QUANTITY PRODUCTION METHODS
(MECH 4143)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) A job shop can manufacture
(a) few type of jobs in large numbers (b) variety of jobs in small numbers
(c) a particular job in small number (d) a particular job in large number.

(ii) What type of process would a paper mill be most likely to use?
(a) continuous flow (b) project
(c) job shop (d) flow shop.

(iii) Eccentric pin of a Crank shaft can be machined by
(a) Turning (b) Milling (c) Turn Broaching (d) All of above.

(iv) Which of the following is not true about a lean production system?
(a) it puts emphasis on quality, flexibility , and time reduction
(b) it puts emphasis on reducing company's labour force
(c) it is involved in maintaining and improving the system with lower amounts of inventory
(d) it relies on buffers against unforeseen occurrences.

(v) Type of chuck used in bar fed automatic lathe is
(a) Collet (b) 3-jaw (c) 4-jaw (d) floating centre.

(vi) Cellular manufacturing is an approach whereby production can be done in
(a) small batches (b) medium batches
(c) large batches (d) optimum batches.

(vii) Components with similar shapes, tolerances, production sequences are manufactured following the concept of
(a) quantity production technology (b) total productivity management
(c) statistical quality control (d) group technology.

(viii) Rapid prototyping is a
(a) joining process (b) removal process
(c) regenerative manufacturing process (d) finishing process.

(ix) Tungsten Carbide tool inserts are made by
(a) Forging (b) Extrusion
(c) Powder metallurgy (d) Casting.

(x) The process carried out in powder metallurgy is as follows:
(i) preparation of power (ii) grading of powder
(iii) compacting of powder (iv) sintering.
The correct sequence is:
(a) (i),(iii), (ii), (iv) (b) (ii) , (i), (iii), (iv)
(c) (iii), (i), (ii), (iv) (d) (i) , (ii), (iii), (iv).

Group – B

2. Write short note outlining the characteristics for the following. List 2 (two) advantages & 2 (two) disadvantages of these.
(i) Job shop Production (ii) Just-In-Time production.

6 + 6 = 12

3. (a) Mention the major sequential steps that are followed in industrial production starting from the pre-forming process till the final inspection.

(b) Write short notes on:
(i) case hardening (ii) annealing (iii) normalizing.

6 + (2 + 2 + 2) = 12

Group – C

4. (a) Explain with suitable sketch the principle of gear cutting by hobbing. Indicate the relative movement between the tool and the job.

(b) Explain the advantages and disadvantages of gear cutting by Forming and Generation process.

(c) Explain with a suitable sketch machining technique of the eccentric pin of a crank shaft.

5 + 4 + 3 = 12

5. (a) Enumerate the steps of quantity production of “Bolts” from raw materials to finished product with neat sketches.

(b) Mention the steps with suitable sketch for production of “Connecting Rod” from raw material.

6 + 6 = 12

Group – D

6. (a) With regard to Fixture Design, define and explain what is a (i) Location Surface (ii) Support Surface and (iii) Clamping Surface. What criteria should be followed for selecting these surfaces?

   (b) What is the difference between "Inspection" and "Quality Control"? What is 'Statistical Quality Control' and where is it applied?

6 + (3 + 3) = 12

7. (a) Prepare a typical 'Process Planning sheet for manufacturing a cylindrical pin (38+/-0.02mm dia x 60+/-0.5 mm long) from a rod showing all the information that should appear in it.

   (b) For classification of parts in Group Technology list 3 (three) "Design Attributes" and 3 (three) "Manufacturing Attributes".

8 + 4 = 12

Group – E

8. (a) Describe the functions of all the four major components of a "Robot". What are the three coordinate system used by robots? Explain with sketches.

   (b) Explain the steps of production of ceramic products. Name two components that are produced by this process.

(3 + 3) + (4 + 2) = 12

9. (a) (i) What is meant by "Powder Metallurgy"?
   (ii) State the advantages and limitations of "Powder Metallurgy ".

   (b) Name six products that are manufactured by the "Powder Metallurgy" process.

(2 + 4) + 6 = 12

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