BIRLA INSTITUTE OF TECHNOLOGY
MESRA – 835215, RANCHI, INDIA

UG

Name: …… Roll No.: ……..

Branch: …… Signature of Invigilator: ……

Semester: VIth Date: 28/04/2022 (MORNING)

Subject with Code: **PE315 WORK STUDY AND ERGONOMICS**

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE

1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. **Candidates should write their roll no. in each page of the booklet.**
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to **submit the question paper cum answer sheets before leaving the examination hall**.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI (END SEMESTER EXAMINATION)	
CLASS : BTECH	**SEMESTER: VI**
BRANCH : PRODUCTION	**SESSION : SP/2022**
SUBJECT: (PE- 315) WORKSTUDY AND ERGONOMICS	
TIME : 2 HOURS	**FULL MARKS: 50**

INSTRUCTIONS:

1. The missing data, if any, may be assumed suitably.

Section 1. All question of Multiple-choice question (All question are mandatory and of 01 Mark)

Q. 1 A work-study sample of a manufacturing activity conducted over a 40-hour period shows that a worker with an 85% rating produced 12 parts. The worker's idle time was 10% and the allowance factor was 12%, Find the standard time for this activity (in hours per part).

A. 2
B. 2.90
C. 3
D. 3.90

Q. 2 Which of the following can contribute to Carpal Tunnel Syndrome?

A. Incorrect typing technique
B. Poor posture
C. Striking the keys too hard
D. All of the option

Q. 3 In which of the following methods is the standard time stated as minutes and points?

A. Barth variable incentive plan
B. Bedeaux system
C. Task and time bonus
D. None of the option

Q. 4 In which method is the standard time expressed in terms of man-minutes called "MANT"?

A. Hayne's incentive plan
B. Rowan incentive plan
C. Barth variable incentive plan
D. Both A and B

Q. 5 Which of the following is not an advantage of the Predetermined motion time system (PMTS)?

A. Rating the most difficult part of time study is not necessary

B. The results obtained are consistent
C. Long cycle jobs can be timed accurately
D. A reasonable estimate of work content can be obtained before the task is actually carried out.

Q.6 A marketing surveyor, takes an average of 10 minutes to complete a particular questionnaire, his performance rating (pace) is 110% and there is an allowance of 15%. Find out the normal time.

A. 12min
B. 15min
C. 11min
D. 12.5min

Q. 7 A marketing surveyor, takes an average of 10 minutes to complete a particular questionnaire, his performance rating (pace) is 110% and there is an allowance of 15%. Find the standard time.

A. 11.9 min
B. 12 min
C. 11 min
D. 12.9 min

Q. 8 In THERBLIGS symbol for plan is generally used in……. colors?

A. Blue
B. Yellow
C. Brown
D. Orange

Q. 9 Choose the correct statements about SIMO chart.

I. SIMO chart is used for micro motion analysis
II. It is a special form of chart, in which a string or thread is used to measure the distances
III. It is a two-hand process chart drawn in terms of therbligs and with a time scale
IV. It is the micro motion form of the man type flow process chart.

A. I and II
B. I and III
C. I, III and IV
D. I, II, III and IV

Q.10 According to Taylor's Differential plan, the worker is paid according to his?

A. Degree of understanding
B. Degree of flexibility
C. Degree of loyalty
D. Degree of efficiency

Q. 11 How often should you take breaks from keyboarding to stretch your hands and wrists?

A. Twice a day
B. Once a day
C. Every 30 minutes
D. Every 4 hours

Q. 12 Which of the following adds idle time due to short runs?

A. Excessive product variety
B. Design changes
C. Lack of standardization
D. Both A and C

Q. 13 Preventive maintenance improves?

A. Material productivity
B. Labour productivity
C. Capital productivity
D. Machine productivity

Q. 14 Achieving cost saving not only on labour cost but also on overheads is the crux of?

A. Towne's incentive plan
B. Priestman bonus plan
C. Halsey incentive plan
D. Rucker incentive plan

Q. 15 MTM procedure recognizes?

A. Eight manual movement
B. Nine pedal and trunk movements
C. Two ocular movement
D. All of the option

Q. 16 Select the correct stages involved in micro motion study.

a) Analysis of the data from the film
b) Recording of the data using SIMO chart
c) Filming the operation to be studied

A. a – b – c
B. b – c – a

C. c – b – a
D. c – a – b

Q. 17 When standard output is 10 units per hour and actual output is 12 units per hour, the efficiency is?

A. 80%
B. 110%
C. 120%
D. 90%

Q.18 Standard time for a job is?

