Spring 2025
Introduction to Philosophy of Technology
Mid-Semester Examination

27th February, 2025 **Time: 1.5 hours**
Marks: 30

Answer any 3 in about 400 - 500 words; keep your answers precise and to the point

3 × 10

1. **Marx writes "*The application of machinery in the present day is one of the relations of our present economic system, but the way in which machinery is utilised is totally distinct from the machinery itself. Powder is powder whether used to wound a man or to dress his wounds.*"**
What is the underlying assumption regarding technology in this quotation? Explain this quotation by outlining the main elements of Marxist theory of historical materialism and the role of technology therein.

Underlying assumption (3; 1 for each point; look for any 3)

see p. 38 of Matthewman, "Marx, modernity, and the machine". The paragraph before and above the indented quotation.

- The underlying assumption here is that technologies are value-neutral instruments. They are not just means to an end. They are not value-laden.
- What makes machines value-laden is the relations of production under which they are utilized.
- It is the capitalist class and the way in which they put technologies to use is the actual source of their negative consequences.
- True oppression is social not mechanical. Technologies can be harnessed for social good.

Main elements of Marxist theory of historical materialism (4); see slides 11-14 of L6_Marx

Look for (2 for covering all components of the first point; 2 for covering all components of the second)

- references to dialectic, relations of production, forces of production, base, superstructure.
- How the superstructure emerges from the base; How at a certain stage of their development the material forces of production in society come into conflict with the existing relations of production. From forms of development of the forces of production these relations turn into their fetters.

Role of technology (3; 1 for each point; look for any 3); see slides 17-21 of L6_Marx

- Humans are labouring animals. They conscript tools as part of their labour for survival.
- Tools enable the creation of surplus. And this surplus is appropriated by a few who form the ruling class in society. The rest form the working class.
- Technology transforms society and corresponds to different stages in history,e.g., handicraft, manufacturing, and modern industry

- with the advancement of machinery, there is a tension between the forces of production and relations of production, which causes society to transform towards a new mode of production
- Technology alienates workers from their product.
- Machinery reduces the requirement for skilled labour, it creates unemployment in new areas, and its refinement undermines existing jobs
- Technology/machinery enables the capitalist to extract more surplus from the labour of the worker and exploit the worker.

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2. **Briefly describe how (a) the Frankfurt school and (b) David Noble differ from Marx in their philosophies of technology? Which among these perspectives on technology (Marxism, Frankfurt school, David Noble, or either/neither of the above) do you find convincing. Provide reasons in support of your position.**

Frankfurt school vs. Marx (3; look for any 3)
see pp. 40-41 in Matthewman

- skeptical of the Enlightenment idea of progress through science and technology
- the relations of production are more flexible than Marx expected. Hence all opposition disappears in the face of consumerism
- instrumental reason has taken over all arenas of life and dominates over it
- everything becomes standardized by capitalism and pseudo-individualism takes over; there is no scope for revolution against the capitalist class in such a takeover

David Noble vs. Marx (3; 1.5 marks for each point; look for any two that)
see p. 46 in Matthewman

- Noble argues that private ownership of the means of production and the ongoing appropriation of surplus value are only means to the ultimate end of domination
- Technology is the materialization of the will to power. Its purpose is not to improve productivity of labour but to take control over labour.

Their position and justification (4)
Use your discretion. 1 mark for position; 3 for justification (1.5 marks for each point in support of their position.

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3. **Briefly describe the three phases into which industrial production has been divided since the Middle Ages by Marx and Engels? What do machines do to workers under capitalism? Bring out the difference in positions between Marx and the Luddites in terms of how this effect of machines on the workers may be remedied.**

Three phases of industrial production since Middle Ages (4)

Handicraft, manufacturing, and modern industry (1 mark for getting all three labels right; 1 mark for briefly describing each; look for any 2 points under each label, 0.5 marks for each); see the last paragraph of p. 32 in Matthewman

In the handicraft phase production is small-scale. Master crafts persons dominate the process. A single worker makes the entire article.

The manufacturing phase sees greater numbers of workers concentrated in a single establishment. There is a division of labour under conditions of manufacture. The finished article passes through the hands of all.

With modern industry, control of the immediate production process was removed from the direct producers. Goods are now the products of power-driven 'cyclopean' machines. Masters no longer supervise apprentices, or workers each other; now employees watch over mechanical agents.

