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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1301 **Time: 1 Hour**

Course Name: CNC Milling & Programming **Max. Marks: 20**

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section – A

05X01 = 05 Marks

1. Which coordinate system is used to define the point in a single plane:
   a) Polar Coordinate system
   b) Cartesian coordinate system
   c) Point coordinate system
   d) All of the above
2. Edge finder is used to:
   a) Cut the material
   b) Take the reference point X and Y direction
   c) Take the reference point in Z direction
   d) Take the reference point in X, Y and Z direction
3. ATC stands for:
   a) Automatic Tool Control
   b) Automatic tool changer
   c) Automatic turret control
   d) None of the above
4. G02 is used to specify:
   a) Linear interpolation
   b) Circular interpolation Clockwise
   c) Circular Interpolation Anti clockwise
   d) None of the above

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5. Which operations can be performed on Vertical Milling Machine?
   a) Facing
   b) Drilling
   c) Tapping
   d) All of the above

Section – B

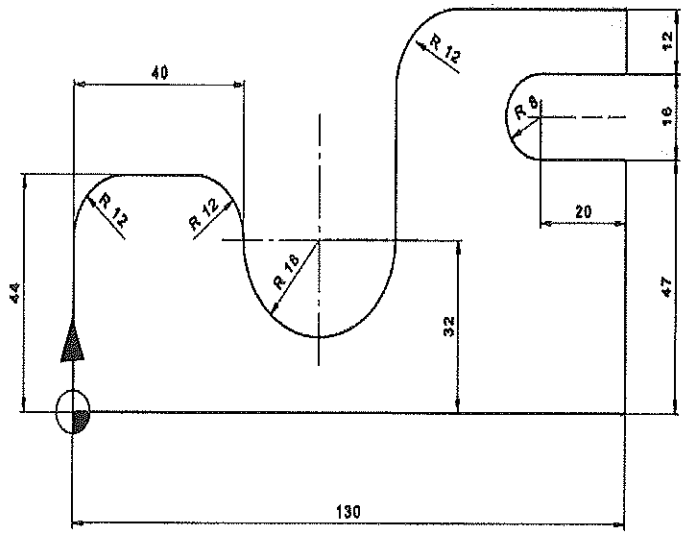
03X02 = 06 Marks

6. What do you mean by Machine Coordinates?
7. Calculate the Spindle speed in RPM and Feed in mm/min for the given data:
   Tool- Face mill ϕ50 with 5 insert
   V_c= 200 m/min
   Feed per tooth= 0.2 mm/rev.
8. What do you mean by continuous path system?

Section – C

03X03 = 09 Marks

9. Write a program for the given drawing.
   Total Depth: 5 mm
   Depth of Cut: 0.5 mm



10. Write down the steps involved in setting zero at left-bottom corner.
11. If we have done facing depth of 1 mm and drilled a hole of 10 mm, now we want to chamfer that hole for 2 mm the total thickness of workpiece is 20mm, Calculate the value of z (Chamfer depth) if zero is taken on the face of the work piece.

Answer Key

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1301 **Time: 1 Hour**

Course Name: CNC Milling & Programming **Max. Marks: 20**

Section – A

05X01 = 05 Marks

1. Which coordinate system is used to define the point in a single plane.

   b) Cartesian coordinate system

2. Edge finder is used to:

   b) Take the reference point X and Y direction

3. ATC stand for:

   b) Automatic tool changer

4. G02 is used to specify:

   b) Circular interpolation Clockwise

5. Which operations can be performed on Vertical Milling Machine?

   d) All of the above

Section – B

03X02 = 06 Marks

6. What do you mean by Machine Coordinates?

   Ans. Distance Between Machine zero point and spindle Zero point.

7. Calculate the Spindle speed in RPM and Feed in mm/min for the given data:

   Tool- Facemill ϕ50 with 5 insert

   Vc= 200 m/min

   Feed per tooth= 0.2 mm/rev.

