BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.----------

Set B.

School of Woodworking Skills

Session: 2020-21 (Winter Semester)

B. Voc. Program, 5th Semester,

End Semester Examination

Course Code: SCS1501 **Time: 2 Hour**
Course Name: Wood and Panel Manufacturing Specialist **Max. Marks: 50**
Instruction:

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

Section A

10X01 = 10

Marks

Q.1 Which one of the following is controlled on the outfeed table of surface planner?

(A) Height (B) Thickness
(C) Angle (D) All of them

Q.2 Ergonomics is related to

(A) Human Comfort (B) Safety
(C) Both A & B (D) None of them

Q.3 Activity in a network diagram is represented by

(A) Rectangle (B)Arrow
(C) Square (D) Circle

Q.5 Which one is the type of ergonomics?

(A) Physical ergonomics (B)Cognitive Ergonomics
(C) A&B Both (D) None of them

Q.6 What are the inventory costs?

(A) Purchase cost (B) Ordering cost
(C) Holding cost (D) All of the above

Q.7 What happens when a project is scheduled by CPM?

A. A project is divided into various activities

B. Required time for each activity is established
C. A sequence of various activities is made according to their importance
D. All of the above

Q.8 How many levels are in production planning?

(A) 1
(B) 2
(C) 3
(D)None of them

Q.9 A Network diagram includes

(A) Activity
(B) Node
(C) Event
(D) All of them

Q.10 Which of the following is true for 'Routing'?

a. It is flow of work in the plant
b. Route sheets include list of machine tools that are to be followed
c. It depends upon material handling facilities
d. All of the above

Section B

04X04 = 16

Marks

Q.11 Explain the open Control System with Diagram.

Q.12 What do you mean by capacity utilization rate? Calculate capacity utilization rate in percentage form for a machine producing 12000 units in a month but it can produce 600 units per day.

Q.13 What are the attributes for making a Work Bench?

Q.14 What is ergonomics? What are the benefits of ergonomics?

Section C

04X06 = 24

Marks

Q.15 What is Economic order quantity? Explain with proper graph.

Q.16 ABC Ltd. uses EOQ logic to determine the order quantity for its various components and is planning its orders. The Annual consumption is 80,000 units, cost to place one order is Rs. 1,200, Cost per unit is Rs. 50 and carrying cost is 6% of Unit cost. Find

EOQ, No. of order per year, Ordering Cost and Carrying Cost and Total Cost of Inventory.

Q.17 What are the types of Inventory cost? Explain.

Q.18 Draw the network diagram and determine the critical path for the following project:

Activity	Time estimate (Weeks)
1- 2	5
1- 3	6
1- 4	3
2 -5	5
3 -6	7
3 -7	10
4 -7	4
5 -8	2
6 -8	5
7 -9	6
8 -9	4

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key

Set B.

School of Woodworking Skills

Session: 2020-21 (Winter Semester)

B. Voc. Program, 5th Semester,

End Sem. Examination

Course Code: SCS1501 **Time: 2 Hour**
Course Name: Wood and Panel Manufacturing Specialist **Max. Marks: 50**
Instruction:

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

Section A

10X01 = 10

Marks

Q1. Which one of the following is controlled on the outfeed table of surface planner

(A) Height
(B) Thickness
(C) Angle
(D) All of them
Ans. A

Q2. Ergonomics is related to

(A) Human Comfort
(B) Safety
(C) Both A & B
(D) None of them
Ans. C

Q3. Activity in a network diagram is represented by

(A) Rectangle
(B)Arrow
(C) Square
(D) Circle
Ans. B

Q5. Which one is the type of ergonomics?

(A) Physical ergonomics
(B)Cognitive Ergonomics
(C) A&B Both
(D) None of them
Ans. C

Q6. What are the inventory costs?

(A) Purchase cost
(B) Ordering cost
(C) Holding cost
(D) All of the above
Ans. D

Q7. What happens when a project is scheduled by CPM?

A. A project is divided into various activities
B. Required time for each activity is established
C. A sequence of various activities is made according to their importance
D. All of the above
Ans. D

Q8. How many levels are in production planning?

