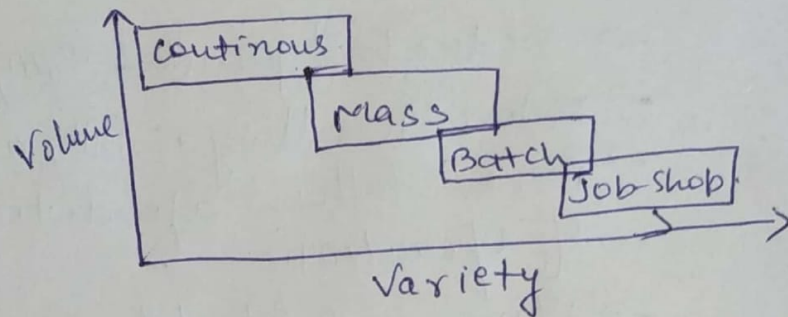


Q.1. Explain various production systems with examples.

Ans:- Production systems can be classified as Job-shop, Batch, Mass and Continuous production systems.



Classification of Production Systems.

### ① Job-shop

- High Variety of products and low volume.
- Use of general purpose machine & facilities.
- Highly skilled operators.
- Large inventory of materials, tools, parts.
- Detailed planning is essential.

### ② Batch :-

- Shorter production runs.
- Plant and machinery are flexible.
- Plant & machinery setup is used for the production of item in a batch & change of setup is required for processing the next batch.
- lower lead-time & cost.

### ⑤ Mass Production

- Standardization of product & process sequence
- Large volume of products.
- Shorter cycle time of production.
- lower in process inventory.
- Perfectly balanced production lines.

### ④ Continuous Production

- Dedicated plant & equipment with zero flexibility
- Material handling is fully automated.
- Process follows a predetermined sequence of operations.
- Planning & Scheduling is routine action.

Q.2 Explain computer's role in manufacturing systems

- Ans:
- Design management & prediction
  - CAD
  - CAM
  - Modelling, Simulation & visualisation
  - Robotics & manufacturing automation
  - Computer aided process planning.
  - Design optimization & analysis
  - Computer aided engineering.
  - Computer aided analysis.
  - Computer numerical control.
  - Superimposition of objects.
  - Photo rendering realistic.

[2]



Q3: Define CAM. Explain its use in modern production systems.

Ans: - CAM: - CAM is the use computer systems to plan, manage and control the operations of a manufacturing plant through either direct or indirect computer interface with the plant's production resources.

Uses: -

- Numerical control part programming by computer.
- Computer-automated process planning.
- Computer-generate work standards.
- Production scheduling.
- Material requirements planning.
- Shop floor control.

Q.4. What do you mean by adaptive control? Explain its functions.

Ans: - The adaptive control is basically a feedback system that treats the CNC as an internal unit and in which the machining variables automatically adapt themselves to the actual conditions of the machining operation/process. IP (performance index) is usually an economic function such as max production rate or minimum machining cost.

→ For a machining operation of the term AC

[3]

denotes control systems that measures certain output variable and uses to control speed or feed.

### functions :-

- ① Identification function.
- ② Decision function.
- ③ Modification function.

### Identification :-

- determining the current performance of the process or system.
- determining the current value of this performance measure by making use of the feedback data from the process.

### Decision :-

- After identification is done, the next function is to decide how the control mechanism should be adjusted to improve process performance.
- the decision procedure is carried out by means of a pre-programmed logic provided by the designer.

### Modification :-

- It is concerned with a physical or mechanical change in the system. [4]



- The modification involves changing the system parameters or variables so as to drive the process towards a more optimal state.

Q.5 Differentiate between CNC & DNC systems.

Ans. - CNC denotes a computer numerical control system, a mode of automation of machine tools that uses a dedicated microprocessor or computer to execute preprogrammed sequence machine control commands.

DNC denotes the networking of CNC machines. It uses a large mainframe or computer to control a number of NC machines. The program is done externally then sent to individual machines.

- In CNC, remote controlling of operation is not possible.  
DNC facilitate the remote control.
- CNC is an integral part of the machine.  
DNC is not integral to machine, DNC computer can control/locate at a distance from machine.
- CNC transferring machining instruction.  
DNC manage the information distribution to the number of machines.
- CNC computer control one machine.  
DNC controls more than one.

