

Chapter: Three Dimensional Figures

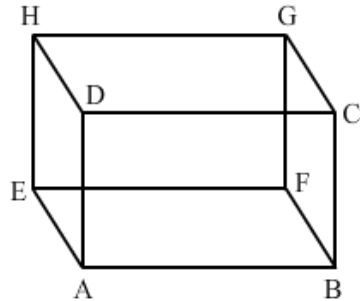
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Exercise: 19A

Question 1:

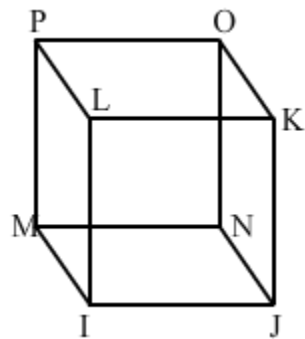
(i)

Solution: A cuboid has 6 faces, namely ABCD, EFGH, HDAE, GCBF, HDCG and EABF.



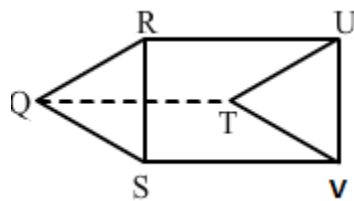
(ii)

Solution: A cube has 6 faces, namely IJKL, MNOP, PLIM, OKJN, LKOP and IJNM.



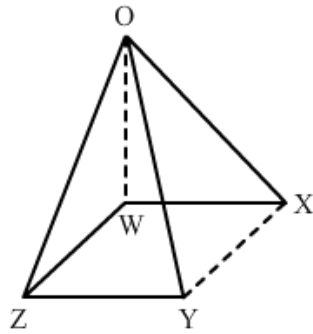
(iii)

Solution: A triangular prism has 5 faces (3 rectangular faces and 2 triangular faces), namely QRUT, QTVS, RUVS, QRS and TUV.



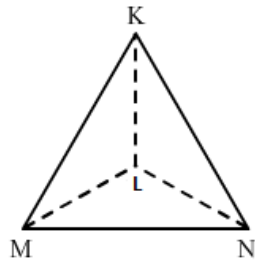
(iv)

Solution: A square pyramid has 5 faces (4 triangular faces and 1 square face), namely OWZ, OWX, OXY, OYZ and WXYZ.



(v)

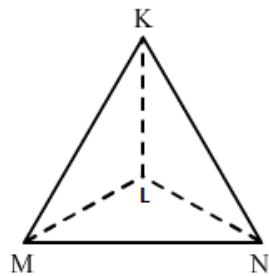
Solution: A tetrahedron has 4 triangular faces, namely KLM, KLN, LMN and KMN.



Question2:

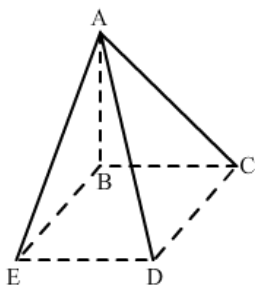
(i)

Solution: A tetrahedron has 6 edges, namely KL, LM, LN, MN, KN and KM.



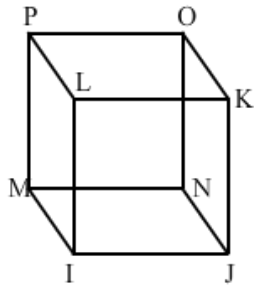
(ii)

Solution: A rectangular pyramid has 8 edges, namely AB, AE, AD, AC, EB, ED, DC and CB.



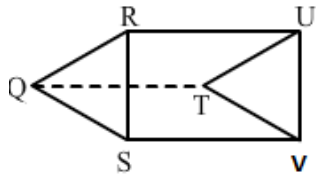
(iii)

Solution: A cube has 12 edges, namely PL, LK, KO, OP, MN, NJ, JI, IM, PM, LI, ON and KJ.



(iv)

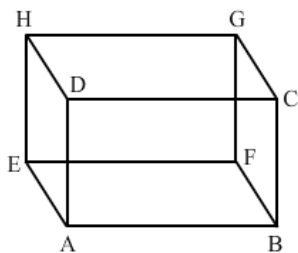
Solution: A triangular prism has 9 edges, namely QR, RS, QS, TU, TV, UV, QT, RU, and SV.



