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**SARDAR PATEL UNIVERSITY**  
**M.Sc. 1<sup>st</sup> Semester (Surface Coating Technology) Examination (CBCS)**  
**Wednesday, March 27<sup>th</sup>, 2019**  
**Time: 10:00 am to 1:00 pm**  
**Course No.: PS01ESCT22**

**Subject: Fundamental Mechanical Engineering for Coating Technologist**

**Total Marks: 70**

- N.B. (1) Marks allotted to the question are on its RHS  
 (2) Illustrate your answers wherever necessary with the help of neat sketches & chemical equations

**Choose the correct answer from the following**

- Q.1. 1 Which property is the ability of a material to regain its original shape after deformation when external load is removed? (1)  
 (A) Strength (B) Hardness  
 (C) Elasticity (D) Toughness
- 2 Which mechanical property is the characteristic of cast iron? (1)  
 (A) Brittleness (B) Ductility  
 (C) Malleability (D) Toughness
- 3 The gears used to transmit power between two parallel shafts (1)  
 (A) Spur Gear (B) Helical Gear  
 (C) Herringbone Gear (D) All of these
- 4 Lathe machine is used to produce (1)  
 (A) Flat workpiece (B) Rectangular workpiece  
 (C) Cylindrical workpiece (D) Irregular workpiece
- 5 Drilling operation is (1)  
 (A) Enlarging a hole (B) Making a slot  
 (C) Creating a hole (D) Threading in a hole
- 6 Clutch is used for (1)  
 (A) Engage driving & driven shaft (B) Disengage driving & driven shaft  
 (C) Engage & disengage driving-driven shafts (D) Control the speed of shafts
- 7 The robots are used for (1)  
 (A) High precision work (B) Simple and variable work  
 (C) Low precision work (D) Difficult and innovative work
- 8 Fluid nozzles are used to (1)  
 (A) control direction of flow only (B) increase pressure of flow only  
 (C) reduce velocity of flow only (D) control direction & flow characteristics

**Q.2 Attempt any Seven Questions:** (14)

- (a) Define these mechanical properties: Strength and Ductility.  
 (b) Why bearings are used in power transmission?  
 (c) Explain with line diagram: Open belt drive & Cross belt drive  
 (d) What are the characteristics of worm gear?  
 (e) What are the advantages of chain drive?  
 (f) Define Nozzle. What is its function?  
 (g) Draw line diagram of Lap and Butt joint.  
 (h) What is hot spraying concept?  
 (i) Define punching and Blanking operation in sheet metal working. (with simple sketch)

(1)

(P.T.O.)

Q.3 a What is the function of coupling? What are different types of coupling? (6)

Q.3 b What are the advantages & limitations of Gear drive? (6)

**OR**

Q.3 a Draw line diagram of any five operations performed on lathe machine, along with direction of speed, feed and depth of cut. (6)

Q.3 b Compare: Belt drive and Chain drive. (6)

Q.4 a Define pattern. Explain taper allowance and shrinkage allowances. (6)

Q.4 b Compare cold working process with hot working process. (6)

**OR**

Q.4 a What are the advantages and disadvantages of casting components? (6)

Q.4 b State Hooke's law. Explain with Stress – Strain diagram. (6)

Q.5 a Explain wire drawing process with suitable sketch. (6)

Q.5 b Brief about various moulding sand properties. (6)

**OR**

Q.5 a Explain 'metal forging' process along with its advantages. (6)

Q.5 b What are the advantages and disadvantages of welding process? (6)

Q.6 a Compare working of hydraulic systems versus pneumatic systems. (6)

Q.6 b What is hot spraying? What are the benefits of using hot spraying? (6)

**OR**

Q.6 b What are the advantages and safety precautions of using Robots in mechanical industries? (6)

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