   Ans. $N=\frac{Vc\ X\ 1000}{\pi x\ D}=\frac{200X1000}{3.14X50}$= 1275 RPM

   Feed= Feed per tooth X N X Number of cutting insert

   = 0.2X1275X5 = 1275 mm/min

8. What do you mean by continuous path system?

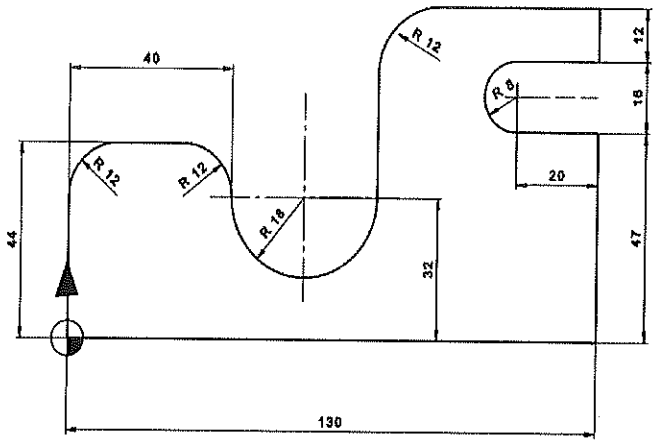
Ans. The continuous-path control system is more commonly known as the contouring system. Its function is to synchronize the axes of motion to generate a predetermined path, generally a line or a circular arc.

Section – C

03X03 = 09 Marks

9. Write a program for the given drawing.

Total Depth: 5 mm
Depth of Cut: 0.5 mm




```
O0001;

G00 G90 G40 G80 G64 G94 F0;

T01 M06 ( END MILL 16);

S2000 M03;

G43 H01 X-10 Y-10 Z50;

Z0;

M98 P100002;

G00 Z50;

X200 Y120 Z120;

M30;
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O0002 (sub program);

G91 Z-1;

G90 G41 D21 X0

G01 Y44 R12;

X40 R12;

G03 X 76 Y32 R18;

G01 Y75 R12;

X130;

Y63;

X110;

G03 X110 Y47 R8;
```

10. Write down the steps involved in setting zero at left-bottom corner.

Step1: clamp the edge finder in spindle

Step2: write a short program in MDI mode to rotate the spindle at 400 rpm

Step3: Touch the side face of the workpiece in x direction on which zero is to be taken

Step4: put the -5 in X relative coordinate.

Note: Edge finder diameter=10mm

Step5: Move the spindle to relative X0.

Step6: Input X Machine Coordinate in X workshift.

Step7: Touch Y side face of the workpiece with edge finder

Step8: Put -5 in Y Relative Coordinate

Step9: Move the Spindle to Relative Y0

Step10: Input Y Machine Coordinate into Y Workshift.

Step11: Verify X, Y Zero point

11. I If we have done facing depth of 1 mm and drilled a hole of 10 mm, now we want to chamfer that hole for 2 mm the total thickness of workpiece is 20mm, Calculate the value of z (Chamfer depth) if zero is taken on the face of the work piece.

Ans. Drill Diameter = 10 mm

Material removed in facing: 1 mm

Chamfer to be done: 2 mm

$Z = 1 + \left(\frac{10+4}{2}\right)$

= 8 mm

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School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: GEN1302 **Time: 1 Hour**

Course Name: Computer Aided Drawing **Max. Marks: 20**

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section-A 05X01=05 Marks

1. What is the full form of CAD?
   a) Computer aided dimensioning
   b) Computer aided design
   c) Computer aided drafting
   d) Computer aided drawing
2. Which of the following is the shortcut command for ellipse in AutoCAD?
   a) c
   b) e
   c) el
   d) pol
3. How many snap points are there in a line?
   a) 6
   b) 2
   c) 3
   d) 1
4. What is the short cut command for ORTHO in AutoCAD?
   a) F9
   b) F8
   c) F5
   d) F1

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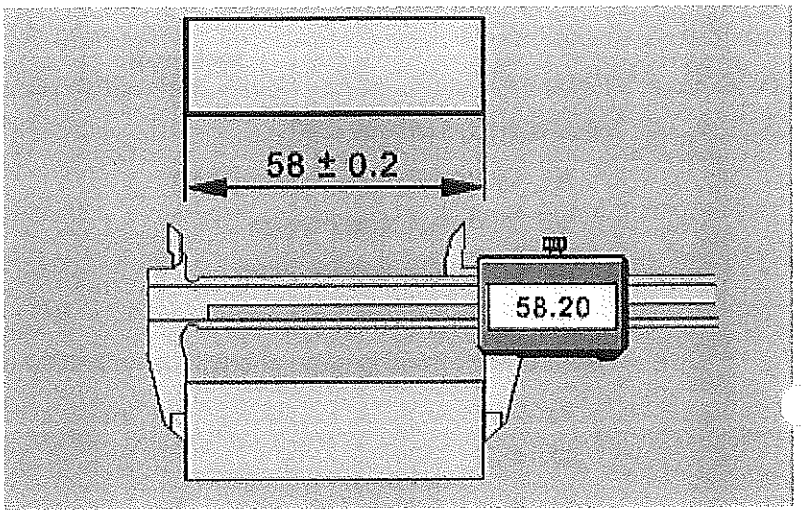
5. What is the maximum number of sides of polygon we can draw in AutoCAD?
   a) 1024
   b) 1020
   c) 1022
   d) 1023

Section- B 03X02=06 Marks

6. What is the use of reference grid in the drawing sheet?
7. Draw the symbol for the first angle of projection.
8. Give two uses of continuous thick lines.

