Registration No.: .....

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 Marks.
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. A Coordinate system in which the point is specified in a plane by a pair of coordinates which are signed distance to the point from two perpendicular lines, measured in same unit length is known as

   b) Cartesian coordinate system

2. Touch probe is used for:

   d) To take zero reference in Z direction

3. What is the work of ATC:

   b) Automatic tool changing

4. G03 is named as:

   b) Circular interpolation Anti-Clockwise

5. Which operation can not be performed on Vertical Milling Machine?

   d) None of the above

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Section – B

03X02 = 06 Marks

6. What do you mean by 'controller' in CNC, please write the name of any controller?

   Ans. In CNC, controller converts the alpha-numeric language into machine language. Means, by controller man can directly control the machine with the help of programming.

   Controller name: GE Fanuc Series 21

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

   Tool- Facemill dia. 40 with 4 insert

   Vc= 400 m/min

   Feed per tooth= 0.1 mm/rev.

   Ans. $N=\frac{Vc\ X\ 1000}{\pi\ X\ D}=\frac{400X1000}{3.14X40}$= 3184 RPM

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

   = 0.1 X 3184 X 4

   = 1273 mm/min

8. What are the similarities and difference between Face Mill and Shoulder Mill?

   Ans. Similarities: Both are used for milling process, both can be of same dimension,

   Difference: Shoulder Mill make 90 degree at the wall whereas, Face Mill do not make 90 degree at the wall

