

**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
**(Deemed to be University)**

**M.E -DEGREE EXAMINATIONS - FEB-2022**

**MANUFACTURING ENGINEERING**

**Second Semester**

**MEMS & NANOTECHNOLOGY**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

**Part-A (10 x 2 =20 Marks)**

- 1 Define MEMS.
- 2 What is micro fluidics?
- 3 Define Galiumarsenide.
- 4 Define Epitaxy.
- 5 List out the applications of smart materials.
- 6 List the application of Actuators.
- 7 Mention the concept used in top down processes and bottom up processes.
- 8 Define Gas Condensation process.
- 9 List out the mechanical properties of Nano materials.
- 10 Define scanning electron microscopy.

**PART-B (5 x 16 = 80 )**

- 11 a. Describe the working principle and application of microsystems.  
**OR**  
b. Describe the design and fabrication process of MEMS.
- 12 a. Examine detail about bulk and surface machining.  
**OR**  
b. Why silicon is widely used in MEMS and explain the mechanical properties of silicon?
- 13 a. Describe various pressure sensors and flow sensors.  
**OR**  
b. List the types of smart materials with examples.
- 14 a. Briefly narrate the history of Nano-materials.  
**OR**  
b. Explain mechanical milling process for synthesis of Nanoparticles.
- 15 a. Describe the Nano processing and Nano measuring systems.  
**OR**  
b. Explain the working principle of scanning electron microscopy and its applications.

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**M.E -DEGREE EXAMINATIONS - FEB-2022**

**MANUFACTURING ENGINEERING**

**Third/Fifth Semester**

**ELECTIVE - FLUID POWER AUTOMATION**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

**Part-A (10 x 2 =20 Marks)**

- 1 What is bulk modulus?
- 2 Draw the hydraulic symbol for the following. (i)Unloading valve. (i) Counter balancing valve
- 3 What is a positive displacement pump?
- 4 Which type of sealing materials used for high temperature operation?
- 5 Why direction control valves needed in a hydraulic system?
- 6 Explain Tandem centre valve
- 7 What are the factors that should be considered while selecting a fluid power circuit?
- 8 Define slip counter.
- 9 What is programmable logic control (PLC)
- 10 State one situation where you use an electrical timer.

**PART-B (5 x 16 = 80 )**

- 11 a. Comment on the difference between using pneumatic fluid power and hydraulic systems.  
**OR**  
b. Discuss about the maintenance of the hydraulic oils.
- 12 a. Explain the working of piston pumps and discharge rates (swash plate type).  
**OR**  
b. (a).Explain the working of double acting cylinder. (b).Explain about the telescoping cylinder with neat sketch.
- 13 a. How does a pressure relief valve differ from pressure reducing valve? How does a pressure reducing valve work? Explain with sketch.  
**OR**  
b. Explain the following centre conditions of spool valves (a) Open centre valve. (b) Tandem centre valve (c) Closed centre valve. (d) Float centered valve
- 14 a. Explain with neat sketch of the step counter and its principle?

**OR**

**(p.t.o)**

- b. What is a functional diagram? How does it differ from a circuit diagram? What are the advantages of such a diagram while trouble-shooting?
- 15 a. Explain with neat sketch the electrical control of a regenerative cycle?

**OR**

- b. What wall – attachment theory is as applied in fluidics? Also illustrate the wall – attachment phenomenon?

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Sl.No. 3037

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**M.E -DEGREE EXAMINATIONS - FEB-2022**

**MANUFACTURING ENGINEERING**

**Second Semester**

**MANUFACTURING METROLOGY AND QUALITY CONTROL**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

**Part-A (10 x 2 =20 Marks)**

- 1 Define engineering metrology.
- 2 State the applications of laser interferometry.
- 3 Define high inertia laser.
- 4 What is high inertia laser scan technique?
- 5 Define displacement devices.
- 6 What is probe sensor?
- 7 Define digital image processing?
- 8 Write the comparison of laser scanning and vision system.
- 9 Need for quality management.
- 10 Write the need for quality management system

**PART-B (5 x 16 = 80 )**

- 11 a. Explain briefly types of interferometry and its applications.  
**OR**  
b. Explain briefly laser doppler anemometry, with suitable diagram.
- 12 a. Explain briefly high inertia laser techniques with suitable example.  
**OR**  
b. Describe the classification of optical scanning system
- 13 a. Define co-ordinate metrology and its applications.  
**OR**  
b. Describe about the co-ordinate metrology.
- 14 a. Explain briefly about image analysis techniques.  
**OR**  
b. Explain briefly comparison Laser scanning with vision system.
- 15 a. Explain briefly poya yoke?and its applications.  
**OR**  
b. Define briefly quality engineering technique.