(A) 1 (B) 2
(C) 3 (D)None of them
Ans. C

Q9. A Network diagram includes

(A) Activity (B) Node
(C) Event (D) All of them
Ans. D

Q10. Which of the following is true for 'Routing'?

a. It is flow of work in the plant
b. Route sheets include list of machine tools that are to be followed
c. It depends upon material handling facilities
d. All of the above
Ans. D

Section B

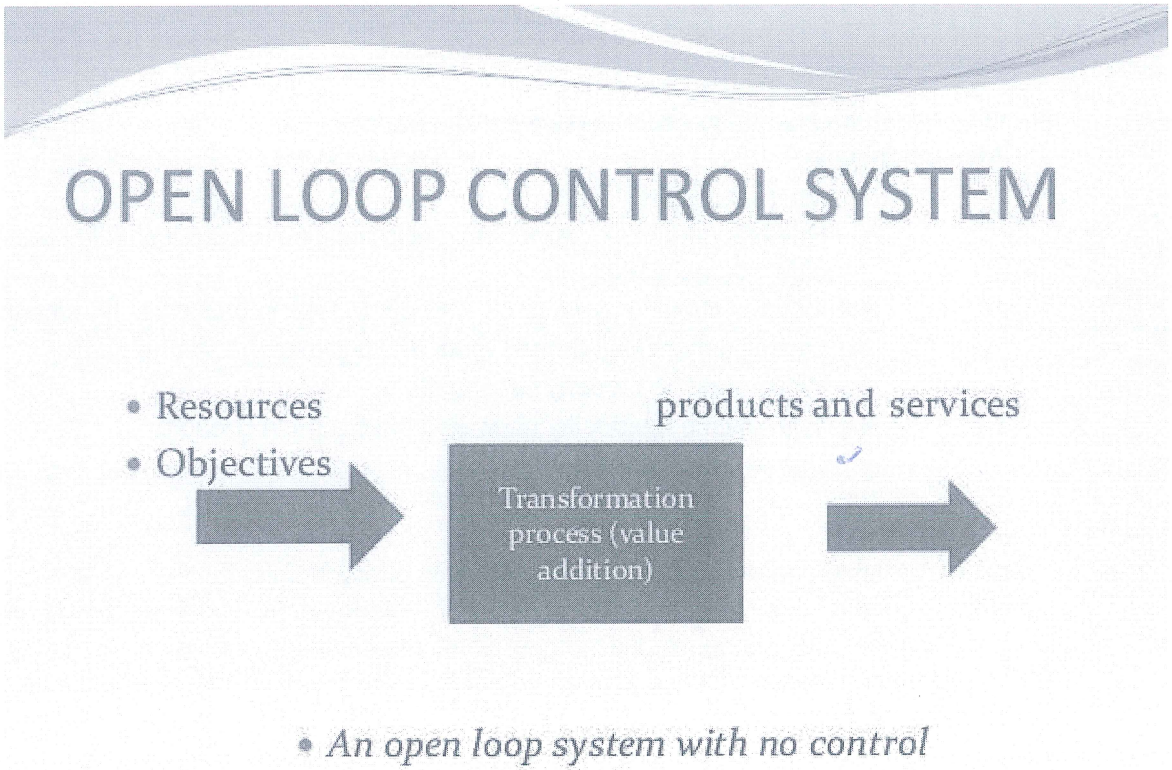
04X04 = 16

Marks

Q11. Explain the open Control System with Diagram.

Ans. Open Loop Control System-

In this kind of control system, the output doesn't change the action of the control system otherwise; the working of the system which depends on time is also called the open-loop control system. It doesn't have any feedback. It is very simple, needs low maintenance, quick operation, and cost-effective. The accuracy of this system is low and less dependable. The example of the open-loop type is shown below. The main advantages of the open-loop control system are easy, needs less protection; operation of this system is fast & inexpensive and the disadvantages are, it is reliable and has less accuracy.



Q12. What do you mean by capacity utilization rate? Calculate capacity utilization rate in percentage form for a machine producing 12000 units in a month but it can produce 600 units per day.

Ans. Capacity utilization refers to the manufacturing and production capabilities that are being utilized by a nation or enterprise at any given time. It is the relationship between the output produced with the given resources and the potential output that can be produced if capacity was fully used.