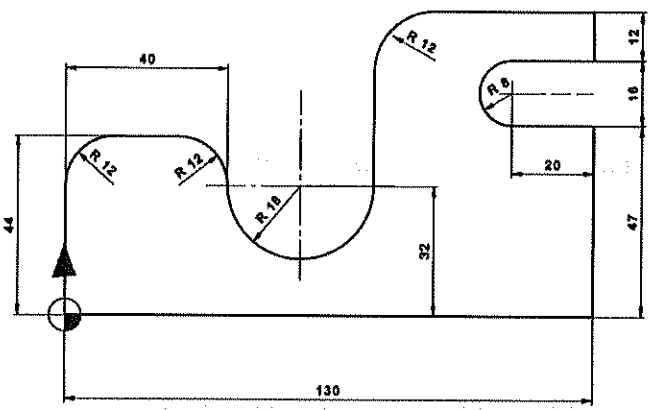
Section – C

03X03 = 09 Marks

9. Write a program for the given drawing.

   Total Depth: 5 mm

   Depth of Cut: 0.5 mm



Ans.

```
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;
```

```
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. What do you mean by machine setup, explain in detail?

Ans: Machine setup consist two part-

1) Work piece setup:
    a) Vice mounting
    b) Work piece clamping
    c) Zero setting: In this we take a reference point in X, Y and Z direction. For this we use edge finder.
2) Tool setup:
    In tool setup we select the tools according to the drawing and clamp them in related tool holders, then measure them and put those values in offset setting.

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11. Write the difference between NC machine and CNC machine.
Ans.

NC AND CNC

S.no	NC Machine	CNC Machine
1.	Here NC stands for Numerical Control	CNC stands for Computer Numerical Control.
2.	It is defined as the machine which is controlled by the set of instructions in the form of numbers, letters and symbols. The set of instructions is called as program.	It is defined as the machine which is used to control the motions of the workpiece and tool with the help of prepared program in computer. The program is written in alphanumeric data.
3.	In NC machine the programs are fed into the punch cards.	In CNC machine the programs are fed directly into the computer by a small key board similar to our traditional keyboard.
4.	Modification in the program is difficult.	Modification in the program is very easy.
5.	High skilled operator is required.	Less skilled operator is required.
6.	Cost of the machine is less.	Cost of the CNC machine is high.
7.	Maintenance cost is less	Maintenance cost is high.
8.	The programs in the NC machine cannot be stored.	In CNC machines, the programs can be stored in the computer and can be used again and again.
9.	It offers less flexibility and computational capability.	It offers additional flexibility and computational capability.
10.	The accuracy is less as compared with the CNC.	It has high accuracy.
11.	It requires more time for the execution of the job.	It takes very less time in the execution of the job.
12.	It is not possible to run it continuously.	It can be run continuously for 24 hours of a day.

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd In-Sem. Examination

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

Course Code: SMS1302 **Time: 1 Hour**

Course Name: CNC Turning & 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. NC Stands for:
   a) Numerically control
   b) Numerical Control
   c) Number control
   d) All of the above

2. G92 is named as:
   a) Speed Limit
   b) Cutting speed
   c) Spindle rotation
   d) Retract up to Start plane

3. M03 is named as:
   a) Tool rotation Clockwise
   b) Tool Rotation Anti Clockwise
   c) Spindle Rotation Clockwise
   d) Spindle Rotation Anti Clockwise

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4. What is the unit of Cutting Velocity?
   a) mm/min
   b) mm/rev
   c) m/min
   d) None of the above

5. M01 is named as:
   a) Coolant ON
   b) Coolant OFF
   c) Program End
   d) Optional Stop

Section – B

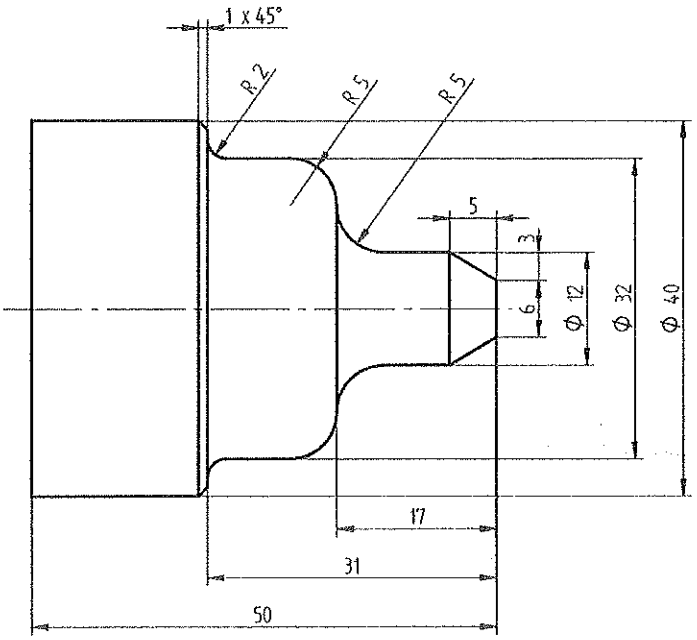
03X02 = 06 Marks

6. What is the use of Dry Run mode?
7. Describe G73 cycle with all its parameters.
8. Write down the differences between Machine coordinates and Absolute coordinates.

