Set-A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. V Semester,

1st In-Sem. Examination

Course Code: SCS1502 **Time: 1 Hour**

Course Name: CNC Woodworking Machining Specialist **Max. Marks: 20**

Instruction:

- Answer all questions from section A, each question carries one mark.
- Answer all question from section B, each question carries two marks.
- Answer all question from section C, each question carries three marks.

Section – A

05X01 = 05 Marks

Q.1.What is the name of programming software in CNC router machine?

(A) WoodFlash4.0 (B) WoodWop4.0

(c) WoodFlash4.1 (D) None of the above

Q.2.Which one of the following face is not suitable for work on CNC router machine?

(A) Face 1 (B) Face 2

(C) Face 3 (D) Face 4

Q.3.what is the compressed air pressure consumption in CNC router machine?

(A) 8 Bar (B) 6-7 Bar

(C) Both (A) & (B) (D) None of these

Q.4.How many are the working station in CNC router machine?

(A) 5 (B) 6

(C) 4 (D) 1

Q.5.How many are the vertical drills in Z direction in a 32mm raster?

(A) 12 (B)14

(C) 18 (D) 4

Section – B

03X02 = 06 Marks

Q.6.Explain working of suction cup and its advantage.

Q.7.Name all the faces on which we can work on CNC router machine with the help of a diagram.

Q.8.Explain Collet Chuck and Hydro feed with the help of diagram.

Section – C

03X03 = 09 Marks

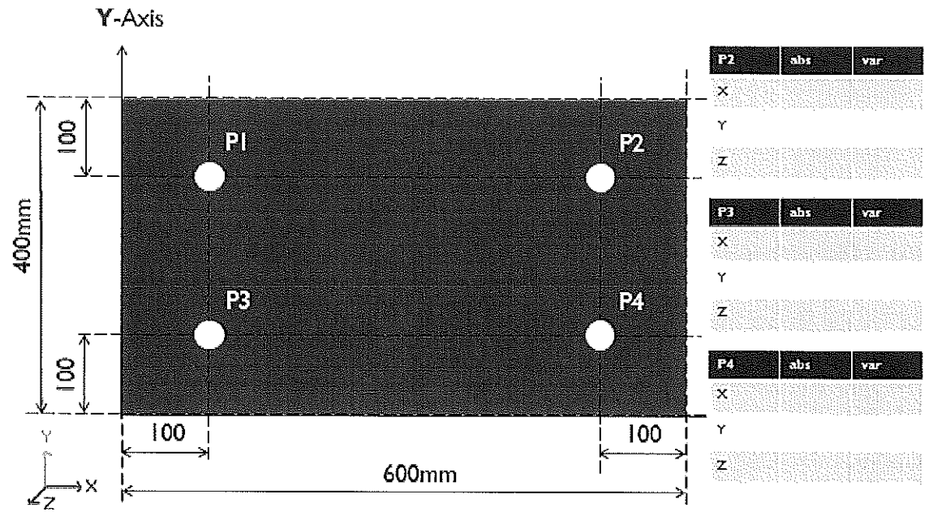
Q.9.What is Cartesian Coordinate System? Explain main axes and Rotary axes of CNC Router.

Q.10. What are the safety precautions which we follow while running a CNC Machining center?

Q.11.Write down the coordinate of point P2, P3 & P4 C in both absolute and relative coordinate system of the given figure below.

X = 600, Y = 400

Drilling: Vertical single drilled holes G81
The drilled holes should be 10 mm deep with a diameter of 35mm.
Please enter the coordinates first absolute and then with variables.



P2	abs	var
X		
Y		
Z		

P3	abs	var
X		
Y		
Z		

P4	abs	var
X		
Y		
Z		

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

ANSWER KEY

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. V Semester,

1st In-Sem. Examination

Course Code: SCS1502 **Time: 1 Hour**

Course Name: CNC Woodworking Machining Specialist **Max. Marks: 20**

Instruction:

- Answer all questions from section A, each question carries one mark.
- Answer all question from section B, each question carries two marks.
- Answer all question from section C, each question carries three marks.

