ACCRA TECHNICAL UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

END OF SECOND SEMESTER EXAMINATION, 2020/2021 ACADEMIC YEAR

COURSE CODE: BME 359 WEEKEND SESSION

COURSE TITLE: INDUSTRIAL ENGINEERRING & ERGONOMICS

INSTRUCTION: ANSWER Q1 and any other two **TIME: 2 HRS**

SECTION A [ANSWER *ALL QUESTIONS FROM THIS SECTION*]

1. The main categories of ergonomic risk are:

a. Environment – risks found in your work environment

b. Equipment – risks associated with the equipment you use and proper fit/adjustment

c. Work practices – risks caused by work requirements, processes or procedures

d. All the above

2. Ergonomic conditions are disorders of the soft tissues, specifically of which of the following:

a. Muscles, nerves and tendons

b. Ligaments, joints and cartilage

c. Blood vessels and spinal discs

d. All the above

3. This chart is a graphic representation of all the production activities occurring on the shop floor

a. Operation process chart
b. Flow process chart
c. Templates
d. All of the above

4. In ship manufacturing, the type of layout preferred is

a. Product layout
b. Process layout
c. Fixed position layout
d. Combination layout

5. The following type of layout is preferred for low volume production of non-standard products

a. Product layout
b. Process layout
c. Fixed position layout
d. Combination layout

6. The following type of layout is preferred to manufacture a standard product in large quantity
a. Product layout
b. Process layout
c. Fixed position layout
d. Combination layout

7. If all the processing equipment and machines are arranged according to the sequence of operations of a product the layout is known as
a. Product layout
b. Process layout
c. Fixed position layout
d. Combination layout

8. "Space available in vertical and horizontal directions is most effectively utilized" is known as principle of
a. Cubic space utilization
b. Flexibility
c. Flow
d. Minimum distance

9. Short term regular variations related to the calendar or time of day is known as
a. Trend
b. Seasonality
c. Cycles
d. Random variations

10. Delphi method is used for
a. Judgmental forecast
b. Time series forecast
c. Associative model
d. All of the above

11. In which of the following forecasting technique, data obtained from past experience is analyzed?
a. Judgmental forecast
b. Time series forecast
c. Associative model
d. All of the above

12. In which of the following forecasting technique, subjective inputs obtained from various sources are analyzed?

a. Judgmental forecast
b. Time series forecast
c. Associative model
d. All of the above

13. Which of the following is not a forecasting technique?
a. Judgmental
b. Time series
c. Time horizon
d. Associative

14. Which of the following is not true for forecasting?
a. Forecasts are rarely perfect
b. The underlying casual system will remain same in the future
c. Forecast for group of items is accurate than individual item
d. Short- range forecasts are less accurate than long range forecasts

15. If the actual demand for a period is 100 units but forecast demand was 90 units. The forecast error is
a. -10
b. +10
c. -5
d. +5

16. TMU in method time measurement stands for
a. time motion unit
b. time measurement unit
c. time movement unit
d. technique measurement unit

17. Job evaluation is the method-of determining the
a. relative worth of jobs
b. skills required by a worker
c. contribution of a worker
d. contribution of a job

18. Choose the wrong statement Time study is used to
a. determine overhead expenses
b. provide a basis for setting piece prices or incentive wages
c. determine standard costs
d. determine the capability of an operator to handle the number of machines

19. Expediting function consists in keeping a watch on
a. operator's activity
b. flow of material and in case of trouble locate source of trouble

c. minimizing the delays
d. making efficient dispatching

20. Scheduling gives information about
a. when work should start and how much work should be completed during a certain period
b. when work should complete
c. that how idle time can be minimized
d. proper utilization of machines

21. Work study is done with the help of
a. process chart
b. material handling
c. stop watch
d. all of the above

22. The standard time for a job is
a. total work content + relaxation time
b. base time + relaxation time
c. total work content + basic time
d. total work content + delay contingency allowance

23. The allowed time for a job equals standard time plus
a. policy allowance
b. interference allowance
c. process allowance
d. learning allowance

24. In micro motion study, therblig is described by
a. a symbol and color
b. an event
c. an activity
d. micro motions

25. Micro motion study is
a. enlarged view of motion study
b. analysis of one stage of motion study
c. minute and detailed motion study
d. subdivision of an operation into therbligs and their analysis

26. Work study is most useful
a. where production activities are involved
b. in judging the rating of machines
c. in improving industrial relations
d. in judging the output of a man and improving it

27. Material handling in automobile industry is done by
a. overhead crane
b. trolley
c. belt conveyor
d. all of the above

28. What does symbol 'V' employ in work study
a. operation
b. inspection
c. delay/ temporary Storage
d. permanent storage

29. Work study is concerned with
a. improving present method and finding standard time
b. motivation of workers
c. improving production capability
d. improving production planning and control

30. Some conditions that can cause musculoskeletal disorders can be brought on by:

a. Sudden increase in your workload and use of vibrating tools

b. Introduction of a new process to your work routine

c. Maintaining poor or unhealthy posture

d. All the above

SECTION B (*ANSWER ANY TWO QUESTIONS FROM THIS SECTION*)

Q1.

(a) 147.7 fans were to be assembled during an 8-hr shift with tasks shown in the table:

Task	Time (Mins)	Description	Predecessors
A	2	Assemble frame	None
B	1	Mount switch	A
C	3.25	Assemble motor housing	None
D	1.2	Mount motor housing in frame	A, C
E	0.5	Attach blade	D
F	1	Assemble and attach safety grill	E
G	1	Attach cord	B
H	1.4	Test	F, G

i. What is the time between which successive units coming off the line?

ii. How many units will be produced per hour?

iii. What is the theoretical minimum number of workstations that can be accommodated to enable the assembly line to achieve the 4-minute cycle time?

iv. Determine the efficiency of the assembly line if cycle time is 4min and number of station is 4.

v. Draw the precedence diagram

(b) List the difference between process versus product layout indicating where each is best suited.

[30 marks]

Q2.

(a) During a time- study experiment, the observed time is 0.75 min, performance rating factor is 110% and allowance is 20% of the normal time. Find the standard time.

(b) List all the steps required in conducting a method study.

(c) List the characteristics of materials that affect their handling. **[30 marks]**

Q3.

(a) Explain briefly the difference between sole proprietorship and partnership in business.

(b) List the main characteristics to look out for when evaluating a job.

(c) List the steps used in the development and selection of alternatives during problem- solving or decision- making process. **[30 marks]**

[Examiner: Govi, D.K.]