Capacity utilization can also be defined as the metric used to calculate the rate at which the prospective levels of output are being met or used. The rate is displayed as a percentage and provides an insight into the total utilization of resources and how a company can increase its output without increasing the costs associated with production. The capacity utilization rate is also called the operating rate.

Capacity utilization rate $= {}^{Capacity\ used}/_{Best\ operating\ Level}$

$$\frac{400}{600} = 4/6 = 66.66\%$$

Q13. What are the attributes for making a Work Bench?
Ans. Attributes

- Material Quality
- Height of the Top of work bench also must be ensure it should be at the elbow of the worker
- Material should have a good strength to bear impact while hammering.
- Overall dimensions (length width and thickness) of all the parts.
- Wood must be properly seasoned.
- Joint must be perfectly made also have a good strength.
- Use of good quality glue.

Q14. What is ergonomics? What are the benefits of ergonomics?
Ans. Ergonomics is basically composed of two Greek words. The first word is 'ergo' which means work, and second word is 'nomos' which means study or laws.
So, as a combination of these two words we can state the definition of ergonomics as study of the work.

Benefits

Ergonomics reduces costs
Ergonomics improves productivity
Ergonomics improves product quality
Ergonomics increases employee engagement

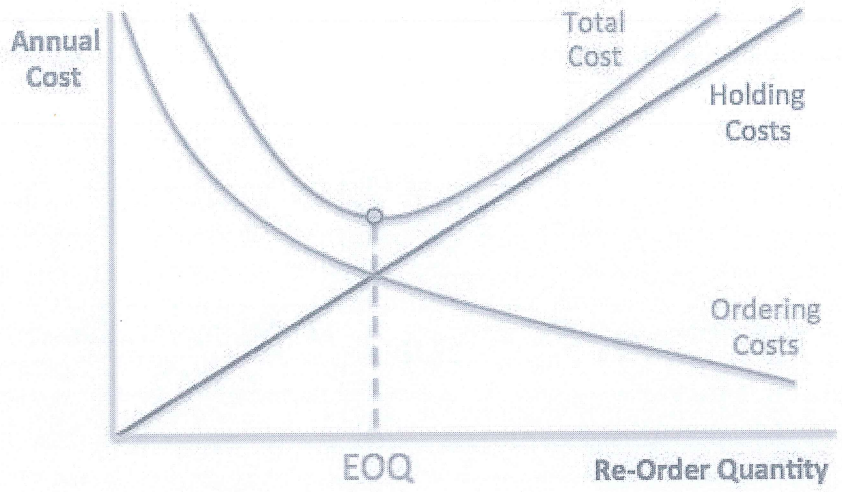
Section C

04X06 = 24

Marks

Q15 What is Economic order quantity? Explain with proper graph.

Ans. The economic order quantity, or EOQ, is a calculation designed to find the optimal order quantity for businesses to minimize logistics costs, warehousing space, stockouts, and overstock costs.
Calculating the EOQ for our business offers several benefits that impact our bottom line. It's a
great way to grasp how much product needs to be purchased to maintain an efficient ecommerce supply chain while keeping costs down.



Q16. ABC Ltd. uses EOQ logic to determine the order quantity for its various components and is planning its orders. The Annual consumption is 80,000 units, Cost to place one order is Rs. 1,200, Cost per unit is Rs. 50 and carrying cost is 6% of Unit cost. Find EOQ, No. of order per year, Ordering Cost and Carrying Cost and Total Cost of Inventory.

Solution

1. Economic Order Quantity

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 80{,}000 * 1{,}200}{50 * 6\%}}$$

EOQ =8000 Units

2. Number of Order Per Year

No of order per year = Annual Requirements / EOQ

No of order per year = 80,000 / 8,000

No of order per year = 10 Orders per year

3. Ordering Cost

*Ordering Cost = Fixed ordering cost (F) * Number of Order per year N*

Ordering Cost = 1,200 * 10

Ordering Cost = 12,000 Rupees

4. Carrying Cost

*Carrying Cost = Carrying Cost (C) * EOQ/2*

Carrying Cost =50*0.06* 8,000/2

Carrying Cost =12,000 Rupees

5. Total Inventory Cost

Total Inventory Cost = Ordering cost + Carrying Cost

Total Inventory Cost = 12,000 + 12,000

Total Inventory Cost = 24,000 Rupees

Q 17. What are the types of Inventory cost? Explain.

