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Q8(a)

Describe the role of Anthropology in designing defence and other equipment.

UPSC Civil Services Mains 2016 · Anthropology GS 1 · 20 marks · Applications of Anthropology

12. Applications of Anthropology: Anthropology of sports, Nutritional anthropology, Anthropology in designing of defence and other equipments, Forensic Anthropology, Methods and principles of personal identification and reconstruction, Applied human genetics-Paternity diagnosis, genetic counselling and eugenics, DNA technology in diseases and medicine, serogenetics and cytogenetics in reproductive biology.

Core demand of the question

- Describe the role of Anthropology in designing defence and other equipment
- Write about 250 words for 20 marks

Revision summary

Design needs Indian body dimensions, not only NATO tables.

Defence uses surveys for helmets, seats, suits, and loads.

Dynamic reach and vision matter as much as stature.

Civil PPE and cockpits use the same applied anthropology.

Reject martial-race myths; use **percentiles** and sex-specific fits.

Introduction

Anthropology enters equipment design through human biology and human variation. Defence kit that fits a census average can fail a real soldier, pilot, or worker.

Body**Anthropometry as design input**

- **Static** measures (stature, sitting height, reach, hip breadth) set cockpit, hatch, and body-armour sizes.
- **Dynamic** measures (range of motion, grip, vision cones) set controls and sightlines.
- Indian defence has used **DRDO** and service anthropometric surveys because imported NATO **percentiles** do not match Indian bodies.

Defence applications

- Helmets, oxygen masks, NBC suits, parachute harnesses, and tank seats need sex- and region-aware size rolls, not one 'universal man'.
- **Load carriage** and boot last design prevent stress fracture and cold injury.
- **Human factors** after **Fitts** and later ergonomics treat the soldier as a system, not a uniformed average.

Other equipment

- **Industry:** machine guards, vehicle cabins, furniture, and PPE for women workers often ignored by male-only samples.
- **Space and aviation:** NASA and IAF cockpit studies are applied somatology.
- **Disability and ageing:** inclusive design is the same method with different **percentiles**.

Role, critically

- Anthropology supplies variation, growth, and culture of use (sari, turban, sitting habits).
- It must refuse racial 'martial type' myths. Fit the person; do not mythologise a tribe as a weapon.

Flow diagram

Anthropometry variation -> Helmet cockpit armour
Anthropometry variation -> Industry PPE furniture
Helmet cockpit armour -> Fit not racial type

Conclusion

Anthropology designs defence and civil equipment by feeding anthropometry, motion, and cultural dress into engineering. The role is to make kit fit Indian bodies and uses, not a foreign percentile or a racial cartoon.

Facts & figures

DRDO

Indian anthropometric work for clothing and equipment sizing.

Percentiles

Design to a range (e.g. 5th-95th), not to the mean alone.

Human factors

Ergonomics of control layout and error in high-risk systems.

Load carriage

A common source of musculoskeletal injury when kit ignores body size.

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