Q84

"3D printing" has applications in which of the following? 1. Preparation of confectionery items 2. Manufacture of bionic ears 3. Automotive industry 4. Reconstructive surgeries 5. Data processing technologies Select the correct answer using the code given below: (a) 1, 3 and 4 only (b) 2, 3 and 5 only (c) 1 and 4 only (d) 1, 2, 3, 4 and 5 Official key: D.

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Explanation

(a)

(a) 1, 3 and 4 only. Food printing, auto parts and reconstructive surgery are real 3D-printing uses, but bionic ears and data-processing/electronics printing are also documented. Dropping 2 and 5 is therefore incomplete. This option is not the key.

(b)

(b) 2, 3 and 5 only. It keeps bionic ears, autos and data hardware but omits confectionery and surgery, which additive manufacturing already serves. This option is not the key.

(c)

(c) 1 and 4 only. Far too narrow: cars, medical devices and printed electronics are missing. This option is not the key.

(d) Official key

(d) 1, 2, 3, 4 and 5. Additive manufacturing prints sugar/chocolate forms, tissue-engineered/bionic ears, automotive prototypes and parts, surgical implants/guides, and even electronic/data-processing hardware (printed circuits, housings). All five listed fields apply. This option is the official key.

Summary

Official key is (d) 1, 2, 3, 4 and 5. Three-dimensional printing is a general fabrication method: food pastes, biomedical scaffolds and bionic ears, vehicle parts, reconstructive implants, and printed electronics for data devices. None of the five listed areas is outside that envelope as UPSC framed it. Partial codes therefore under-count. The Set A key is all five.

Related possible facts

These can be asked in a future Prelims paper.

Additive manufacturing
Layer-by-layer build from a digital model

SLS / SLA / FDM
Common 3D-printing process families

Bioprinting
Cells and hydrogels for tissue structures

Printed electronics
Conductive inks for circuits and sensors

ISO/ASTM 52900
Terminology standard for additive manufacturing