Section- C 03X03=09 Marks

9. Write down the differences between first and third angle of projection?
10. Calculate
    a) Upper deviation
    b) Minimum size
    c) Nominal size
    d) Actual size
    e) Upper limit
    f) Lower deviation



11. Draw the layout for engineering drawing format and indicate its main components.

Answer Key

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: GEN1302 **Time: 1 Hour**

Course Name: Computer Aided Drawing **Max. Marks: 20**

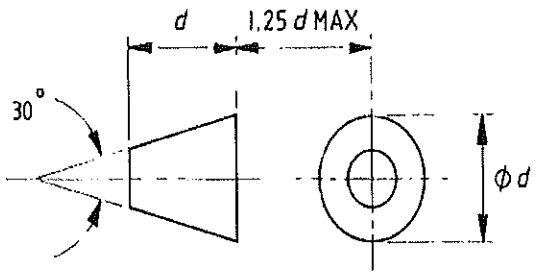
Section- A **(01x05=05 Marks)**

1. What is the full form of CAD? 1Mark
   Ans. (B) computer aided design
2. Which of the following is the shortcut command for ellipse in AutoCAD? 1 Mark
   Ans. (C)el
3. How many snap points are there in a line? 1 Mark
   Ans. (C) 3
4. What is the short cut command for ORTHO in AutoCAD? 1 Mark
   Ans. (B) F8
5. What is the maximum number of sides of polygon we can draw in AutoCAD? 1 Mark
   Ans. (A) 1024

Section- B **(02x03=06 Marks)**

6. What is the use of reference grid in the drawing sheet? 2 Marks
   Ans. to locate specific area in a drawing sheet.
7. Draw the symbol for the first angle of projection? 2 Marks

   Ans.



Recommended proportions

8. Give two uses of continuous thick lines? 2 Marks

   Ans. 1. Used to represent outlines

   2. Used to represent Visible edges

Section- C (03x03=09 Marks)

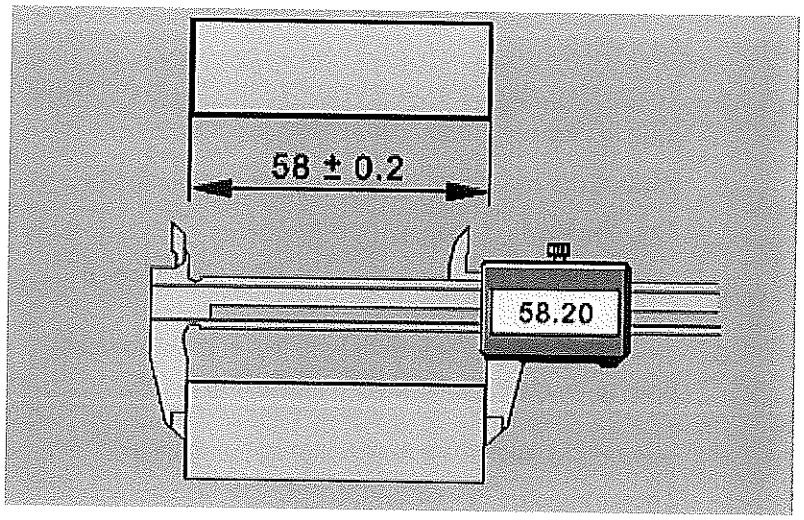
9. Write down the differences between first and third angle of projection? 1x6=3 Marks

Ans.

First angle projection	Third-angle projection
Object is kept in the first quadrant.	Object is assumed to be kept in the third quadrant.
Object lies between observer and the plane of projection.	Plane of projection lies between the observer and the object.
The plane of projection is assumed to be non-transparent.	The plane of projection is assumed to be transparent.
Front (elevation) view is drawn above the XY line	Front (elevation) view is drawn below the XY line
Top (plan) view is drawn below the XY line	Top (plan) view is drawn above the XY line
Left view is projected on the right plane and vice versa	Left view is projected on the left plane itself.

