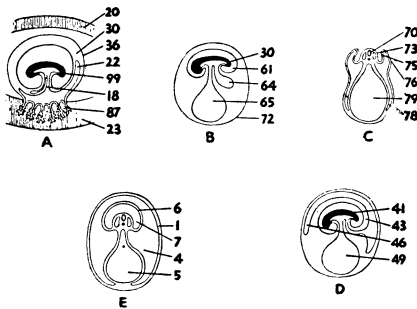


56. A formula giving the velocity of a source of vibration receding from a stationary observer is  $I: S = \frac{F(V)}{V+P}$
- 2:  $S = \frac{(F-P)V}{P}$     3:  $S = \frac{F(V)}{P}$     4:  $S = \frac{F}{P}$         56
57. If a whistling train moves from an observer on another moving train, the observed pitch may be determined by the formula 1:  $P = FV$     2:  $P = \frac{F(V-O)}{V+S}$     3:  $P = \frac{VF}{V+S}$     4:  $P = \frac{V+S}{VO}$         57
58. The "whistles" on the fins of a bomb emit a frequency of F vibrations per second. The frequency analyzed on the ground is P vib/sec. How fast is the bomb approaching if V = Velocity of sound? 1:  $\frac{VF+VP}{V}$     2:  $\frac{FP}{V}$     3:  $\frac{VP-VF}{P}$     4:  $\frac{VP}{F}$         58
59. In August of 1943, Colonel Hough was reported to have dived a plane at 780 mph. If a siren were attached to the tail of his plane and vibrated at 790 vib/sec. during the dive only, 1: the siren could not be heard on the ground on a straight line projected from his direction of dive    2: the apparent pitch of the siren dropped    3: Hough could hear the siren intermittently    4: the pitch of the sound heard was 10 vib/sec        59
60. The whistle of a train A was set to deliver a sound of 650 vib/sec. An observer on train B moving at 30 miles per hour heard the whistle sound 20 seconds after he saw the steam of the whistle. The pitch of the sound observed was determined to be 650 vib/sec. The distance between the observer and whistle after the whistle had been blown for 20 seconds is 1: 4.1 mi.    2: 5.6 mi.    3: 3.2 mi.    4: 7.5 mi.        60

PARAGRAPH G: There are four embryonic membranes in vertebrates — the yoke sac, the allantois, the amnion, and the chorion. The amnion and chorion are formed by a fold of the somatopleuræ which rises up around the embryo and fuses over it; the outer limb of the fold becomes the chorion and the inner the amnion. The yoke sac which extends ventral to the embryo becomes smaller with development, the allantois spreading between the amnion and yoke sac, and the chorion. The allantois originates as an evagination of the embryonic digestive tract, the outer wall of the allantois growing into contact with the chorion; the two together form the chorio-allantoic membrane. In mammals the placenta is formed by the penetration of the chorio-allantoic membrane into the wall of the uterus, the penetration taking the form of treelike ingrowths which are called chorionic villi.

QUESTIONS ON PARAGRAPH G:

91. If the embryonic diagrams above were to be arranged in sequence from oldest to youngest, which would be the second? 1: A    2: B    3: C    4: D        91
92. In which diagram does the allantois first appear? 1: B    2: C    3: D    4: E        92
93. Which embryonic membrane is in closest contact with the skin of the embryo? 1: allantois    2: amnion    3: yoke sac    4: chorion        93
94. Structure 79 in C is identified by what number in diagram A? 1: 30    2: 22    3: 18    4: none        94
95. Structure 75 in C is identified by what number in diagram E? 1: 7    2: 1    3: 4    4: 6        95
96. What structure in C is the same as structure 99 in diagram A? 1: 78    2: 76    3: 79    4: 70        96
97. What structure in D is the same as structure 4 in diagram E? 1: 41    2: 43    3: 46    4: 49        97



made a perfect score. When you try this selection of questions from the examination you should, therefore, not expect to find that you have checked all the right answers.

To save your time only typical questions out of the original three-hour examination are reproduced on the following pages.

Don't read further. Cover up this paragraph until you have taken the test. Here are the correct answers:

96, 4; 97, 2. 98, 1; 99, 1; 100, 1; 101, 1; 102, 2; 103, 2; 104, 2; 105, 2; 106, 2; 107, 2; 108, 2; 109, 2; 110, 2; 111, 2; 112, 2; 113, 2; 114, 2; 115, 2; 116, 2; 117, 2; 118, 2; 119, 2; 120, 2; 121, 2; 122, 2; 123, 2; 124, 2; 125, 2; 126, 2; 127, 2; 128, 2; 129, 2; 130, 2; 131, 2; 132, 2; 133, 2; 134, 2; 135, 2; 136, 2; 137, 2; 138, 2; 139, 2; 140, 2; 141, 2; 142, 2; 143, 2; 144, 2; 145, 2; 146, 2; 147, 2; 148, 2; 149, 2; 150, 2; 151, 2; 152, 2; 153, 2; 154, 2; 155, 2; 156, 2; 157, 2; 158, 2; 159, 2; 160, 2; 161, 2; 162, 2; 163, 2; 164, 2; 165, 2; 166, 2; 167, 2; 168, 2; 169, 2; 170, 2; 171, 2; 172, 2; 173, 2; 174, 2; 175, 2; 176, 2; 177, 2; 178, 2; 179, 2; 180, 2; 181, 2; 182, 2; 183, 2; 184, 2; 185, 2; 186, 2; 187, 2; 188, 2; 189, 2; 190, 2; 191, 2; 192, 2; 193, 2; 194, 2; 195, 2; 196, 2; 197, 2; 198, 2; 199, 2; 200, 2; 201, 2; 202, 2; 203, 2; 204, 2; 205, 2; 206, 2; 207, 2; 208, 2; 209, 2; 210, 2; 211, 2; 212, 2; 213, 2; 214, 2; 215, 2; 216, 2; 217, 2; 218, 2; 219, 2; 220, 2; 221, 2; 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If more than ten were scored right you did better than three-fourths of the scholars.

Science News Letter, February 5, 1944

ENGINEERING

X-Ray Tube Locates Foreign Bodies in Tires

► HIDDEN nail-in-the tire troubles are exorcised by the invention on which G. P. Bosomworth of Akron, Ohio, received patent No. 2,339,550, rights in which are assigned to Firestone Tire and Rubber Company. The device consists of a powerful X-ray tube attached to a lead-shielded frame, over which automobile wheels may be slowly rotated without being removed from the car. The operator, peering through an aperture at a fluorescent screen, sees nails, sharp metal scraps and other tire-hurting foreign bodies in dark silhouette. He marks the spot with chalk for the guidance of the repair man.

Science News Letter, February 5, 1944

HORTICULTURE

Hand-Pushed Weeder Invented for Gardens

► A NEW TYPE of hand-pushed, wheeled, weeding implement, is covered by patent No. 2,339,905, obtained by W. J. Baker of Southgate, Ky. It resembles in principle the larger, power-drawn implements known as subsoil or fallow cultivators now coming into favor in soil-conserving agricultural practice. Long, flat, relatively narrow blades are drawn through the soil just below the surface, neatly shearing off the roots and leaving the tops to wilt and die and form a mulch.

Science News Letter, February 5, 1944