Section – A

05X01 = 05 Marks

Q.1.What is the name of programming software in CNC router machine?

(A) WoodFlash4.0 (B) WoodWop4.0

(c) WoodFlash4.1 (D) None of the above (A)

Q.2.Which one of the following face is not suitable for work on CNC router machine?

(A) Face 1 (B) Face 2

(C) Face 3 (D) Face 4 (B)

Q.3.what is the compressed air pressure consumption in CNC router machine?

(A) 8 Bar (B) 6-7 Bar

(C) Both (A) & (B) (D) None of these (C)

Q.4.How many are the working station in CNC router machine?

(A) 5 (B) 6

(C) 4 (D) 1 (C)

Q.5.How many are the vertical drills in Z direction in a 32mm raster?

(A) 12 (B)14

(C) 18 (D) 4 (B)

Section – B

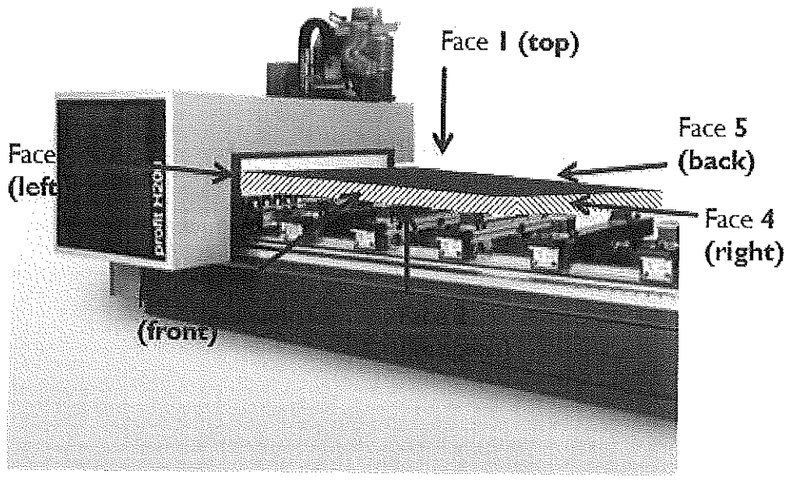
03X02 = 06 Marks

Q.6.Explain working of suction cup and its advantage.

ANS: - Tables with brackets, on which vacuum cups are placed arbitrarily, are used to clamp work pieces. Due to the adjustability of the brackets in the X-axis and the adjustability of the suction cups in the Y-axis different sized work pieces can be tensioned. Falling chips fall between the consoles and so hinder the operation a little. There are also plain tables with the corresponding vacuum blocks, grid tables and clamping templates. All have in common that they need a powerful vacuum pump. However, with small suction surfaces, this technique reaches its limits.

Q.7.Name all the faces on which we can work on CNC router machine with the help of a diagram.

ANS:-

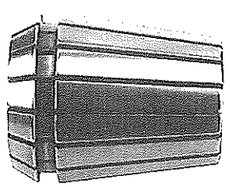


Q.8.Explain Collet Chuck and Hydro feed with the help of diagram.

ANS:-

- **Collet chuck**

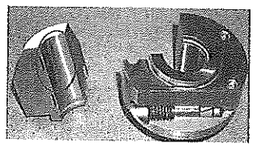
With a slotted collet according to the shaft diameter, the tools are clamped into the chuck with the clamping nut.



Better concentricity can be achieved today with hydro- or Shrink chuck.

- **Hydro feed**

About a pressure membrane is a fat jacket in an inner chamber Pressurized, so that narrows the inner diameter of the chuck and thus accurately clamps the shaft run out.



Section – C

03X03 = 09 Marks

Q.9.What is Cartesian Coordinate System? Explain main axes and Rotary axes of CNC Router.

ANS: - A Cartesian coordinate system is an orthogonal coordinate system which divides the two- and three-dimensional space geometrically. The directional axes are orthogonal to each other, so they intersect at the 900 angle. It is assumed that the horizontal axis is referred to as X, the vertical axis as Y and the depth axis as Z.