10. Calculate 1x6=3 Marks

a) Upper deviation
b) Minimum size
c) Nominal size
d) Actual size
e) Upper limit
f) Lower deviation

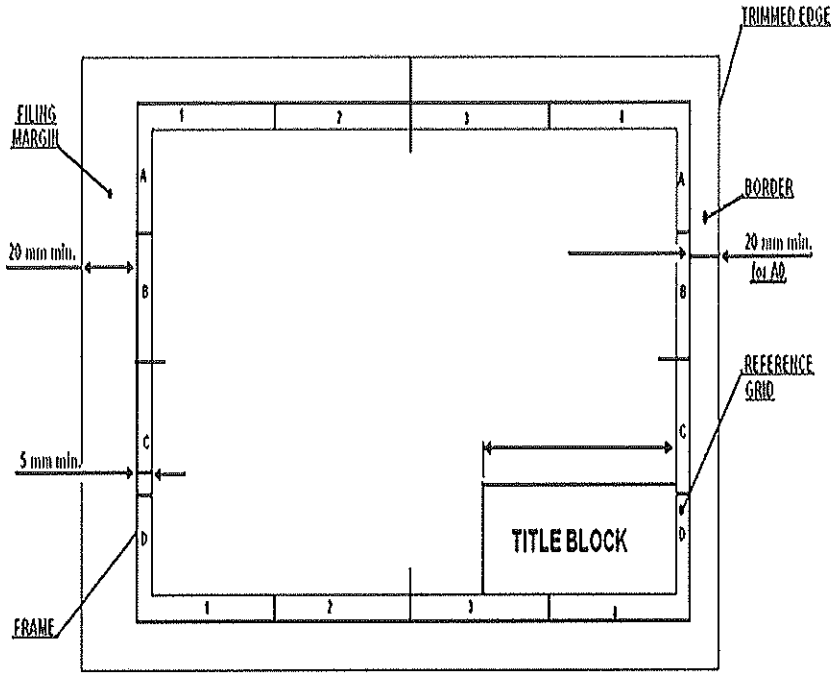


Ans. Upper deviation = +0.2
Minimum size = 57.8
Nominal size = 58
Actual size = 58.20
Upper limit = 58.20
Lower deviation= -0.2

11. Draw the layout for engineering drawing format and indicate its main components?

1.5x2=3 Marks

Ans.



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School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1303 **Time: 1 Hour**

Course Name: CMM & Grinding **Max. Marks: 20**

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section – A

05X01 = 05 Marks

1. What kind of bond do Aluminum Oxide or Silicon Carbide wheel have?
   a) Vitrified bond
   b) Rubber bond
   c) Resinoid bond
   d) Metal bond
2. What is the unit of Cutting Speed (Vc) used for Grinding wheel?
   a) mm/s
   b) m/s
   c) m/min
   d) mm/min
3. Single acting cylinder is used for counter balancing .....
   a) X-axis
   b) Y-axis
   c) Z-axis
   d) C-axis
4. CMM is an instrument used for:
   a) Dimensional measurement of the engineering parts
   b) Geometrical tolerances of the parts
   c) Both above
   d) None of above

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5. Which of the following is not a form error:
   a) Circularity
   b) Concentricity
   c) Flatness
   d) Cylindricity

Section – B

03X02 = 06 Marks

6. Define datum.
7. Draw symbol for the tolerances given below:
   a) Symmetry
   b) Position
   c) Angularity
   d) Cylindricity
8. Define grinding.

Section – C

03X03 = 09 Marks

9. Explain different types of TP20 module and probe head.
10. Why granite material is used in CMM?
11. Calculate the RPM for Grinding wheel if:
    - Vc = 25 m/s
    - Diameter = 300 mm

Answer Key

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1303 **Time: 1 Hour**

Course Name: CMM & Grinding **Max. Marks: 20**

Section – A

05X01 = 05 Marks

1. What kind of bond do Aluminium Oxide or Silicon Carbide wheel have? 1 mark

   Ans. a) Vitrified bond

2. What is the unit of Vc used for Grinding wheel? 1 mark

   Ans. b) m/s

3. Single acting cylinder is used for counter balancing ..... 1 mark

   Ans. c) Z-axis

4. CMM is an instrument used for: 1 mark

   Ans. c) Both above

5. Which of the following is not a form error. 1 mark

   Ans. b) Concentricity

Section – B

03X02 = 06 Marks

6. Define datum. 2 marks

   Ans. A theoretically exact geometric reference (such as planes, straight lines, etc.) to which toleranced features are related.

