii) Unsharpened pencil (iii) A table weight (iv) A box

Solution:

Prisms are only (i) and (iv).

Question 3.

Verify Euler's formula for these solids:

(i) (ii) (iii) (iv)

Solution:

	Faces	Vertices	Edges	F + V = E + 2
(i)	7	10	15	7 + 10 = 15 + 2 ⇒ 17 = 17
(ii)	9	5	12	9 + 5 = 12 + 2 ⇒ 14 = 14
(iii)	7	7	12	7 + 7 = 12 + 2 ⇒ 14 = 14
(iv)	9	9	16	9 + 9 = 16 + 2 ⇒ 18 = 18

Question 4.

Can a polyhedron have 15 faces, 30 edges and 20 vertices?

Solution:

Can a polyhedron have 15 faces, 30 edges and 20 vertices.

$\because$ F + V = E + 2

⇒ 15 + 20 = 35 and 30 + 2 = 32

$\because$ 35 ≠ 32

$\therefore$ It has not.

Question 5.

If a polyhedron has 8 faces and 8 vertices, find the number of edges.

Solution:

A polyhedron has 8 faces and 8 vertices.

$\therefore$ Number of edges = F + V − 2 = 8 + 8 − 2 = 14

Question 6.

If a polyhedron has 7 faces and 10 vertices, find the number of edges.

Solution:

A polyhedron has 7 faces and 10 vertices.

∴ Number of edges = F + V − 2 = 7 + 10 − 2 = 15

Question 7.

Write the number of faces, vertices and edges in

(i) an octagonal prism

(ii) decagonal pyramid.

Solution:

	No. of faces	No. of vertices	No. of edges
(i) an octagonal prism :	10	16	24
(ii) decagonal pyramid :	11	11	20

Question 8.

Using Euler's formula, complete the following table:

	Faces	Vertices	Edges
(i)	6	—	12
(ii)	—	5	8
(iii)	14	24	—
(iv)	—	16	30
(v)	16	—	42
(vi)	19	19	—

Solution:

	Faces	Vertices	Edges	F + V = E + 2
(i)	6	8	12	12 + 2 = 14 ∴ 6 + 8 = 14
(ii)	5	5	8	8 + 2 = 10 ∴ 5 + 5 = 10
(iii)	14	24	36	14 + 24 = 38 ∴ 38 − 2 = 36
(iv)	16	16	30	30 + 2 = 32 ∴ 16 + 16 = 32
(v)	16	28	42	42 + 2 = 44 ∴ 16 + 28 = 44
(vi)	19	19	36	19 + 19 = 38 ∴ 2 + 36 = 38