Main axes X, Y, Z

With the three main axes of movement, every point in the room can be approached. However, the tool is always perpendicular to an axis. Thus, for example, no oblique holes or saw cuts in any angle possible.

Rotary axes a, b, c

In order to programmatically perform inclined drilling and bevel cuts with saw blade, further controlled axes are used with corresponding angle gears. Widely used is the so-called C-axis, which, for example, can turn a saw blade around the Z-axis so that angle cuts are possible.

Q.10.What are the safety precautions which we follow while running a CNC Machining center?

ANS: - When running a CNC machining center, pay attention to the following points:

1. Never bridge or disassemble the existing safety devices.
2. Never dismantle the dust extraction covers, they protect against wood and tool splinters.
3. The work pieces must be well stretched. Check this before every program start.
4. The stop cams for the work pieces must be lowered at the start of the program so that the tool does not travel into the stops.
5. Before the milling, the positioning of the suction cups has to be checked.
6. Offcuts must not be jammed.
7. The minimum as well as the maximum speeds must be observed. The maximum speed must be stored in the machine control.

Q.11. Write down the coordinate of point P2, P3 & P4 C in both absolute and relative coordinate system of the given figure below.

X = 600, Y = 400

ANS: -

P2	Absolute	Variable
X	500	X-100
Y	300	Y-100
Z	-10	-10

P3	Absolute	Variable
X	100	100
Y	100	100
Z	-10	-10

P4	Absolute	Variable
X	500	X-100
Y	100	100
Z	-10	-10

Set-1

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 5th Semester,

1st In-Sem. Examination

Course Code: SCS1504 **Time: 1 Hour**

Course Name: Project planning specialist in Cabinetmaking and Joinery **Max. Marks: 20**

Instruction: All the questions are compulsory.

Section – A

05X01 = 05 Marks

Q1. Dummy activities are used to

(a) Determine the critical path
(b) Maintain the required net work
(c) Determine the project completion time
(d) None of these

Q2. Slack represents the difference between the

(a) Earliest completion time and latest completion time
(b) Latest completion time and Latest start time
(c) Earliest completion time and normal expected time
(d) Latest completion time and normal allowable time

Q3. A critical activity has

(a) Maximum slack
(b) Minimum slack
(c) Zero slack
(d) Average slack

Q4. Which of the following statement is correct about the network diagram?

(a) The events are represented graphically by circles or nodes at the beginning and the end of activity by arrows.
(b) The tail end of the arrow represents the start of an activity.
(c) The head of the arrow represents the end of an activity.
(d) All of the above

Q5. PERT stands for

(a) Programme Estimation and Reporting Technique
(b) Process Estimation and Review Technique
(c) Programme Evaluation and Review Technique
(d) Planning Estimation and Resulting Technique

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

03X02 = 06 Marks

Q6. Write a short note on the role of a project manager in a project firm.

Q7. A path in a network has three activities. Their standard deviations are 1.50, 0.80, and 1.30. Find the path standard deviation.

Q8. Explain in brief the project life cycle.

Section – C

03X03 = 09 Marks

Q9. Make a comparison between CPM and PERT.

Q10. A project has been defined to contain the following activities, along with their time estimates for completion:

Activity	Time Estimates (weeks)			Immediate Predecessor
	a	*m*	*b*	
A	1	4	7	-
B	2	6	7	A
C	3	4	6	D
D	6	12	14	A
E	3	6	12	D
F	6	8	16	B,C
G	1	5	6	E,F

Where *a* = optimistic time estimate

m = most likely time estimate

b = pessimistic time estimate

a) Calculate the expected time for each activity.
b) Draw the critical path diagram.

Q11. Apply the forward and backward pass to the project given in Q10 and determine the following

a) Find the early start, early finish times, and late start, late finish times and slack for each activity.
b) Find the critical path and its duration.

Set-1 Answer Key

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 5th Semester,

1st In-Sem. Examination

Course Code: SCS1504 **Time: 1 Hour**

Course Name: Project planning specialist in Cabinetmaking and Joinery **Max. Marks: 20**

Instruction: All the questions are compulsory.