Question 3:

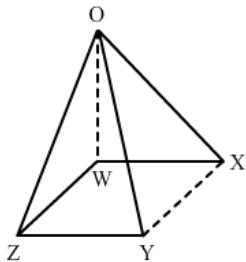
(i)

Solution: A cuboid has 8 vertices, namely A, B, C, D, E, F, G and H.



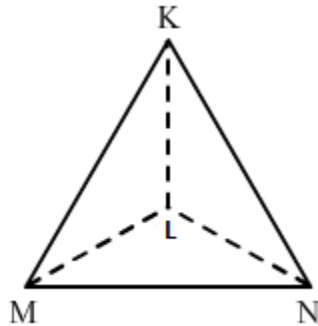
(ii)

Solution: A square pyramid has 5 vertices, namely O, W, X, Y and Z.



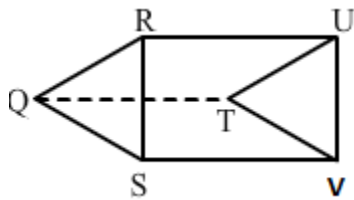
(iii)

Solution: Tetrahedron has 4 vertices, namely K, L, M and N.



(iv)

Solution: A triangular prism has 6 vertices, namely Q, R, S, T, U and V.



Question 4:

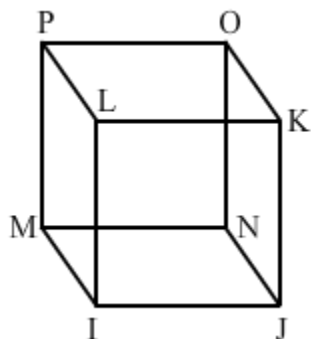
(i)

Solution: A cube has 8 vertices, 12 edges and 6 faces.

Vertices: I, J, K, L, M, N, O and P

Edges: IJ, JN, NM, MI, PL, LK, KO, OP, PM, LI, KJ, and ON

Faces: MNJI, POKL, PLIM, OKJN, PONM and LKJI



(ii)

Solution: The point at which the three faces of a figure meet is known as its vertex.

(iii)

Solution: A cuboid is also known as a rectangular cube.

(iv)

Solution: A triangular pyramid is called a tetrahedron.

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Exercise: 19 B

Question 1:

Solution: The Euler's relation for a three dimensional figure can be expressed in the following manner:

$$F - E + V = 2$$

Here,

F = Number of faces

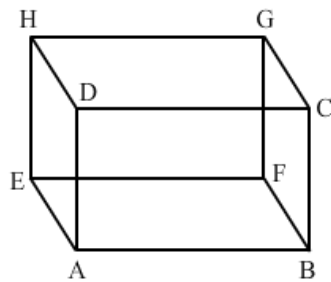
E = Number of edges

V = Number of vertices

Question 2:

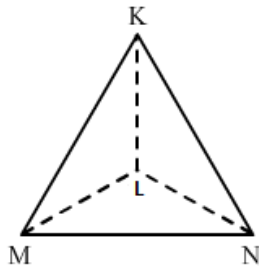
(i)

Solution: A cuboid has 12 edges, namely AD, DC, CB, BA, EA, FB, HD, DC, CG, GH, HE, and GF.



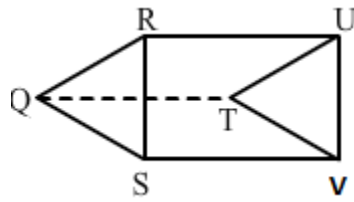
(ii)

Solution: A tetrahedron has 6 edges, namely KL, LM, MN, NL, KM and KN.



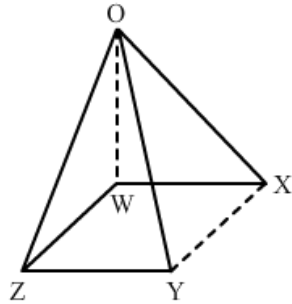
(iii)

Solution: A triangular prism has 9 edges, namely QR, RS, SQ, TU, UV, VT, RU, SV and QT.



