Past-paper walk-through

The Internal Structure of Cities ▪ 6.5

eXercise

Questions in this set

- 2023 Set 1 Q3

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- // separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = "or words to that effect" – the wording need not match.

Question 3

2023 Set 1 ▪ Q3

Two stimuli.
Stimulus 1 (map): MAJOR MEDICAL AND BIOTECHNOLOGY COMPANIES AND INSTITUTIONS IN THE BOSTON AND PROVIDENCE REGION. An inset map shows the downtown areas of Boston and Cambridge, Massachusetts, with numerous medical and biotechnology companies and institutions clustered together along the Charles River and arterial routes. Source: National Institutes of Health.
Stimulus 2 (table): SELECTED TECHNOLOGY RESEARCH AND DEVELOPMENT AREAS IN THE MEDICAL FIELD.

Category	**Product or Service**
Biotechnology	Genetic engineering research; Biochemistry research; Diagnostic and testing science
Gene therapies	Cancer treatments; Neurological treatments; Rare and genetic disease treatments; Antiviral treatments and vaccines (e.g., Moderna)

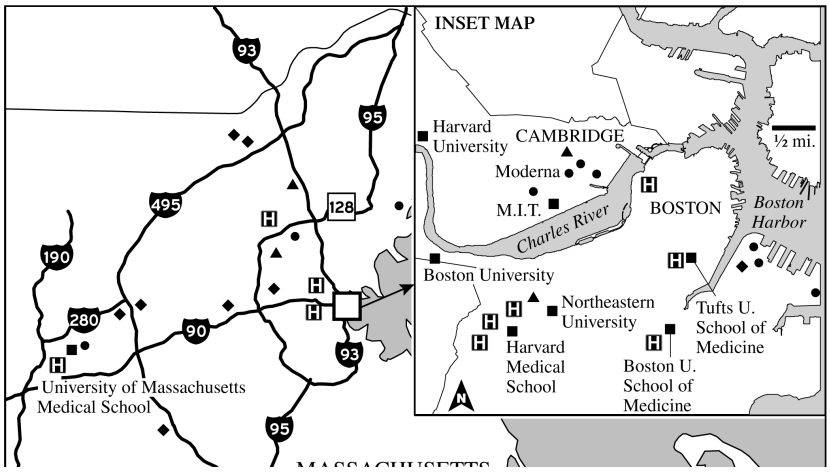
Question 3

Since the 1980s, the northeastern United States has developed into a major global center of high-technology industry that specializes in the medical field.
(a) Describe the spatial pattern of the companies and institutions shown in the inset map.
(b) Describe the concept of a growth pole.
(c) Explain ONE way education infrastructure affects a region's potential for high-technology development.
(d) Explain how the pattern shown on the map resembles the galactic city model.
(e) Explain ONE way local economic changes may be a result of deindustrialization.
(f) Explain how the products and services listed in the table demonstrate that this economy has moved into the quaternary sector.

Question 3

(g) The map focuses on a regional scale. Explain a possible limitation of drawing country scale conclusions from a regional scale map.

Question 3


INSET MAP
93
95
495
128
190
280
90
93
95
Harvard University
CAMBRIDGE
½ mi.
Moderna
M.I.T.
BOSTON
Boston Harbor
Charles River
Boston University
Northeastern University
Tufts U. School of Medicine
Harvard Medical School
Boston U. School of Medicine
University of Massachusetts Medical School
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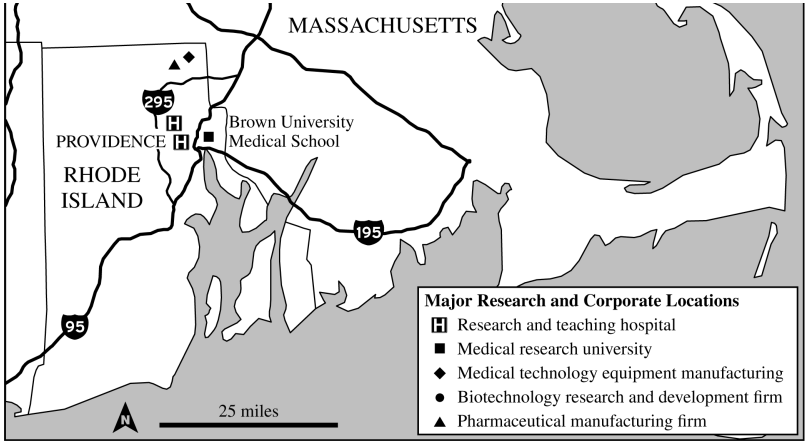
Question 3



Source: National Institutes of Health

Solution 3

(a)

Mark scheme

- Describe the spatial pattern on the inset map (1 point) — accept any: agglomeration of similar economic activities; clustering/concentration of similar activities; concentration along transportation routes (rivers, arterial roads); a concentration of similar economic activities within a metropolitan area in Massachusetts.

Solution 3

(b)

Mark scheme

- Describe a growth pole (1 point) — accept any: a location where research, development, and/or innovation generates new products or services; an institution (university, hospital, laboratory) whose discoveries/inventions create new economic opportunities; an area where new businesses start up or locate to join an emerging market or attract investment; an area attracting businesses seeking a specialized/educated labor pool; an area designated by government to facilitate economic activity for a specific purpose.

Solution 3

(c) Mark scheme

- Explain ONE way education infrastructure affects high-technology potential (1 point) — accept any: graduates who stay in the region promote development, create innovative products, and provide wealth for investment; educational institutions build a specialized labor force that attracts high-tech firms/investors; institutions sponsor research yielding new products/services, value, investment, and employment; public investment in specialized training/infrastructure (positive), or, conversely, lack of educational infrastructure hurts potential by leaving no highly educated/specialized workforce or sponsored research.

Solution 3

(d)

Mark scheme

- Explain resemblance to the galactic city (peripheral) model (1 point) — accept any: multiple development centers (edge cities, CBDs, suburban CBDs) based on specialized products/services; a decentralized pattern of business spread across the region; a circumferential/circular/radial highway pattern typical of a galactic city; several highway intersections serving as nodes for new business districts or development centers.

Solution 3

(e) Mark scheme

- Explain ONE local economic change from deindustrialization (1 point) — accept any: a shift from a manufacturing/secondary economy to a service/technology (tertiary, quaternary, or quinary) economy; outsourcing of manufacturing abroad causing declining local employment or rising unemployment; increased CBD unemployment, declining investment, or falling real-estate values from lost manufacturing firms/jobs; increased use of post-Fordist methods (specialized firms, just-in-time supply chains, flexible production); falling GNI per capita or rising unemployment/underemployment as workers lose manufacturing jobs.

Solution 3

(f)

Mark scheme

- Explain how the listed products/services show a quaternary economy (1 point): the biotechnology and gene-therapy research, development, and information/knowledge-based services listed (genetic engineering research, biochemistry research, diagnostic science, R&D of treatments and vaccines) are knowledge-, information-, and research-intensive activities that define the quaternary sector, rather than the extraction (primary), manufacturing (secondary), or routine service (tertiary) sectors.

Solution 3

(g)

Mark scheme

- Explain a limitation of drawing country-scale conclusions from a regional-scale map (1 point): the map shows only one region (a metropolitan area of Massachusetts), so its pattern is not representative of the whole country — other regions may have different or no such clustering, so generalizing the regional agglomeration to the national scale would be inaccurate. Changing the scale of analysis changes the pattern observed and the conclusions drawn.