Section – A

05X01 = 05 Marks

Q1. Dummy activities are used to

(a) Determine the critical path (b) Maintain the required net work

(c) Determine the project completion time (d) None of these (b)

Q2. Slack represents the difference between the

(a) Earliest completion time and latest completion time

(b) Latest completion time and Latest start time

(c) Earliest completion time and normal expected time

(d) Latest completion time and normal allowable time (a)

Q3. A critical activity has

(a) Maximum slack (b) Minimum slack

(c) Zero slack (d) Average slack (c)

Q4. Which of the following statement is correct about the network diagram?

(a) The events are represented graphically by circles or nodes at the beginning and the end of activity by arrows.

(b) The tail end of the arrow represents the start of an activity.

(c) The head of the arrow represents the end of an activity.

(d) All of the above (d)

Q5. PERT stands for

(a) Programme Estimation and Reporting Technique

(b) Process Estimation and Review Technique

(c) Programme Evaluation and Review Technique

(d) Planning Estimation and Resulting Technique (c)

Section – B

03X02 = 06 Marks

Q6. Write a short note on the role of a project manager in a project firm.

Ans. The role of a project manager

The project manager is responsible for coordinating and integrating activities across multiple, functional lines. The integration activities performed by the project manager include:

- Integrating the activities necessary to develop a project plan
- Integrating the activities necessary to execute the plan
- Integrating the activities necessary to make changes to the plan

In order to do this, the project manager needs strong communicative and interpersonal skills, must become familiar with the operations of each line organization, and must have knowledge of the technology being used.

To be effective as a project manager, an individual must have management as well as technical skills.

Q7. A path in a network has three activities. Their standard deviations are 1.50, 0.80, and 1.30. Find the path standard deviation.

Ans.

Standard deviations cannot be added, but variances can be added. Square each standard deviation to obtain its variance, and then add the resulting variances to obtain the path variance:

Standard Deviation	Variance
1.50	2.25
0.80	0.64
1.30	1.69
	4.58 (path variance)

The square root of the path variance is the path standard deviation:

$\sqrt{4.58} = 2.14$ (path standard deviation)

Q8. Explain in brief the project life cycle.

Ans. Phases of the Project Life Cycle

1. Selection of the project
2. Project planning
   - Scope of work & network development
   - Basic scheduling
   - Time cost trade-offs
   - Resource consideration in projects
3. Project implementation

4. Project completion and audit

Section – C

03X03 = 09 Marks

Q9. Make a comparison between CPM and PERT.

Ans. Comparison between CPM and PERT

	CPM	**PERT**
1	Uses network, calculate float or slack, identify critical path and activities, guides to monitor and controlling project	Same as CPM
2	Uses one value of activity time	Requires 3 estimates of activity time Calculates mean and variance of time
3	Used where times can be estimated with confidence, familiar activities	Used where times cannot be estimated with confidence. Unfamiliar or new activities
4	Minimizing cost is more important	Meeting time target or estimating percent completion is more important
5	Example: construction projects, building one off machines, ships, etc.	Example: Involving new activities or products, research and development etc.

Q10. A project has been defined to contain the following activities, along with their time estimates for completion:

Activity	Time Estimates (weeks)			Immediate Predecessor
	a	*m*	*b*	
A	1	4	7	-
B	2	6	7	A
C	3	4	6	D
D	6	12	14	A
E	3	6	12	D
F	6	8	16	B,C
G	1	5	6	E,F

Where a = optimistic time estimate

m = most likely time estimate

b = pessimistic time estimate

a) Calculate the expected time for each activity.
b) Draw the critical path diagram.