A. Total work content
B. Basic time + relaxation time
C. Total work content +delay contingency allowance
D. Total work content + basic time

Q. 19 How far should your monitor be from your eyes?

A. At least 48”
B. 30” – 48”
C. 8” to 24”
D. 18”- 30”

Q. 20 Both Rowan plan and 50-50 Halsey plan will provide the same earning when the actual time is……. the standard time.

A. One fourth
B. One third
C. Twice
D. One half

Q. 21 Ergonomics principle suggests that

A. Visual systems should be preferred over auditory systems in noisy locations
B. Glow-in-the dark dials made of reflective substances are good for viewing in the nights
C. Glow-in-the dark dials made of reflective substances are good for viewing in the nights
D. Glow-in-the dark dials made of reflective substances are good for viewing in the nights

Q. 22 In THERBLIGS, color for ‘select’ is

A. Black
B. Red
C. Grey
D. Light Grey

Q. 23 A job order shop has 12 general purpose machines. A work sampling study has been designed to know the ineffective time of the entire shop. The study conducted revealed that the ineffective time is to the extent of 30%, Compute the number of observations that are required to have the accuracy of 5% with confidence level of 95%.

A. 34333
B. 23333
C. 54322
D. 33333

Q. 24 In SIMO chart, the movements are recorded against time measured in _____.

A. Minutes
B. Winks
C. Seconds
D. Micro seconds

Q. 25 One TMU is equal (in minute)?

A. 0.0001 min
B. 0.006 min
C. 0.0006 min
D. 0.001 min

Q. 26 A company produces 160 kg of plastic molded parts of acceptable quality by consuming 200 kg of raw materials for a particular period, what is the productivity of the company?

A. 90%
B. 85%
C. 80%
D. 75%

Q. 27 Correct order of steps involved in Work-study?

A. Select-Record-Examine-Develop-Measure-Define-Install-Maintain
B. Record-Select-Examine-Measure-Develop-Define-Install-Maintain
C. Define-Install-Examine-Develop-Select-Maintain-Measure-Record
D. Select-Record-Examine-Develop-Define-Measure-Install-Maintain

Q. 28 In work sampling study required number of observations (N) at 95% confidence level is determined by? (A=Limits of accuracy, P=Activity Percentage)

A. N= 4(1−P)/ (A^2-P)
B. N=4(1-P)/A^2 P
C. N=4P/ (A^2-P)
D. N=(P-1)/A^2 P

Q. 29 Correct sequence of steps in job evaluation are?

A. Job description-Job Specification-Job Classification-Job Analysis-Wage Determination-Evaluate performance.
B. Job Analysis- Job Description-Job Specification-Job Classification-Wage Determination-Evaluate Performance.
C. Job Analysis- Job Description-Job Specification-Job Classification-Evaluate Performance-Wage Determination
D. Job description-Job Specification-Job Classification-Job Analysis-Evaluate Performance-Wage Determination.

Q. 30 Following Data are given
Output of Worker A = 700-unit, Output of Worker B = 900-unit, Standard production = 100 No's/hour, Labor rate = Rs 10 per hour, Differential rate is 80% of the standard piece rate for below standard performance, 120% of the standard piece rate for standard and above standard performance.
Find the earnings of A&B. (assume working hours of 8, std. output per day is 800pcs

A. Earning of A=56 Rs, Earning of B= 112 Rs
B. Earning of A=56 Rs, Earning of B= 108 Rs
C. Earning of A=112 Rs, Earning of B= 56 Rs
D. Earning of A=108 Rs, Earning of B= 56 Rs

Section 2 (Attempt any five question. All question carry equal 04 marks.)

Q. 31 "Work study is a scientific technique of management for improving efficiency and effectiveness at all levels." Discuss. How this technique is useful in cost reduction programme?

Q.32 What do you understand by "scientific method"? Examine some techniques of work study in the light of the above discussion and point out area where work study lacks scientific methodology.

Q.33 Illustrate the construction of operation process chart with the help of suitable example and indicate its application in work study.

Q. 34 What do you mean by flow process chart? Explain the procedure of drawing flow process chart material type with the help of suitable example. What are its application possibilities and limitations?

Q.35 What is SIMO chart? What are its advantages and limitations? Explain the procedure of making SIMO chart with suitable example.

Q. 36 What is work sampling and how it works in industries? Discuss few industrial applications of this technique. How can work sampling help to find out standard time? Under what circumstances it is economical.

Q. 37 What do you mean by ergonomics? What is its basic objective in the design of man – machine – environment system?

Q. 38 What are the common ergonomic considerations, which you take into account in design of home sewing machine and industrial sewing machine? What are drawbacks in the existing design? How can you get rid of that?