Ans.- Inventory Costs: For deciding the best suitable inventory policy, the top most criteria used is the cost function. This inventory analysis has four major components:

- Purchase Cost
- Ordering Cost/Set-up Cost
- Carrying Cost
- Stockout Cost:

- Purchase Cost: This is basically the nominal cost of an inventory. It is the cost incurred in buying from the outside sources, and it would be known as production cost if the items are produced within the organization. The cost is constant for a unit but may vary according to the quantity purchased increases or decreases. For example, the unit price is Rs.20 for up to 100 units and Rs.19.50 for more than 100 units. If a unit cost is constant, the control decisions would not have any affect because whether all the requirements are produced just once or made in installments the total amount of money involved would be the same.

- Ordering Cost/Set-up Cost: This occurs whenever the stock replenishes. It associates with the processing and chasing the purchased order, transportation, and inspection for quality. It is also called procurement cost. The parallel of ordering cost when the units are produced within the organization is the set-up cost. It refers to cost incurred in relation to developing production schedules. The ordering cost and set-up cost are taken to be independent to the order size. So the unit ordering/set-up cost decreases as the purchase order increases.

- Carrying Cost: Carrying cost is also known as holding cost and it refers to the cost that is associated with storing an item in the inventory. It is proportional to the amount of inventory and the time taken to hold that inventory. The elements of carrying cost include opportunity cost, obsolescence cost, deterioration cost. The carrying cost is expressed in terms of rate per unit or as a percentage of the inventory value.

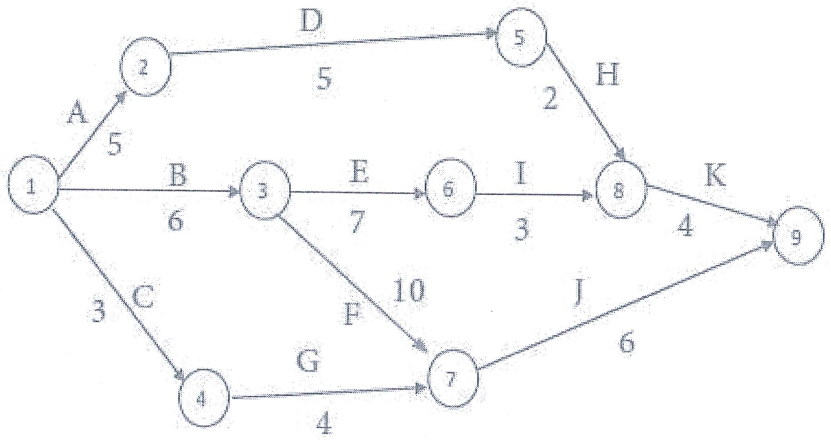
- Stock out Cost: Stock out cost is the cost, which incurs when customers are not being served. These costs imply shortages. If stock out is internal, that means that some production is lost internally

Q 18. Draw the network diagram and determine the critical path for the following project:

Activity	Time estimate (Weeks)
1- 2	5
1- 3	6
1- 4	3
2 -5	5
3 -6	7
3 -7	10
4 -7	4
5 -8	2
6 -8	5
7 -9	6
8 -9	4

Solution

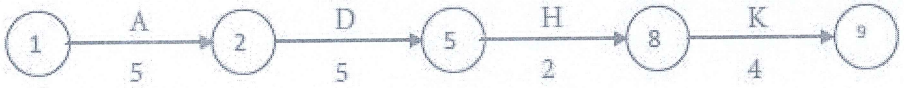
We have the following network diagram for the project:



Solution

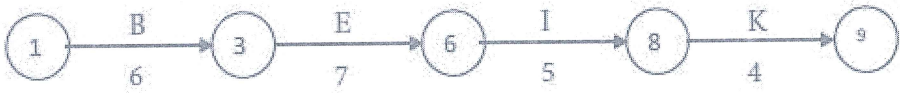
We assert that there are 4 paths, beginning with the start node of 1 and terminating at the end node of 9. They are as follows:

Path I



Time for the path = 5 + 5 + 2 + 4 = 16 weeks.