Q11. Apply the forward and backward pass to the project given in Q10 and determine the following

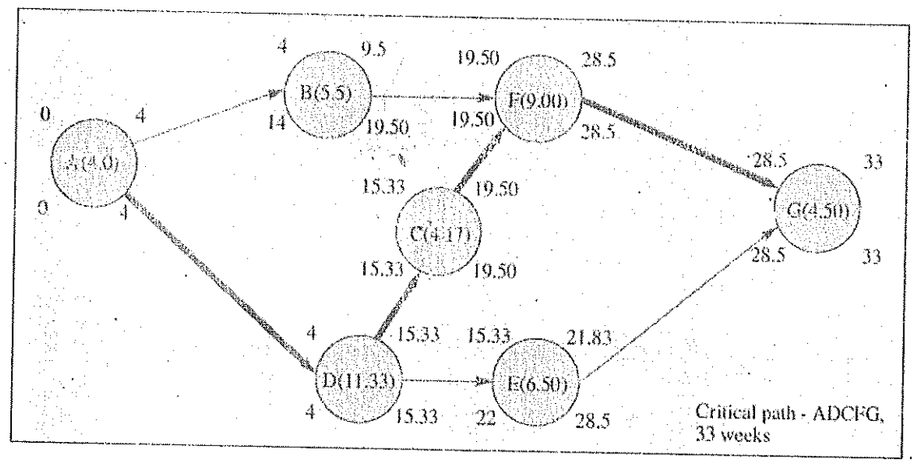
a) Find the early start, early finish times, and late start, late finish times and slack for each activity.
b) Find the critical path and its duration.

Ans. 10 and 11

a.

Activity	Expected Time $\frac{a+4m+b}{6}$	Activity Variance $\left(\frac{b-a}{6}\right)^2$
A	4.00	1
B	5.50	0.6944
C	4.17	0.2500
D	11.33	1.7778
E	6.50	2.2500
F	9.00	2.7778
G	4.50	0.6944

b.



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: Set - A

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 5th Semester,

1st In-Sem. Examination

Course Code: SC1505 **Time: 1 Hour**

Course Name: Ad. Carpenter Mathematics **Max. Marks: 20**

Instruction: All question compulsory. Humidity Table for Question no.9 is given at the end of question paper.

Section – A

05X01 = 05 Marks

1)The science of study of the thermodynamic properties of a mixture of dry air and water vapour in the atmosphere is called

a) Refrigeration b) Air Conditioning c) Psychrometry d) None of these.

2) The value of variable that occurs with greatest frequency in data set called as

a) Median b) Mode c) Mean d) None of these.

3) Dry bulb temperature is the temperature of air recorded by a thermometer, when

a) it is not affected by the moisture present in the air

b) its bulb is surrounded by a wet cloth exposed to the air

c) the moisture present in it begins to condense

d) None of the above.

4) The temperature at which moisture present in the air is begins to condense is known as

(a) Dry bulb temperature

(b) Wet bulb temperature

(c) Dew point temperature

(d) Wet bulb depression

5) The oak wood has a mass of 134 kg and a volume of 194 dm3 What is the density?

(a) 1.44 kg/dm3 (b) 0.69 kg/dm3 (c) 0.89 kg/dm3 (d) 1.34 kg/dm3

Section – B

03X02 = 06 Marks

6) Briefly explain the following terms: a) Population and sampling b) Discrete variables.

7) Air at a temperature of 85°C, contains an absolute humidity of 210 g/m3. what is the relative humidity of air? (Maximum humidity at 85°C is 353 g/m3)

8) The following table gives the height of 350 men. Calculate the mean height of the group.

Height in cm	No of persons
159	1
161	2
163	9
165	48
167	131
169	102
171	40
173	17

Section – C 03X03 = 09 Marks

9) Explain briefly any two major influence of moisture content in the wood product.

10) Air with a temperature of 18°C and a relative humidity of 70% must cool to 8°C.

a) at what temperature is the dew point reached?

b) how much condensation occurs per m3 of air at 8°C.

(Maximum humidity at 18°C and 8°C is 15.4 g/m^3 and 8.27 g/m^3, respectively).

11)Find the missing frequency from the missing data. If the average marks is 16.82.

Marks	Frequency
0-5	10
5-10	12
10-15	16
15-20	?
20-25	14
25-30	10
30-35	8

Table1: Humidity table for Question No. 9.