What machines do to workers under capitalism (3; 1 mark each for any 3 points)

- Machinery reduces the requirement for skilled labour, it creates unemployment in new areas, and its refinement undermines existing jobs.
- In consequence, labour costs and demand for labour are much reduced.
- In the battle between capital and labour, machines weigh in for the former. They are implements of class war.
- Marx (1978, p. 139) attributed all technological innovation since the first crisis of English capitalism to the struggle between workers and bosses. 'It is the capitalistic employment of machinery, and not merely capitalism in general, which generates the modern proletariat as Marx conceived it'

Marx vs. Luddites (3)

Look for any 2 points of difference (1.5 each)

- Marx replaced the machinery question with the social question. Whereas the Luddites waged war against the machines themselves, Marx noted that this was misplaced. It confused the machinery's current use for its essence.
- For Marx, technology is value-neutral. It is the relations of production that are responsible for technology's oppressive character. The Luddites on the other hand saw technology as value-laden and in a negative sense. Technology was responsible for their unemployment.

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4. **Briefly describe Alexander Koyre's conception of technology and its relationship to science. What is Layton's evaluation of this conception? Describe the central purpose of technology, according to Layton and the implications of viewing technology as a spectrum.**

Koyre's conception of technology (2; 1 mark each for any 2 points); see pp. 35-36 in Layton

- Koyre did not reduce technology to techniques; on the contrary, he insisted that **technology is a system of thought, an independent system different from science**.
- He considered it a **system of thinking based on common sense.**
- He held that "the technical thought of common sense **does not depend on scientific thought**

its relationship to science (2; 1 mark each for any 2 points); see pp. 35-36 in Layton

- Koyre emphasized a rather subtle, indirect influence of science on technology. The presuppositions of science—such as the idea of a world governed by precise mathematical laws—were transmitted to technology and subsequently emerged the making of the mechanical clock as an instrument of precision.
- Koyre assumed that the influence was indirect, involving something like a translation of the idea from one medium to another.
- The result was not simply the grafting of a scientific result onto technology but, rather, transformation of the very structure of technology's own system of thought.

Layton's evaluation (2; 2 marks each; look for any 2); see p. 40 in Layton

- Koyre's model of science and technology as belonging to separate bodies of knowledge. Koyre's model of science-technology relationship as asymmetric.
- Koyre saw the difference between science and technology in Platonic terms as the distinction between two Greek philosophical ideas, episteme (knowledge) and techne (art).
- This does not enable for the flow of knowledge from technology to science.
- Koyre's approach leads to a static model: the Platonic ideas of "knowledge" and "art" do not change over time.

Central purpose of technology (2; look for any two points; 1 mark each); see p. 37 in Layton

- Design is the central purpose of technology.
- Design as involving the adaptation of means to some preconceived end.
- Design as the reasoned capacity to make.
- Design as the attribute of a human being which may be expressed in an object but which is not identical with the object itself.
- Design can be reduced to technique only in the final stage of drafting the blueprint and making the tools that technique and things come into picture.

Implications of viewing technology as a spectrum (2; look for any 2 points; 1 mark each); see p. 37 in Layton

- to view technology as a spectrum is to view it such that there are ideas on one end and techniques and things at the other, with design as the middle term.
- current model of science-technology relations looks at only one end of the spectrum. It would be an equal distortion to see technology solely as thought. Both aspects are needed for a balanced view.
- Enables to think of the knowledge components of science and technology in social terms as values held by communities
- Brings intellectual and social history to the fore.

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5. ***"Basic research leads to new knowledge. It provides scientific capital. It creates the fund from which the practical applications of knowledge must be drawn. New products and new processes do not appear full-grown. They are founded on new principles and new conceptions, which in turn are painstakingly developed by research in the purest realms of science."***
   Who is the source of this quote? Critically evaluate the above quotation on the basis of its implications for science–technology relationship as discussed by Layton.

   Source; p. 34 in Layton (+1 bonus for getting the name)

   - Vannevar Bush

   Critical evaluation (10); see p. 31-33; see slides 5, 6, 7, 9, 10

   Interpretation of quote (3; look for any 2 points; 1.5 marks each)

   - The quote encapsulates the idea that it is only basic research that produces new knowledge.
   - Technology is applied science.
   - This is the semiofficial ideology of science.

   Layton's analysis and Implication of quote (4; 2 marks each; any 2 points)

   - Layton traces the origin of this ideology to a reaction against the Marxist conception of science as part of the superstructure emerging out of the forces of production.
   - Reakartavyaction against Zilsel thesis which thought of the scientific revolution as originating with the breaking down of the social barrier between scholars and craftspersons.
   - According to the Zilsel thesis, modern science arose in early modern Europe through the interaction of artisans and elite intellectuals. Both elements were essential to the process.

   Critical evaluation (3; 1 mark for the first aspect; 2 marks for the second aspect)

   - Look for how they bring to bear the above points and more from Layton's paper in their critical evaluation.
   - Look for their interpretation of Layton—whether they agree/disagree and what justification they give for their respective positions.