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SARDAR PATEL UNIVERSITY

M.Sc. 1st Semester (Surface Coating Technology) Examination (CBCS)

Thursday, December 6, 2012

Time: 10:30 am to 1:30 pm

Course No. : PS01ESCT02

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

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Q-1 (1) Hard steel usually have high (1)
(a) Ductility (b) Toughness
(c) Wear resistance (d) Machinability

(2) Deformation of metal beyond the elastic limit is called (1)
(a) Elastic deformation (b) Temporary deformation
(c) Plastic deformation (d) Selective deformation

(3) Gear pairs are used for transmitting (1)
(a) Speed only (b) Speed and power both
(c) Power only (d) None of the above

(4) Operation to produce large number of holes in sheet metal is (1)
(a) Machining (b) Casting
(c) Milling (d) Punching

(5) Grinding operation is required for (1)
(a) High dimensional accuracy (b) Machining hard material
(c) High surface finish (d) All the three

(6) Important parameter(s) for metal cutting are (1)
(a) Speed (b) Depth of cut
(c) Feed (d) All of the above

(7) The property of material to absorb impact load is called (1)
(a) Hardness (b) Ductility
(c) Brittleness (d) Toughness

(8) Automatic and fast painting can be done by (1)
(a) Hydraulic cylinder (b) Robot
(c) Lathe machine (d) Welding machine

Q-2 Answer **any seven** of the following: (14)

(1) Differentiate between hot working and cold working of steel.

(2) Differentiate between spur gear and bevel gears with the help of neat sketch.

(3) Name at least four operations done on Lathe machine with a neat sketch.

(4) Name and explain any four mechanical properties of engineering material.

(5) Explain Blanking and Roll bending operations with a neat sketch.

(6) Name at least four functions of flux used in welding operation.

(7) Draw the symbols for the Non-Return valve and Four port-Two position Spring actuated Direction control valve used in hydraulic circuit.

(8) Name two pattern allowances given on pattern with reason.

(9) What is the difference between a drilling operation and boring operation?

Q-3 (a) Draw the stress-strain curve for ductile material and explain its significance in engineering. (6)

(b) Draw a neat and labeled sketch of a flanged coupling. (6)

OR

(b) Draw and explain six different types of patterns used in sand casting process. (6)

Q-4 (a) Explain the process of Metal Inert Gas Welding with the help of neat sketch. List its advantages and limitations. (6)

(b) Draw a neat labeled diagram of Center type lathe machine. (6)

OR

(b) Draw a neat labeled diagram of Pillar drilling machine. (6)

Q-5 (a) Explain the method of sand casting with the help of neat sketch. (6)

(b) Name and explain the basic constituents of a Robot. (6)

OR

(b) (i) List and explain at least three applications of Robot. (6)

(ii) Explain the Airless spraying technique for spraying paint.

Q-6 (a) Draw a schematic diagram of a Typical spray gun and describe function of each part. (6)

(b) With the help of neat sketch and suitable example explain the application and working of following seals: (6)

(i) Glands

(ii) Radial shaft seal

(iii) O-ring

OR

(b) Differentiate between Single acting and double acting hydraulic cylinder with the help of neat sketch. (6)