Section – C

03X03 = 09 Marks

9. How the machining will be affected if rack angle increases?
10. Describe Threading Cycle (G78) with all the parameters.
11. Write a program for the following drawing.



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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd In-Sem. Examination

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

Course Code: SMS1302 **Time: 1 Hour**

Course Name: CNC Turning & 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. NC stands for:

b) Numerical control

2. G92 is named as:

c) Speed Limit

3. M03 is named as:

c) Spindle Rotation Clockwise

4. What is the unit of Cutting velocity?

c) m/min

5. M01 is named as:

d) Optional stop

Section – B

03X02 = 06 Marks

6. What is the use of Dry run mode?

   Ans: Dry run is a mode in which we can check the tool path quickly without spindle rotation.

7. Describe G73 cycle with all its parameters

   Ans: G73: Contour Turning Cycle

   Syntax: G73 U1 R;

G73 P Q U2 W F;

Where,

U1 – incremental depth of cut in X direction (mm)

R – retract in X direction (diametrically) and in Z direction (mm)

P – block number from where cycle starts

Q – block number where cycle ends

U2 – finishing allowance in X direction (mm)

W – finishing allowance in Z direction (mm)

F – feed in mm/rev

8. Write down the difference between Machine coordinates and Absolute coordinates.

Ans: Machine coordinates – Machine coordinates shows the distance between the machine zero point and turret zero point.

Absolute coordinates – Absolute coordinates shows the distance between the work piece zero point and turret zero point.

Section – C

03X03 = 09 Marks

9. How the machining will be affected if rake angle increases?

Ans. Rake angle is cutting edge angle that has a large effect on cutting resistance, chip disposal, cutting temperature and tool life.

Effect of rake angle:

1. Increasing rake angle in the positive (+) direction improves sharpness.
2. Increasing rake angle in the positive (+) direction decreases cutting power.
3. When to increase rake angle in negative (-) direction
   a) Hard workpieces
   b) When the cutting edge strength is required such as interrupted cutting.
4. When to increase rake angle in positive (+) direction
   a) Soft workpieces
   b) Workpiece is easy to machine
   c) When the workpiece or the machine have poor rigidity.

10. Describe Threading Cycle (G78) with all the parameters.

G78: Threading Cycle

G78 PXXXXXX Q1 R1;
G78 X Z P Q2 R2 F;

Where,

PXXxxxx - Number of Finishing cut
PxxXXxx - Chamfer value
PxxxxXX - Thread Angle (60^0 for metric)
Q1 – First depth of cut in micron
R1 - Finishing allowance in mm
X - Minor Diameter
Z - Thread length (absolute)
R2 - Taper Value (R0 for Cylindrical threads)

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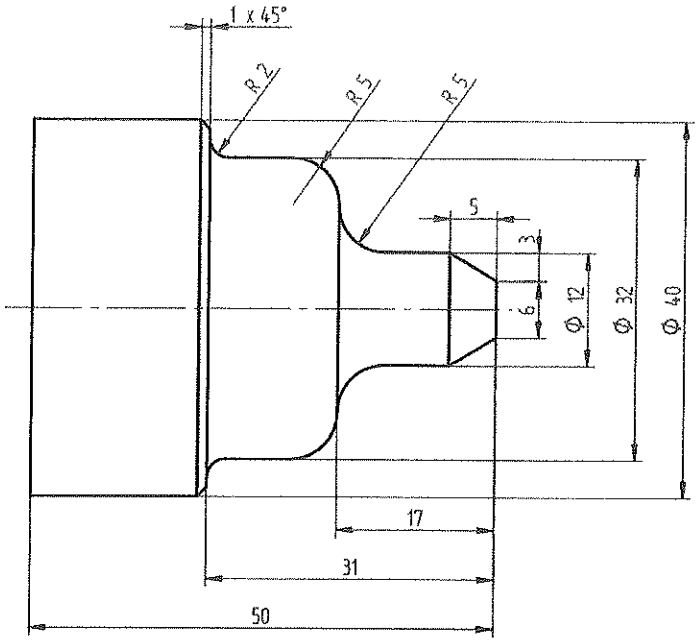
Q2 – Remaining depth of cut in micron
P - Thread depth radial in micron
F - thread pitch (feed)

11. Write a program for the following drawing.



Ans.

O0001;

N5 G00 G90 G80 G40 G95 F0;

N10 T0202(LEFT 55);

N15 G92 S4000;

N20 G96 S200 M4;

N25 G00 X41 Z0;

N26 G01 X-1 F0.15;

N27 Z1;

N28 G00 X41;

N30 G73 U0.5 R0.5;

N35 G73 P40 Q90 U0.1 W0.05 F0.2;

N40 G00 X6;

N45 G01 Z0;

N50 X12 Z-5;

N55 Z-12;

N60 G02 X22 Z-17 R5;

N65 G03 X32 Z-32 R5;

N70 G01 Z-29;

N75 G02 X36 Z-31 R2;

N80 G01 X40 C1;

N85 G01 Z-55;

N90 G01 X41;

N95 G72 P40 Q90 F0.15;