T (°C)	ϕ_{max}	T (°C)	ϕ_{max}	T (°C)	ϕ_{max}
−10	2.14				
− 9	2.33	11	10.00	35	39.60
− 8	2.54	12	10.70	40	51.10
− 7	2.76	13	11.40	45	65.40
− 6	2.99	14	12.10	50	83.00
− 5	3.24	15	12.80	55	104.30
− 4	3.51	16	13.60	60	130
− 3	3.81	17	14.50	65	161
− 2	4.13	18	15.40	70	197
− 1	4.47	19	16.30	75	241
0	4.85	20	17.30	80	290
1	5.19	21	18.30	85	353
2	5.56	22	19.40	90	420
3	5.95	23	20.60	95	504
4	6.36	24	21.80	100	589
5	6.80	25	23.00	120	1122
6	7.26	26	24.40	140	1967
7	7.75	27	25.80	160	3260
8	8.27	28	27.20	180	5157
9	8.82	29	28.70		
10	9.40	30	30.40		

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Set-A.

Registration No.: **Solution.**

School of Woodworking Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 5th Semester,

1st In-Sem. Examination

Course Code: SC1505 **Time: 1 Hour**

Course Name: Ad. Carpenter Mathematics **Max. Marks: 20**

Instruction: (if any)

Section – A

05X01 = 05 Marks

1)The science of study of the thermodynamic properties of a mixture of dry air and water vapour in the atmosphere is called

a) Refrigeration b) Air Conditioning c) Psychrometry d) None of these.

Ans: (c)

2) The value of variable that occurs with greatest frequency in data set called as

a) Median b) Mode c) Mean d) None of these.

Ans: (b)

3) Dry bulb temperature is the temperature of air recorded by a thermometer, when

a) it is not affected by the moisture present in the air

b) its bulb is surrounded by a wet cloth exposed to the air

c) the moisture present in it begins to condense

d) None of the above.

Ans: (a)

4) The temperature at which moisture present in the air is begins to condense is known as

(a) Dry bulb temperature

(b) Wet bulb temperature

(c) Dew point temperature

(d) Wet bulb depression

Ans: (c)

5) The oak wood has a mass of 134 kg and a volume of 194 dm3 What is the density?

(a) 1.44 kg/dm3 (b) 0.69 kg/dm3 (c) 0.89 kg/dm3 (d) 1.34 kg/dm3

Ans: (b)

Section – B

03X02 = 06 Marks

6) Briefly explain the following terms: a) Population and sampling b) Discrete variables.

(a) Population and sampling: A population includes all members of that target group and the number of people in that population is usually labeled. Its is a collection of all possible individuals, objects, or measurements of interest. A sample is a portion, or part, of the population of interest. The main issue

with samples is whether they are representative of a population, whether the subjects in the sample accurately reflect the subjects of the population. The best way to ensure a representative sample is through *random sampling*, which involves selecting people from a population at random and without bias. A sample is a ***portion***, or ***part***, of the population of interest.

(b) Discrete variables: A discrete variable is a variable whose possible values are some or all of the ordinary counting numbers like 0, 1, 2, 3, ... As a definition, we can say that a variable is discrete if it has only a countable number of distinct possible values. Some variables, such as the numbers of children in family, the numbers of car accident on the certain road on different days, or the numbers of students taking basics of statistics course are the results of counting and thus these are discrete variables.

7) Air at a temperature of 85°C, contains an absolute humidity of 210 g/m3. what is the relative humidity of air? (Maximum humidity at 85°C is 353 g/m3)

Solution: Given

Relative humidity (φ_{rel}) =?

Absolute humidity (φ_{abs}) = 210 g/m^3

$$\boldsymbol{\varphi_{rel} = \frac{\varphi_{abs} \times 100\%}{\varphi_{Max}}}$$

Ans: 59.49%

8) The following table gives the height of 350 men. Calculate the mean height of the group.

Height in cm	No of persons
159	1
161	2
163	9
165	48
167	131
169	102
171	40
173	17

Solution:

Height in cm (x)	*No of persons f*	*Deviation from assumed mean 167 dx*	*Step Deviation dx*	*Total deviation (fdx)*
159	1	-8	-4	-4
161	2	-6	-3	-6
163	9	-4	-2	-18
165	48	-2	-1	-48
167	131	0	0	0
169	102	2	1	102
171	40	4	2	80
173	17	6	3	51

Ans : $X=167+(\frac{157}{350}\times 2)=167.8$

Section – C 03X03 = 09 Marks

9) Explain briefly any two major influence of moisture content in the wood product.