7. Draw symbols for the tolerance given below:

   Ans.

   a) Symmetry 0.5 mark

   

   b) Position 0.5 mark

   

c) Angularity 0.5 mark

d) Cylindricity 0.5 mark

8. Define grinding. 2 marks

Ans. Grinding is a metal removal procedure that produces workpiece surfaces with close tolerances and high surface quality.

Section – C

03X03 = 09 Marks

9. Define different types of TP20 module and probe head.

Ans. PROBE HEAD 0.5X6 = 3 marks

- Manual head
- Motorized head
- Fixed head

TP20 MODULE

- Light force
- Standard force
- Medium force

10. Why granite material is used in CMM? 1X3 = 3 marks

Ans.

- Granite is used because of its wear resistance, slow thermal response and relatively low cost.
- Granite takes eight hours to fully dissipate thermal change.
- The thermal expansion of Al is 3.5 times that of granite yet over 80% of CMM's supplied annually have an Al frame because the thermal diffusion of Al is 60 times faster than granite.

11. Calculate the RPM for Grinding wheel if

- Vc = 25 m/s
- Diameter = 300 mm

Ans. $Vc = \pi dn$ 3 marks

$n = Vc/\pi d$

$n = (25 * 60000) / (3.14 * 300)$

$n = 1592.3566$

$n \approx 1592 \frac{1}{min}$

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School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1305 **Time: 1 Hour**

Course Name: Pneumatic Technology **Max. Marks: 20**

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section – A

05X01 = 05 Marks

1. Fluid power system is based on-
   a) Bernoulli's principle
   b) Gas law
   c) Avogadro's law
   d) Pascal law
2. In Isochoric process, at constant volume-
   a) Pressure is directly proportional to temperature
   b) Pressure is inversely proportional to temperature
   c) Temperature is proportional to volume
   d) Volume is directly proportional to pressure
3. According to ohm's law:
   a) Current is directly proportional to voltage
   b) Voltage is inversely proportional to current
   c) Current is directly proportional to resistance
   d) Voltage is directly proportional to resistance
4. When PV=Constant, if we increase the volume then pressure will-
   a) Remains constant
   b) Decrease
   c) Increase
   d) none of these

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5. Dynamo works on the phenomenon of:
    a) Magnetism
    b) Electromagnetism
    c) Electromagnetic Induction
    d) Kirchhoff's law

Section – B

03X02 = 06 Marks

6. Draw flow diagram for the various types of compressor.
7. What is an Electrical Push button? Name three types of electrical push buttons.
8. Draw the symbols of Single acting and Double acting cylinder.

Section – C

03X03 = 09 Marks

9. Write down any six advantages of using compressed air in Pneumatics
10. Explain three types of Proximity sensors.
11. Describe relay and its principle.

Answer Key

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 1st In-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: SMS1305 | **Time: 60 minutes**

Course Name: Pneumatic Technology | **Max. Marks: 20**

Section – A

05X01 = 05 Marks

1. Fluid power system is based on-

d) Pascal law

2. In Isochoric process, at constant volume-

a) Pressure is directly proportional to temperature

3. According to ohm's law:

a) Current is directly proportional to voltage

4. When PV=Constant, if we increase the volume then pressure will-

b) Decrease

5. Dynamo works on the phenomenon of:

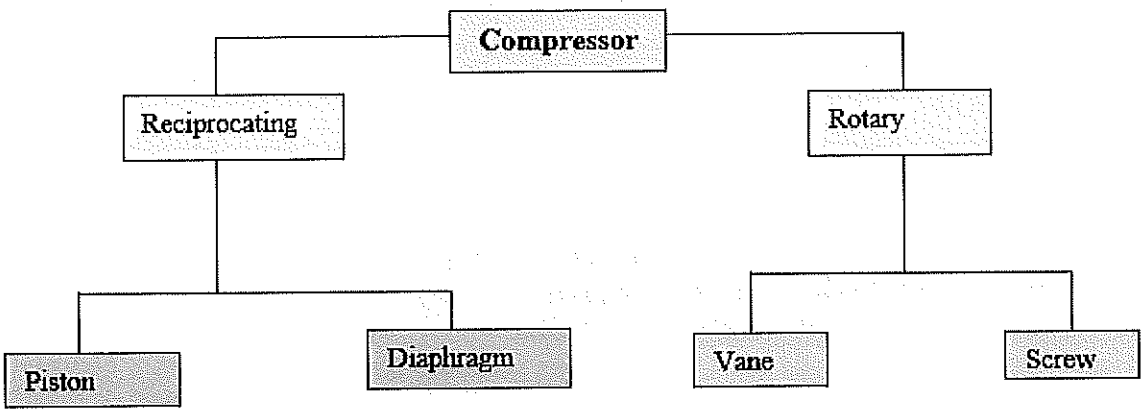
c) Electromagnetic Induction

Section – B

03X02 = 06 Marks

6. Draw flow diagram for the types of compressor.

Ans.