M30;

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd 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 Diamond and Boron Nitride wheel have?
   a) Vitrified bond
   b) Rubber bond
   c) Resinoid bond
   d) Metal bond
2. What is the unit of Vc used for Grinding wheel?
   a) mm/s
   b) m/s
   c) m/min
   d) mm/min
3. Full form of UCC is .....
   a) Universal coordinate controller
   b) Universal CMM controller
   c) Ultra CMM console
   d) None of the above
4. CMM reduces:
   a) Inventory of measuring instruments
   b) Human error
   c) Both above
   d) None of the above

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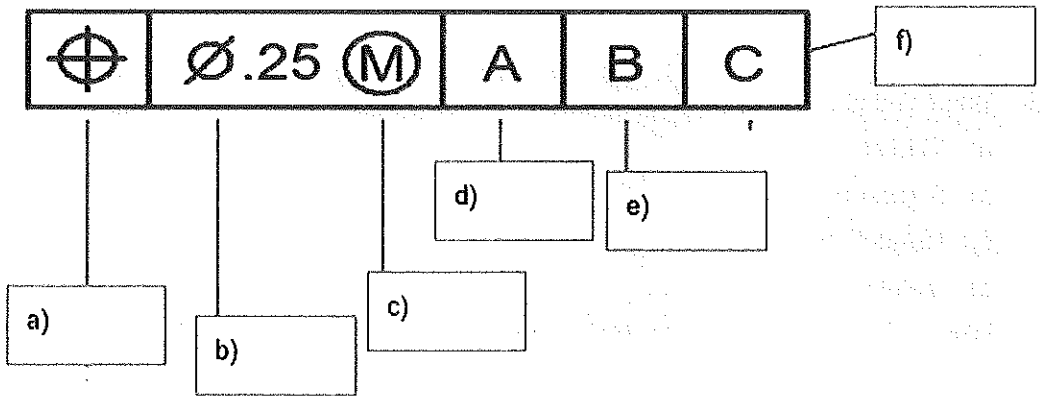
5. Following is not a form error.
   a) Circularity
   b) Concentricity
   c) Flatness
   d) Cylindricity

Section – B

03X02 = 06 Marks

6. Define grinding.
7. Draw symbol of given tolerances:
   a) Profile of a line
   b) Total runout
   c) Cylindricity
   d) Flatness

8. Fill in the box.



Section – C

03X03 = 09 Marks

9. Write the procedure of how to open inspection report in ArcoCAD 3.5.100 ....
10. Why granite material is used in CMM?
11. Calculate the RPM for Grinding wheel if
    - Vc = 25 m/s
    - Diameter = 0.3 m

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd 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 Diamond and Boron Nitride wheel have? 1 mark

   Ans. a) Metal

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

   Ans. b) m/s

3. Full form of UCC is ..... 1 mark

   Ans. c) Universal CMM controller

4. CMM reduces: 1 mark

   Ans. c) Both above

5. Following is not a form error. 1 mark

   Ans. b) Concentricity

Section – B

03X02 = 06 Marks

6. Define grinding. 2 marks

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

7. Draw symbol of given tolerances:

   Ans.

   a) Profile of a line 0.5 mark

   b) Total runout 0.5 mark

c) Cylindricity 0.5 mark

d) Flatness 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. Write the procedure of how to open inspection report in ArcoCAD 3.5.100

Ans. PROCEDURE 0.5X6 = 3 marks

- Go to input/output toggle in quick programmer
- Go to format
- Give name to the report (like V1)
    - Vendor
    - HTML
    - PDF
    - CSV
- Add
- Ok
- Go to standard
    - Open
    - Close all
- Select V1
- Add
- Ok

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 = 0.3 m

Ans. $Vc = \pi dn$ 3 marks

$n = Vc/\pi d$

$n = (25 * 60000) / (3.14 * 0.3 * 1000)$

$n = 1592.3566$

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

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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd 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 **05X1= 5 Marks**

1. In pneumatic the volume flow of air is expressed in term of:
   a) M^3/s
   b) L/m
   c) Both a and b
   d) None of above
2. What is Electricity?
   a) Rate of flow of electron
   b) Force of attraction between unlike charges
   c) The form of energy contained in an atom
   d) The product of the voltage and current
3. In a solenoid the core material is:
   a) Plastic
   b) Magnet
   c) Copper
   d) Ferro magnet
4. _____are required in control systems to effect time delay between work operations.
   a) Counter
   b) Relays
   c) Timers
   d) Reed switches

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5. The difference in charge between the two points is called _____.
   a) Current
   b) Voltage
   c) EMF
   d) Power

Section- B **02X3= 6 Marks**