(iv)

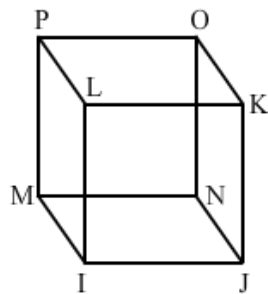
Solution: A square pyramid has 8 edges, namely OW, OX, OY, OZ, WX, XY, YZ and ZW.



Question 3: How many faces are there in a

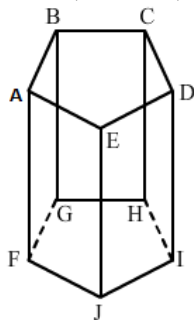
(i)

Solution: A cube has 6 faces, namely IJKL, MNOP, PLIM, OKJN, POKL and MNJI.



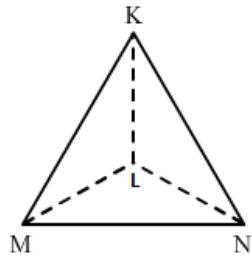
(ii)

Solution: A pentagonal prism has 7 faces, i.e. 2 pentagons and 5 rectangles, namely ABCDE, FGHIJ, ABGF, AEJF, EDIJ, DCHI and CBGH.



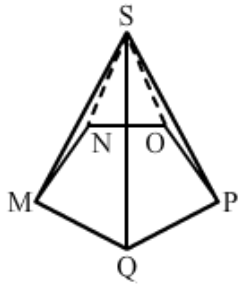
(iii)

Solution: A tetrahedron has 4 faces, namely KLM, KLN, LMN and KMN.



(iv)

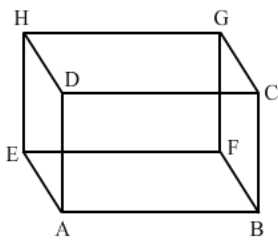
Solution: A pentagonal pyramid has 6 faces, i.e. 1 pentagon and 5 triangles, namely NOPQM, SNM, SOP, SNO, SMQ and SQP.



Question 4:

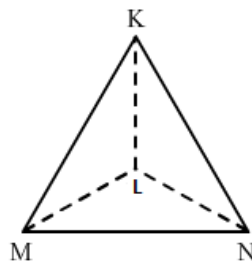
(i)

Solution: A cuboid has 8 vertices, namely A, B, C, D, E, F, G and H.



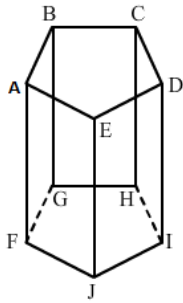
(ii)

Solution: A tetrahedron has 4 vertices, namely K, L, M and N.



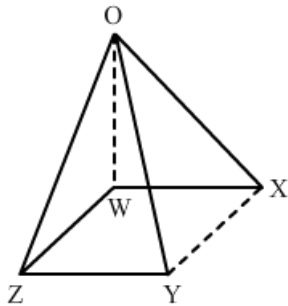
(iii)

Solution: A pentagonal prism has 10 vertices, namely A, B, C, D, E, F, G, H, I and J.



(iv)

Solution: A square pyramid has 5 vertices, namely O, W, X, Y and Z.



Question 5:

Solutions: The Euler's relation for a three dimensional figure can be expressed in the following manner:

$$F - E + V = 2$$

Here,

F = Number of faces

E = Number of edges

V = Number of vertices

(i)

Solution:

Number of faces = $F = 2$ squares + 4 rectangular = 6

Number of edges = $E = 12$

Number of vertices = $V = 8$

$$(F - E + V) = 6 - 12 + 8 = 2$$

(ii)

Solution:

Number of faces = $F = 4$

Number of edges = $E = 6$

Number of vertices = $V = 4$

$$\Rightarrow F-E+V=4-6+4=2$$

(iii)

Solution:

Number of faces = $F=2$

Triangular + 3 rectangular = 5

Number of edges = $E = 9$

Number of vertices = $V = 6$

$$\Rightarrow F-E+V=5-9+6=2$$

(iv)

Solution:

Number of faces = $F=2$

Triangular + 3 rectangular = 5

Number of edges = $E = 8$

Number of vertices = $V = 5$

$$\Rightarrow F-E+V=5-8+5=2$$