Q.1 Explain the importance of Preamble.

Ans. The 'Preamble' to the constitution of India is a brief introductory statement that sets out the guiding purpose and principles of document. The hope and aspiration of the peoples as well as the ideas before our nation are described in the preamble in clear cut words.

It may considered as the soul of constitution. It was adopted on 26 Nov. 1949 by the constitution assembly.

It explains the objective of constitution in two ways: one about the structure of the governance and the other, about the ideals to be achieved in independent India. It clarifies four important aspects

1. Constitution derives its authority from the people of India.
2. It declares India to be sovereign, socialist, secular, democratic and republic country.



3. It clarifies the objective of constitution - Justice, liberty, Equality, and Fraternity.
4. It states that the date of adoption i.e. 26 Nov. 1949.

The objectives, which are laid down in the Preamble, are:

- (a) Liberty of thought, expression, belief, faith.
- (b) Equality of status and opportunity.
- (c) Fraternity assuring dignity of the individual and unity and integrity of the nation.

Sovereignty: It means absolute for independence, i.e. a government which is not controlled by any other power internal or external matters. India is Sovereign country.

Socialist: It means commitment to attain ideals like removal of inequalities, provision of minimum basic necessities to all, equal pay for equal work.

Secularism: It is said that 'India is neither religious, nor irreligious nor anti-religious. It implies that in India there will be no 'State' Religion. The state will not support any particular religion out of public fund.

Democratic Republic It is ~~generally~~ generally known as government of the people, by the people and for the people. Effectively this means that the government is elected by the people, it is responsible and accountable to people.

Q.2 Discuss the fundamental rights with their applicability for individual and write directive principles provide by state policy.

Ans: The fundamental Rights are defined as the basic human rights of all citizens. Rights are claims that are essential for the existence and development of individuals. In that sense there will a long list of rights.

The constitution ~~go~~ has six fundamental rights to Indian citizen as follows:

1. Right to Equality    2. Right to freedom
3. Right against exploitation
4. Right to freedom of religion
5. Cultural and educational rights,
6. Right to Constitutional remedies

1. Right to Equality: The Constitution guarantees that all citizens will be equal before law. It



means that everyone will be equally protected by the laws of the country.

(ii) No Discrimination on the basis of Religion, Race, Caste, Sex or place of Birth. The state cannot discriminate against a citizen on the basis of religion, race, caste, sex or place of birth.

(iii) Equality of opportunity to all citizens in matter of Public Employment. All citizen can apply and become employee of state.

(iv) Abolition of untouchability : Practising untouchability in any form has been made a punishable offence under the law.

(v) Abolition of Titles: All the British ~~title~~ titles like Sir ~~and~~ except education and defence are abolished because they created distinction of artificial nature.

Right to freedom This rights is under Articles 19-22.

Six freedoms

1. Freedom of speech, expression, assemble peacefully, form union, move freely

more thought out India.

## 2. Protection In Respect of Conviction for offences

No one can be given punishment greater than what was provided in law prevalent at the time of its commission.

## 3. Protection of Life and Personal liberty

## 4. Protection Against Arrest and Detention In certain cases.

Right against Exploitation The citizens have been guaranteed the right against exploitation through exploitation Articles 23 and 24 of the constitution. These two provisions

1. Prohibition of traffic in human beings and forced labour.
2. Prohibition of employment of children in factories.

Right to freedom of Religion : India is a multi-religion country, where Hindus, Muslims, Sikhs, Christian and many other communities live together, the constitution declares India as a 'secular state'. It means that Indian state has no religion of its own.

1. Freedom of conscience and free profession, practice and propagation of religion.



2. Freedom to manage religious affairs.
3. Freedom as to payment of taxes for promotion of any particular religion.
4. Freedom as to attendance at religious instruction or religious worship in certain educational institutions.

### Cultural and Educational Rights Protection

of language, culture, ~~scripts~~ religion of the minorities becomes essential so that the minorities may not feel ~~neglected~~ or undermined under the impact of majority rule.

Right to constitutional remedies Encroachment or violation of fundamental rights in our day to day life is a matter of great concern. Constitution does not permit the legislature and the executive to curb these rights.

Q.3 Explain the human rights and describe its historical development.