Path II

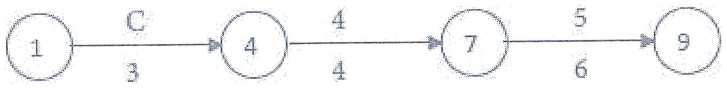


Time for the path = 6 + 7 + 5 + 4 = 22 weeks.

Path III

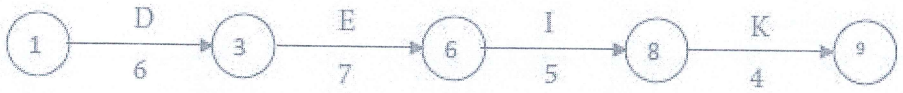
Time for the path = 6 + 10 + 6 = 16 weeks.

Path IV



Time for the path = 3 + 4 + 6 = 13 weeks.

Compare the times for the four paths. Maximum of {16, 22, 16, 13} = 22. We see that the following path has the maximum time and so it is the critical path:



The critical activities are B, E, I and K. The non-critical activities are A, C, D, F, G, H and J. The project completion time is 22 weeks.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Woodworking Skill

Session: 2020-21 (Winter Semester)

B. Voc. Program, 5th Semester,

End-Sem. Examination

Course Code: SCS1505 **Time: 2 Hours**

Course Name: Advance Carpenter Mathematics (Set B) **Max. Marks: 50**

Instruction: (if any) Calculator permitted.

Section – A

10X01 = 10 Marks

Q.1 The value of variable that occurs with greatest frequency in data set called as

(a) Median (b) Mode

(c) Mean (d) None of these.

Q.2 A variable having a countable number for distinct value is called as

(a) Continuous (b) Discrete

(c) Specific (d) None

Q.3 The ratio of the actual specific humidity to the specific humidity when the air is saturated at the same dry bulb temperature is called

(a) Humidity ratio (b) Relative humidity

(c) Absolute humidity (d) Degree of saturation

Q.4 The moisture content of wood product generally lies between:

(a) 8-25% (b) 20-45%

(c) 60-80% (d) Depends on climatic conditions

Q.5 Which of following is a power transmitting device

(a) Engine (b) Electric motor

(c) Gear (d) None of these

Q.6 The electric energy can be converted to mechanical energy with the help of

(a) Engine (b) Turbine

(c) Electric motor (d) Belt drive

Q.7 A planer shaft runs at 4200 rpm and has 4 knives. How big is the step when the feed is 16m / min?

(a) 0.95mm
(b) 0.88 mm
(c) 0.16 mm
(d) 0.70 mm

Q.8 Power transmitted from belt drive is given by

(a) Torque × Force
(b) Torque × Tension
(c) Torque × Speed
(d) Tension × Mass

Q.9 In a machine, the drive motor has a pulley with a diameter of 220 mm. The speed is specified at 1480 rpm. How big must the pulley be on the working shaft if it is to run at 2680 rpm?

(a) 121.49
(b) 398.37
(c) 1480
(d) None

Q.10 A circular saw blade has a diameter of 400mm and a speed of 3000 1 / min. How big is its cutting speed?

(a) 62.8 m/s
(b) 226 m/s
(c) 62.8 mm/s
(d) 226 mm/s

Section – B

04X04 = 16 Marks

Q.11 Define the terms in the context of Production, Planning and control: a) Scheduling b) Dispatching.

Q.12 Write short notes on: a) Demand forecasting b) Dry and Wet bulb temperature.

Q.13 In a machine, the drive motor has a pulley with a diameter of 220 mm. The speed is specified at 1480 rpm. How big must the pulley be on the working shaft if it is to run at 2680 rpm?

Q.14 Air at a temperature of 85°C, contains an absolute humidity of 210 g/m^3. what is the relative humidity of air? (Maximum humidity at 85C is 353 g/m^3)

Section – C

04X06 = 24 Marks

Q.15 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

Q.16 The floor of a room is 3.50m by 4.50m. The room height is 2.4m. The air has a relative humidity of 75% and a temperature of 18°C. How much water vapor is there in this air?
(Maximum humidity at 18°C is 15.4 g/m^3.)