6. Draw symbols of pressure regulator and pressure switch.
7. Write down two advantages and two disadvantages of reed switches.
8. Write down any four functions of relay.

Section- C **03X3= 9 Marks**

9. What is timer? Explain delay timer with its internal circuit diagram.
10. What are the types of Actuators? Draw symbols and also write their functions
11. Explain Adsorption Type Air Dryer

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

3rd Semester, 2nd In-Sem. Examination

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

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

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

Instruction:

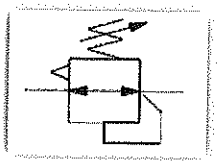
1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

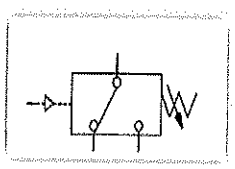
Section – A

1. In pneumatic the volume flow of air is expressed in term of ..... **01 Marks**
   - L/m
2. What is Electricity? **01Marks**
   - The form of energy contained in an atom
3. In a solenoid the core material is: **01Marks**
   - Ferro magnet
4. _____are required in control systems to effect time delay between work operations. **01Marks**
   - Timer
5. The difference in charge between the two points is called _____ **01Marks**
   - Voltage

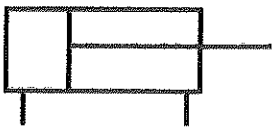
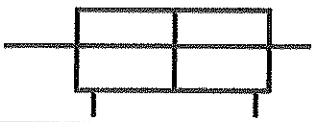
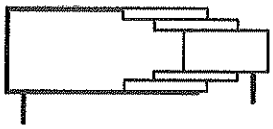
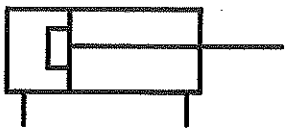
Section- B

6. Draw the symbol of pressure regulator and pressure switch. **2 Marks**

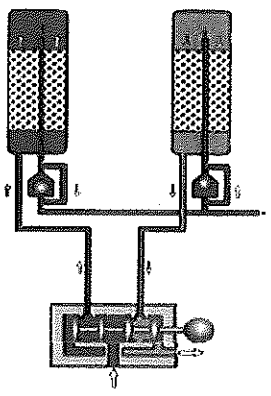




10. What are the types of Actuators? Draw symbols and also write their functions. **3 Marks**

Symbol	Function
	**Single acting cylinder with spring return.** Air pushes the piston in one direction and piston returns by spring.
	**Double acting cylinder –single piston rod:** The force exerted by compressed air moves the piston in both directions.
	**Double acting cylinder –double piston rod:** It has piston rods extending from both ends of the cylinder. It produces equal force and speed on both sides of the cylinder.
	**Telescopic cylinder –double acting** is used where space is constraint. It is used for long stroke application like in pneumatic cranes, dump trucks, lift fork trucks, dipper wagon, etc.
	**Double acting cylinder – Fixed cushion on one side**: Cushioning is used in the end position to prevent sudden impact which otherwise may damage parts.
	**Double acting cylinder – variable cushion on one side:** Fixed cushion on one side, cushioning is variable in one direction by adjusting the orifice opening.

11. Explain Adsorption type air dryer.



- In a vertical chamber, a chemical such as silica gel or activated alumina in granular form is used to absorb moisture from the compressed air passing through it. It is regenerated when drying agent becomes saturated by heat or heatless by flowing previous dried air.
- Wet compressed air is supplied through direction control valve, passing through column C1 and air becomes dry. The dried air flows to the outlet port. Between 10-20% of the dry air passes through orifice O2. It flows in reverse direction in column C2 to reabsorb moisture from the last regenerate. Then this regenerating air goes to exhaust.
- The direction control valve switches periodically by a time. Extremely lower due point is possible with this method. Example, -38 ^{0}C.
- Initial and operating costs are high but maintenance cost is low.