Solution: Wood is a material that continually absorbs or releases moisture until it reaches a balance with its surroundings. In normal use the moisture content of wood varies between 8% and 25% by weight, depending on the relative humidity of the air. On the other hand, an excess of moisture in wood can cause other problems, including, but not limited to: Preventing adhesives from making a secure bond (Less strength) and Shrinkage as the excess moisture leaves the wood:

Shrinkage occurs as moisture content decreases, while swelling takes place when it increases. Volume change is not equal in all directions. The greatest dimensional change occurs in a direction tangential to the growth rings. Shrinkage from the pith outwards, or radially, is usually considerably less than tangential shrinkage, while longitudinal (along the grain) shrinkage is so slight as to be usually neglected. The longitudinal shrinkage is 0.1% to 0.3%, in contrast to transverse shrinkages, which is 2% to 10%. Tangential shrinkage is often about twice as great as in the radial direction, although in some species it is as much as five times as great. The shrinkage is about 5% to 10% in the tangential direction and about 2% to 6% in the radial direction.

10) Air with a temperature of 18°C and a relative humidity of 70% must cool to 8°C.

a) at what temperature is the dew point reached?

b) how much condensation occurs per m3 of air at 8°C.

(Maximum humidity at 18°C and 8°C is 15.4 g/m^3 and 8.27 g/m^3, respectively).

Solution:

Maximum humidity at 18°C is 15.4 g/m^3

Maximum humidity at 8°C is 8.27 g/m^3

Absolute humidity at 18 °C

$$\varphi_{abs} = \frac{\varphi_{max} \times rel}{100\%}$$

$$\varphi_{abs} = \frac{15.4 \times 70\%}{100\%} = \qquad 10.78 g/m^3$$

From the table for maximum humidity and temperature, the temperature at 10.78g/m^3 is 12°C.

T (°C)	ϕ_{max}	T (°C)	ϕ_{max}	T (°C)	ϕ_{max}
-10	2.14				
- 9	2.33	11	10.00	35	39.60
- 8	2.54	12	10.70	40	51.10
- 7	2.76	13	11.40	45	65.40
- 6	2.99	14	12.10	50	83.00
- 5	3.24	15	12.80	55	104.30
- 4	3.51	16	13.60	60	130
- 3	3.81	17	14.50	65	161
- 2	4.13	18	15.40	70	197
- 1	4.47	19	16.30	75	241
0	4.85	20	17.30	80	290
1	5.19	21	18.30	85	353
2	5.56	22	19.40	90	420
3	5.95	23	20.60	95	504
4	6.36	24	21.80	100	589
5	6.80	25	23.00	120	1122
6	7.26	26	24.40	140	1967
7	7.75	27	25.80	160	3260
8	8.27	28	27.20	180	5157
9	8.82	29	28.70		
10	9.40	30	30.40		

Ans (a): 12 °C

$$\varphi_{abs}(at\ 8°C) = \varphi_{abs}(at\ 18°C) - \varphi_{max}(at\ 8°C) = 10.78 - 8.27 = 2.51\ g/m3$$

Ans: 2.51 g/m^3

11)Find the missing frequency from the missing data. If the average marks is 16.82.

Marks	Frequency
0-5	10
5-10	12
10-15	16
15-20	?
20-25	14
25-30	10
30-35	8

Solution:

Marks	Mid Value	Frequency *(f)*	Step deviation *(dx)*	*fdx*
0-5	2.5	10	-3	-30
5-10	7.5	12	-2	-24
10-15	12.5	16	-1	16
15-20	17.5	f	0	0
20-25	22.5	14	1	14
25-30	27.5	10	2	20
30-35	32.5	8	3	24
Total		**70+*f***		**-12**

$$16.82=17.5+(\frac{-12}{70+f}\times 5)$$

Solving the equation for *"f"*

Ans: Missing data for the marks: 18

SET - A.