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**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
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**M.E -DEGREE EXAMINATIONS - FEB-2022**  
**MANUFACTURING ENGINEERING**  
**Third/Fifth Semester**  
**ELECTIVE - QUALITY AND RELIABILITY ENGINEERING**  
(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions  
**Part-A (10 x 2 =20 Marks)**

- 1 What is an R Chart?
- 2 Distinguish between a 'defect' and a 'defective'.
- 3 What do you understand by producer's risk and consumer's risk?
- 4 What is an OC Curve and what information does it convey?
- 5 What do you mean by factorial experiments?
- 6 What are two factorial experiments?
- 7 What is wear out failures?
- 8 What is system reliability?
- 9 Define maintainability?
- 10 What is preventive maintenance?

**PART-B (5 x 16 = 80 )**

- 11 a. What are the areas of applications of quality control?  

**OR**

b. Following inspection data refers to 10 samples of 100 items each, concerning the production of bottle corks. Construct a P chart and comment.

Sample number	1	2	3	4	5	6	7	8	9	10
Number of defectives k	5	3	3	6	5	6	8	10	10	4

- 12 a. Explain in detail OC Curve in single sampling fraction defective plan.  

**OR**

b. Explain in detail on consumer's risk and producer's risk in sampling plans.
- 13 a. Explain Taguchi's quality loss function  

**OR**

b. What are the steps in quality process suggested by Taguchi?
- 14 a. Explain the measures of reliability?

**OR**

**(P.T.O)**

- b. Explain briefly parallel system reliability?
- 15 a. Write short notes on reliability life testing?

**OR**

- b. Briefly explain the following (1) corrective maintenance (2) Predictive maintenance (3) Preventive maintenance.

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Sl.No. 3026

**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
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**M.E -DEGREE EXAMINATIONS - FEB-2022**  
**MANUFACTURING ENGINEERING**  
**Third/Fifth Semester**  
**ELECTIVE - ADVANCES IN CASTING AND WELDING PROCESSES**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions  
**Part-A (10 x 2 =20 Marks)**

- 1 Where skeleton patterns are employed?
- 2 Define choke area in castings?
- 3 Mention some important alloys of copper and their applications.
- 4 How impurities or slag are removed in direct arc furnace?
- 5 Differentiate between shell moulding and precision investment casting.
- 6 List the application of counter gravity low pressure casting.
- 7 What is meant by weld solidification rate?
- 8 What are the types of destructive testing of welds?
- 9 Name two functions of the filter glasses used in metal arc welding.
- 10 What is an inert gas?

**PART-B (5 x 16 = 80 )**

- 11 a. Explain the procedure for calculation of dimensions of a gating system. Illustrate with an example.  

**OR**

  - b. Explain the terms a). Directional solidification b). Use of internal and external chills. c). Bind risers. d). Use of exothermic and insulating materials for riser.
- 12 a. How does mold design affect the quality of castings. Explain with illustrations.  

**OR**

  - b. What are the factors that affect the quality demands of S.G iron? Explain.
- 13 a. Explain briefly the process of continuous casting. In what way is it superior then rolling process?  

**OR**

  - b. What are the main reasons of pollution in fettling shop? Explain how can there be controlled?
- 14 a. Explain methods to reduce welding stresses.  

**OR**

  - b. Briefly explain welding characteristics of magnesium.
- 15 a. Briefly explain ultrasonic welding process.  

**OR**

  - b. Describe with suitable sketch the explosive welding process and its limitations as well as applications.

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**M.E -DEGREE EXAMINATIONS - FEB-2022**

**MANUFACTURING ENGINEERING**

**Third /Fifth Semester**

**ROBOT DESIGN & PROGRAMMING**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

**Part-A (10 x 2 =20 Marks)**

- 1 What is meant by accuracy of robot?
- 2 What are the specifications of robots?
- 3 Write the uses of D-H representation.
- 4 Write the uses of homogeneous transformation matrix.
- 5 How to overcome discontinuities in trajectory planning?
- 6 Write the equation of third order polynomial trajectory planning.
- 7 What are the motion commands available in VAL programming?
- 8 What do you mean by topology of artificial neural networks?
- 9 Compare electrical, pneumatic and hydraulic actuators used in robot based on speed and load.
- 10 What are the basic classifications of sensors?

**PART-B (5 x 16 = 80 )**

- 11 a. With a neat sketch explain the degrees of freedom associated with the robot wrist.  
**OR**  
b. Write the specifications of a spray-painting robot and explain the terms used in the specification.
- 12 a. Derive the general expression of the Jacobian Matrix  $J_v$ .  
**OR**  
b. Write the inverse kinematic equations of a RR configuration robot using DH transformation matrix.
- 13 a. Explain the joint velocities as applied to robot arm dynamics analysis.  
**OR**  
b. Discuss the steps involved in trajectory planning with suitable examples.
- 14 a. Explain the important and salient features of expert system used in robotics.  
**OR**  
b. With a block diagram explain the components of expert system.
- 15 a. (i) Describe the four types of photo electric sensors. (ii) Explain in detail the tactile and non-tactile sensors.  
**OR**  
b. With neat sketches explain any two methods of measuring forces in robot.

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