Q.17 An engine run at 150 rpm drives a line shaft by means of a belt. The engine pulley is 750mm diameter and pulley of line shaft 450 mm. A 900 mm diameter pulley on a line shaft drives a 150 mm diameter pulley keyed to dynamo shaft. Find the speed of dynamo shaft. When 1. there is no slip 2 there is slip of 2% at each drive.

Q.18 Compare belt, chain and gear drive used for power transmission.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key

School of Woodworking Skill

Session: 2020-21 (Winter Semester)

B. Voc. Program, 5th Semester,

End-Sem. Examination

Course Code: SCS1505 **Time: 2 Hours**

Course Name: Advance Carpenter Mathematics (Set B) **Max. 50 Marks**

Instruction: (if any) Calculator permitted.

Section – A

10X01 = 10 Marks

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

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

2) A variable having a countable number for distinct value is called as

a) Continuous b) Discrete c) Specific d) None

3) The ratio of the actual specific humidity to the specific humidity when the air is saturated at the same dry bulb temperature is called

(a) Humidity ratio (b) Relative humidity (c) Absolute humidity (d) Degree of saturation

4) The moisture content of wood product generally lies between:

(a) 8-25% (b) 20-45% (c) 60-80% (d) Depends on climatic conditions

5) Which of following is a power transmitting device

(a) Engine b) Electric motor c) Gear d) None of these

6) The electric energy can be converted to mechanical energy with the help of

a) Engine b) Turbine c) Electric motor d) Belt drive

7) A planer shaft runs at 4200 rpm and has 4 knives. How big is the step when the feed is 16m / min?

a) 0.95mm b) 0.88 mm c) 0.16 mm d) 0.70 mm

8) Power transmitted from belt drive is given by

a) Torque × Force b) Torque × Tension c) Torque × Speed d) Tension × Mass

9)In a machine, the drive motor has a pulley with a diameter of 220 mm. The speed is specified at 1480 rpm. How big must the pulley be on the working shaft if it is to run at 2680 rpm?

a) 121.49 b) 398.37 c) 1480 d) None

10) A circular saw blade has a diameter of 400mm and a speed of 3000 1 / min. How big is its cutting speed?

a) 62.8 m/s b) 226 m/s c) 62.8 mm/s d) 226 mm/s

Section – B

04X04 = 16 Marks

11) Air at a temperature of 85°C, contains an absolute humidity of 210 g/m^3. what is the relative humidity of air? (Maximum humidity at 85C is 353 g/m^3)

Solution:

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

$$\frac{100\ \% \cdot 210\ g/m^3}{353\ g/m^3} = 59.49...\ \%$$

Ans: 59.49 %

12) Write short notes on: a) Demand forecasting b) Dry and Wet bulb temperature.

Solution:

a) Demand forecasting is the art and science of forecasting customer demand to drive holistic execution of such demand by corporate supply chain and business management. It involves techniques including both informal methods, such as educated guesses, and quantitative methods, such as the use of historical sales data and statistical techniques or current data from test markets. Demand forecasting may be used in production planning, inventory management, and at times in assessing future capacity requirements, or in making decisions on whether to enter a new market.It is use for predicting future demand for the product. In other words it refers to the prediction of probable demand for a product or a service on the basis of the past events and prevailing trends in the present.

b) Dry and Wet bulb temperature: Dry bulb temperature It is the temperature of air recorded by a thermometer, when it is not affected by the moisture present in the air. The dry bulb temperature (briefly written as DBT) is generally denoted by td or tdb.

Wet bulb temperature It is the temperature of air recorded by a thermometer, when its bulb is surrounded by a wet cloth exposed to the air. Such a thermometer is called *wet bulb thermometer. The wet bulb temperature (briefly written as WBT) is generally denoted by tw or twb.At 100%

relative humidity, the wet-bulb temperature is equal to the air temperature (dry-bulb temperature) and is lower at lower humidity

13) In a machine, the drive motor has a pulley with a diameter of 220 mm. The speed is specified at 1480 rpm. How big must the pulley be on the working shaft if it is to run at 2680 rpm?