Ans Human rights in India is as old as in west, few practices in the Indian tradition were not consistent with the idea of human rights, but they were

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successfully denounced as corruption of the tradition by those who understood the essence of that tradition. The available history gives us the picture of Indian rulers before the establishment of Islamic rule, having been created as a requirement of dharma in order to uphold it. Beyond taking the law and order matters into their hands, the Islamic rulers also did not disturb this arrangement. The Islamic rulers were not bound by dharma as expounded in the Indian tradition but generally they did not interfere in matters of dharma. The British rulers also did not disturb this arrangement except to the extent necessary of dharma. The society in general, mostly rural, did not come much in touch with the state. It also did not pass through the stages experienced by the western



Societies, such as the fight for supremacy between the church and the state and their subsequent separation as two independent institutions, religious reformation, feudalism, mercantilism, and creation of a powerful state industrial revolution, imperialism and colonialism etc.

Q.4 Explain covenant on civil & political rights 1966 with optional protocol - I and protocol - II

Ans The International covenant on Civil and Political Rights (ICCPR) is a multilateral treaty adopted by the United Nations General Assembly on 16 Dec. 1966. and in force from 23 March 1976.

Part-1 Article 1, Recognizes the right of all peoples to self determination, including the right to "freely determine their political status".

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Part-2 (Article 2-5) Oblige party to legislate where necessary to give effect to the rights recog recognised in the convent and to provide legal remedy for any & violation of those rights.

It also requires the rights to recognised "without distinction of any kind, such as race, colour sex, language religion, political or other opinion, national, property birth or other status.

Part-3 Art 8

- Physical Integrity in the form of the right to life and freedom from torture and slavery

Part 4 ~~Governs~~ the It also allows parties to recognise the competence of the committee to resolve disputes between parties on the implementation of the convent.



In court proceeding relating to human rights.

3. To visit jail or other institution under the control of the State & Government.
4. Review the factors, including of terrorism that inhibit the enjoyment of human rights and recommend appropriate remedial measure.
5. Encourage the efforts of NGOs and institution working in the field of human rights.

2. NCW (National commission for Women)  
It was established in January 1992 under the provision of the Indian constitution, as defined in the 1990 NCW act. The first head of the commission was Jayanti Patnaik.

Objective of the NCW is to be represent the rights of women in India and to provide a voice for their issues and concerns. The subjects of their campaigns have included dowry, politics,

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religion, equal representation of women  
in jobs, and exploitation of women for  
labour.

In December 2006 and January 2007, the NCW found itself at the centre of a minor controversy over its insistence that section 497 of the Indian Penal code not be changed to make adulterous wives equally prosecutable by their husbands. The NCW demanded that women should not be punished for adultery, as a woman is "the victim and not an offender" in such cases.



Part 5 <sup>16</sup> The inherent right of all peoples to enjoy and utilize fully and freely their ~~no~~ natural wealth and resources.

Part 6 The covenant is not directly enforceable in Australia, however its provisions support a number of domestic law which confer enforceable rights on individuals.

Q.5 Write a note on (i) NHRC (ii) NEW

1. NHRC ∴ The National Human Right Commission of India is an autonomous public body constituted on 12 Oct-1993 under the protection of Human Rights Ordinance of 28 Sept-1993.

Rights relating to life, liberty, equality, dignity of the individual guaranteed by the constitution or embodied in the International covenants and enforceable by courts in India.

Function ∴ 1. Prevention of violation.  
2. By leave of the court, to intervene

## Solution of "Power Generation"

Q1. While selecting a power plant location, what are the points to be considered in economic impacts?

Ans: While selecting a power plant location, the following points to be considered in economic impacts:

- (i) Delivered cost of energy:- Sometimes, the cost of locating and constructing a power plant is included in the electric rates charged to customers. If so, the cost should be evaluated to determine both the immediate and long-term effects on customer rates.
- (ii) Future development limitations:- The construction of a plant at a particular site may create limitations on future development in the local area through its effect on land use or through its consumption of local PSD air increments, water resources and water discharge capacity.
- (iii) Jobs and purchases:- The economic impact of a plant includes the jobs and purchases associated with the construction and operation of a plant.
- (iv) Property values:- A potential concern of local property owners is the effect of plant siting on nearby property values. Generally, sites that enhance property value of minimize the decrease in property values may be more desirable.



Q2. What do you understand by depreciation cost in power plant? Explain various methods to calculate depreciation in detail.

