

4.7 Organogenesis and congenital anomalies

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS foramen ovale

Objective

Date congenital anomalies to their construction windows and trace the fetal circulation’s transition at birth.

1 Key knowledge and worked examples

■ **Windows**

Weeks 3–4 tubes (neural, heart); weeks 4–8 septation, palate (7–8), diaphragm (7), limbs; foramen ovale + ductus arteriosus open in the fetus, close at birth (PFO persists ~25%).

■ **Worked example: neighbourhood logic**

Cleft palate + VSD + thumb anomaly = one week-7 event ✓ – palate shelves, septum and limb patterning were simultaneous neighbours.

2 Practice

2.1 Why must the foramen ovale be open before birth? [3]

2.2 What closes it at birth? [3]

2.3 In which weeks does the palate fuse? [3]

3 Exam-style questions

3.1 Trace a red cell from the placenta through the fetal heart to the aorta.

List the route including both shunts ✓. State the pressure reason each shunt flows as it does. Predict the immediate postnatal change. [8]

3.2 A newborn has a cleft palate and a heart murmur (fictional).

Date the disruptive event to its window (week 7–8). Explain why two systems share one cause. State the examination this logic demands elsewhere. [7]

Solutions

2.1

- Lungs are closed: blood must bypass them to reach the body.

2.2

- First breath drops pulmonary resistance → left-atrial pressure rises → functional closure.

2.3

- Weeks 7–8.

3.1

- Placenta → umbilical vein → IVC → right atrium → (i) foramen ovale → left atrium, and (ii) the remainder → right ventricle → pulmonary artery → ductus arteriosus → aorta.
- Pressures: pulmonary resistance is sky-high in utero, so blood takes the low-resistance shunts.
- Postnatal: air inflates lungs, resistance falls, left pressure rises; both shunts reverse gradient and close.

3.2

- Weeks 7–8 (palate shelves + ventricular septum both mid-closure).
- Simultaneous neighbours: one disruption, several systems.
- Examine every midline neighbour – the heart by auscultation and echo.