Solution:

$$d_2 = \frac{d_1 n_1}{n_2}$$

Ans: 121.49 mm

14) Define the terms in the context of Production, Planning and control: a) Scheduling b) Dispatching.

Ans: a) scheduling ensure that parts and sub-assemblies and finished goods are completed as per required delivery dates. It provides a timetable for manufacturing activities.

Purpose of scheduling:

- To prevent unbalance use of time among work and centers and department.
- To utilize labour such a way that output is produced within established lead time or cycle time so as to deliver the products on time and complete production in minimum total cost.

Ans: b) This is concerned with the execution of the planning functions. It gives necessary authority to start a particular work which has already planned under routing and scheduling functions. Dispatching is release of orders and instructions for starting of production in accordance with routing sheet and scheduling charts.

Section – C

04X06 = 24 Marks

15) 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 : $X=167+(\text{—} \times 2) = 167.8$

16) The floor of a room is 3.50m by 4.50m. The room height is 2.4m. The air has a relative humidity of 75% and a temperature of 18°C. How much water vapor is there in this air?

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

Solution:

φ_{Max} = 15.4 g/m^3

ϕ_{rel} = 75%

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

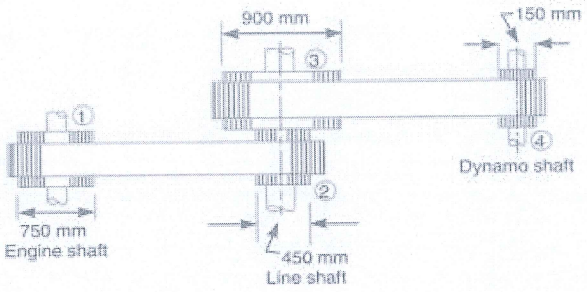
$\phi_{abs} = \frac{15.4 \times 75}{100} = 11.55$ g/m^3

$V = l \times b \times h = 37.8$ m^3

Ans: Amount of water vapour = $11.55 \times 37.8 = 436.59$ gm

17) An engine run at 150 rpm drives a line shaft by means of a belt. The engine pulley is 750mm diameter and pulley of line shaft 450 mm. A 900 mm diameter pulley on a line shaft drives a 150 mm diameter pulley keyed to dynamo shaft. Find the speed of dynamo shaft. When 1. there is no slip 2 there is slip of 2% at each drive.

Solution:



When no slip

$$\frac{N_4}{N_1} = \frac{d_1 \times d_3}{d_2 \times d_4} \quad \text{or} \quad \frac{N_4}{150} = \frac{750 \times 900}{450 \times 150} = 10$$

Ans: 1500 rpm

With slip

$$\frac{N_4}{N_1} = \frac{d_1 \times d_3}{d_2 \times d_4}\left(1 - \frac{s_1}{100}\right)\left(1 - \frac{s_2}{100}\right)$$

$$\frac{N_4}{150} = \frac{750 \times 900}{450 \times 150}\left(1 - \frac{2}{100}\right)\left(1 - \frac{2}{100}\right) = 9.6$$

Ans: 1440 rpm

18) Compare belt, chain and gear drive used for power transmission.

BELT DRIVE	CHAIN DRIVE	GEAR DRIVE
Main element Pulleys, belt	Main element Sprockets, chain	Main element Gears
Slip may occur	No-slip	No-slip
Suitability For the large center distance	Suitability For the moderate center distance	Suitability For the short center distance
Large Space requires	Moderate Space requires	Less Space requires
Simplest Design, manufacturing, complexity	Simplest Design, manufacturing, complexity	Complicated Design, manufacturing, complexity
Failure of the belt does not cause the further damage of machine	Failure of a chain may not seriously damage the machine.	Failure of gear may cause serious break down in the machine.
Less Life	Moderate Life	Long Life
Lubrication Not required	Lubrication required	Requires proper lubrication
Less Installation cost	Moderate Installation cost	More Installation cost
Used For low-velocity ratio	Used For moderate velocity ratio	Used For high velocity ratio