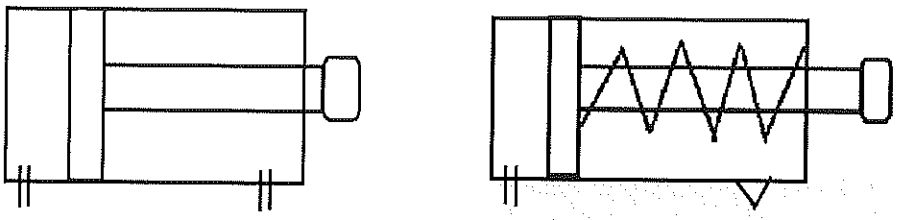
7. What is an Electrical Push button? Name three types of electrical push buttons.

Ans. A push button is a switch used to close or open an electric control circuit. They are primarily used for starting and stopping of operation of machinery. Push button switches are actuated by pushing the actuator into the housing. This causes set of contacts to open or close.

1. Normally open (NO) type
2. Normally closed (NC) type
3. Change over (CO) type.

8. Draw the symbol of Single acting and Double acting cylinder.

Ans.



Section – C

03X03 = 09 Marks

9. Write down any six advantages of using compressed air in Pneumatics

Ans.

- Availability: Air is available everywhere and can be compressed with a portable compressor so most factories and industries use this for many activities.
- Storage: It is easily stored in tanks in large volume.
- Simplicity of Design: Most pneumatic components are of simple design and structure.
- Easy to Work: Pneumatic components have simple control and are easily fitted to provide automation.
- Choice of Movement: It provides both linear movement and angular rotation with continuously variable operational speeds.
- Economy: Low installation cost and low maintenance cost as no service is required.
- Reliability: High system reliability because pneumatic components have a long working life.
- Resistance to Environment: High temperature, dust and corrosive atmosphere does not affect it while many other systems may get affected.
- Environmentally Clean: It is clean and does not cause any pollution.
- Safety: No fire hazards and pneumatic components do not produce heat.

10. Explain three types of Proximity sensors.

Ans.

Inductive sensors:

- Inductive sensor use currents induced by magnetic field to detect the nearby metal objects. The inductive sensor uses a coil or inductor to generate a high frequency magnetic field as shown in **Figure.**
- If there is a metal object near the changing magnetic field, current will flow in the object. This resulting current flow sets up a new magnetic field that opposes the original magnetic field.
- The net effect is that it changes the inductance of the coil in the inductive sensor. By measuring the inductance, the sensor can determine when a metal have been brought nearby.

Capacitive sensor:

- In the capacitive type, a moving object pass through an electrostatic field produced by the sensor.
- The change in circuit capacitance produces a switching signal.
- These sensors work well for insulators (such as plastics) that tend to have high dielectric coefficients, thus increasing the capacitance.
- But, they also work well for metals because the conductive materials in the target appear as larger electrodes, thus increasing the capacitance.

Optical (photoelectric) Sensor:

- A photoelectric sensor will give a switching signal when a pre-set level of light is received.
- These are used to detect the presence of moving objects such as the presence or absence of objects on conveyor system, a break in moving roll of material, a lack of or incorrect level of liquid in a bottle filling operation, detection of objects of a certain colour etc.
- The switching signal produced by a moving object can be fed into the electrical control circuit to provide a corrective action.

11. Describe relay and its principle.

Ans. Relay is an electrically operated switch. It consists of a coil with an iron core and one or more contacts, switched by the magnetic field of the coil assembly. An electrical device, typically incorporating an electromagnet, which is activated by a current or signal in one circuit to open or close another circuit.

When the voltage is applied to the coil, an electric current flows through the coil; a magnetic field builds up and causes the armature to be pulled into the core of winding. The switching position is maintained as long as the voltage is applied. When the voltage is removed, the armature is restored to its original position by the return spring.