Sol. It is the amount to get aside per year from the income of the plant to meet the depreciation caused due to wear and tear of the equipments.

### Methods to calculate Depreciation cost

(i) Straight line method: Annual amount to be set aside is calculated by using the following formula:-

$$A = \frac{P - S}{n}$$

where,  $A$  = the amount set aside per year.

$P$  = initial investment to install the plant

$n$  = life of plant in years.

(ii) Sinking Fund method:-

$$A = \left[ \frac{x}{(1+x)^n - 1} \right] (P - S)$$

where,  $x$  = annual rate of compound interest.

$S$  = Salvage value of at the end of plant life.

(iii) Diminishing Value Method: In this method, the amount set aside per year decrease as the life of the plant increases.

This method requires heavy installments in the early year when the maintenance charges are minimum and it goes on decreasing as the time passes but the maintenance charge increases. This is the main advantage of this method.



Q3. How coal is stored and pulverized before going into boiler combustion chamber?

Sol1. The coal is transported to the power station by road or rail and is stored in the coal storage plant. Storage of coal is primarily a matter of protection against coal strikes, failure of transportation system and general coal shortages.

From the coal storage plant, coal is delivered to the coal handling plant where it is pulverized (ie crushed into small pieces) in order to increase its surface exposure, thus promoting rapid combustion without using large quantity of excess air. The pulverized coal is fed to the boiler by belt conveyers. The coal is burnt in the boiler and the ash produced after the complete combustion of coal is removed to the ash handling plant and then delivered to the ash storage plant for disposal. The removal of the ash from the boiler furnace is necessary for proper burning of coal.

The coal is pulverised in the pulveriser unit in which coal and steel balls of (500gm to 1kg) is rotated together in the pulveriser drum. Due to the striking of coal and steel balls, coal is converted into powdered form to burn easily.



Q4 What is the use of cooling tower in any steam power plant? Explain its types, working, advantages and disadvantages.

Sol: Cooling tower remove heat from the water discharged from the condenser so that the water can be discharged to the river or recirculated and reused.

A cooling tower extracts heat from water by evaporation. In an evaporative cooling tower, a small portion of the water being cooled is allowed to evaporate into a moving air stream to provide significant cooling to the rest of that water stream.

### Types of cooling Towers

- (i) Open cooling tower: Also called direct cooling towers, allow the water to come into contact with outside air. If cooled water is returned from the cooling tower to be used again, some water must be added to replace the water that has been lost.
- (ii) Closed loop cooling tower: Also called indirect cooling tower system, do not allow the water to come into contact with any outside substance, therefore keeping the water more pure due to the lack of foreign particles introduced.

Working: When water is reused in the process, it is pumped to the top of the cooling tower and will then flow down through plastic or wood shells, much like a honeycomb found in a beehive. The water



will emit heat as it is downward flowing which mixes with the above air flow, which in turn cools the water. Part of this water will also evaporate, causing it to lose even more heat.

### Advantages.

- (i) Overall system cost effective
- (ii) Easy mechanism
- (iii) Easier maintenance
- (iv) Requires small space to be installed.

### Disadvantages.

- (i) Low overall efficiency
- (ii) Demands excessive amount of water for cooling purpose
- (iii) Ultimately responsible for raise in sea water level.
- (iv) Evaporated vapour heats the environment.

Q5. A generating station has an installed capacity of 50000 KW and delivers  $220 \times 10^6$  units per annum. If the annual fixed charges are Rs. 160 per KW installed capacity and running charges are 4 paise per KWh, determine the cost per unit generated?

Sol.

$$\begin{aligned}\text{Annual fixed charges} &= 160 \times \text{plant capacity} \\ &= 160 \times 50000 \\ &= \text{Rs. } 80 \times 10^5\end{aligned}$$



$$\text{Annual running charges} = \text{Rs. } 0.04 \times 220 \times 10^6$$

$$= \text{Rs. } 88 \times 10^5$$

$$\text{Total annual charges} = \text{Rs. } (80 \times 10^5 + 88 \times 10^5)$$

$$= \text{Rs. } 168 \times 10^5$$

$$\text{Cost per unit} = \text{Rs. } \frac{168 \times 10^5}{220 \times 10^6}$$

$$= \text{Rs. } 0.0764$$

$$= 7.64 \text{ paise}$$

Ans