

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 2nd Year 1st Term Examination, 2018

TE 2101

(Yarn Manufacturing Engineering-I)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Write down the objectives of Blow room. Mention a modern blowroom line. 07
1(b) Make a list of the components of blow room machines. 10
1(c) Describe the working principle of 'UNIClean' of Rieter blowroom line with neat sketch. 12
1(d) Write down the process sequence of 50 Ne combed yarn. 06
- 2(a) Briefly describe the fibre properties which have influence on yarn quality. 10
2(b) Sketch a magnetic metal extractor. 06
2(c) Write short notes on: (i) Bale Management (ii) Blending (iii) Elements of grid 09
2(d) Calculate the production/day of blow-room line with 2 scutchers if- 10
Shell roller dia=7.5
Shell roller speed= 12rpm
Lap weight =13 oz/yd
Waste=3%
Efficiency=90%
Also find out the total no. lap if lap weight= 40 lb/lap
- 3(a) Sketch and describe the working principle of a carding machine. 12
3(b) Mention the surface speed and wire direction of the parts of carding machine: 10
i) Licker-in
ii) Flat
iii) Cylinder
iv) Doffer
- 3(c) State the different actions of the carding machine with neat sketch. 10
3(d) What is CIW? 03
- 4(a) Write the features of modern draw frame. 08
4(b) Explain (mathematically & graphically) the effects of draft & doubling of the quality of drawn sliver. 12
4(c) Discuss an auto-levelling system of a modern draw-frame. 08
4(d) Find out the production/shift in kg of 10 draw-frames from the following data: 07
Surface speed of delivery roller=720 m/mi
Card sliver wt=70 grain/yd
Draw-frame draft=7
Draw-frame doubling=(Assume)
Delivery/head=2
Efficiency=85%

SECTION-B

- 5(a) Describe the chute feed system with diagram. 14
5(b) Write down the major setting points of carding machine with their effects. 10
5(c) Calculate the Production/shift in kg of 10 carding machines from the following particulars: 05
Doffer speed=40 rpm
Doffer dia= (Assume)
Card sliver hank=0.144
Waste=3%
Efficiency=90%
- 5(d) What is grinding? Briefly discuss the IGS. 06

6(a)	Show the process flow chart of Jute yarn.	05
6(b)	Describe and sketch a jute spreader machine.	10
6(c)	Show a diagram of an automatic batch mixer with description.	07
6(d)	State the faults of emulsion used in Jute spinning mill mentioning remedies.	07
6(e)	Write short notes on: (i) Clock length (ii) Dollop weight (iii) Defects of Jute	06
7(a)	What is batch and batching? What factors are to be considered for batch?	10
7(b)	Mention the batch for the following Jute yarn: (i) CBC (ii) Hessian warp (iii) 8 lb/spindle of sacking warp.	06
7(c)	List the different types of Jute yarn.	04
7(d)	Describe the functions of emulsion ingredients.	09
7(e)	Differentiate between woolen & worsted yarn.	06
8(a)	Write down the objectives of Jute Carding.	03
8(b)	Show classifications of Jute Carding. Distinguish between breaker card and finisher card.	08
8(c)	Describe and sketch a cross-sectional diagram of a Breaker Card.	15
8(d)	Why two types of Carding machine is used in Jute spinning?	05
8(e)	What is Shell setting? Calculate the weight of silver in lb/100 yds from the following data:	04
	Dollop wt=30 lb	
	Clock length=12.9 yds	
	Draft=12	
	and Loss = 4%	

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 2nd Year 1st Term Examination, 2018

ME 2121

(Engineering Mechanics)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
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iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) A 50Kg cylinder C rests on a smooth inclined plane. For a tension in the rope of 250N, find the inclination of the plane and the plane reaction. 17

Fig: 1(a)

- 1(b) The force P is applied to a small wheel which rolls on the cable ACB. Knowing that the tension in both parts of the cable is 750N, determine the magnitude and direction of P. 18

Fig:1(b)

- 2(a) A tower guy wire is anchored by means of a bolt at A. The tension in the wire is 2500N. Determine (i) the components F_x , F_y and F_z of the force acting on the bolt, (ii) the angle x, y, z 17

Fig:2(a)

- 2(b) Three cables are joined at D where two forces $\underline{P} = (3.5\text{KN})\underline{i}$ and $\underline{Q} = (1.5\text{KN})\underline{k}$ are applied. Determine the tension in each cable. 18

Fig:2(b)

- 3(a) The member AB mass 205kg and rest against a smooth wall at B. Determine the reaction at B and A when $\theta = 30^\circ$. What are the components of the reaction at A? 17

Fig:3(a)

- 3(b) In figure CD is a rigid weightless body, $F=6700\text{N}$, the pegs are smooth, and the cable is weightless and flexible. Determine the weights of A and B if the bodies are in equilibrium and CD remains horizontal. 18

Fig:3(b)

- 4 In the bridge truss, find the forces in member AB, AF, BF and EF 35

$$R_A=200\text{N} \quad P=200\text{N} \quad Q=200\text{W} \quad R_D=200\text{N}$$

Fig:4

SECTION-B

- 5(a) Find the centroid of the area shown in figure below. 18

Fig: 5(a)

- 5(b) Locate the centroid of the plane area shown in figure below. 17

Fig:5(b)

- 6(a) Determine by direct integration the location of the centroid of a parabolic spandrel as shown in figure. 17

Fig: 6(a)

- 6(b) Determine the location of the center of gravity of the homogeneous body of revolution as shown in figure, which was obtained by joining a hemisphere and a cylinder and carving out a cone. 18

Fig: 6(b)

- 7(a) What is the least value of Q which will result in impending sliding motion of body A in figure shown up the plane. When A weighs 1400 kg, $\theta = 30^\circ$ and $f = \dots$ 17

Fig:7(a)

- 7(b) Determine the horizontal force p required to start the 40.78 kg wedge (i) moving to the right and (ii) moving to the left. The angle of friction is 20° at all contact surfaces. 18

Fig: 7(b)

- 8(a) In belt friction, prove that $T_1 = T_2 e^{\mu \theta}$, where the symbols have their usual meanings. 17

- 8(b) Two weights W and Q are suspended one from each end of a rope which passes about a stationary drum, where $\mu = \dots$. If Q is about to move downward, what is the value of Q/W ? 18

Fig: 8(b)

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 2nd Year 1st Term Examination, 2018

EE 2121

(Electrical Circuits, Machines and Electronics)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
 ii) Figures in the right margin indicate full marks.
 iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Define branch, node, mesh and loop of an electrical circuit. 08
 1(b) Using nodal analysis find the current through the $4\ \Omega$ resistor of Fig 1(b) 12

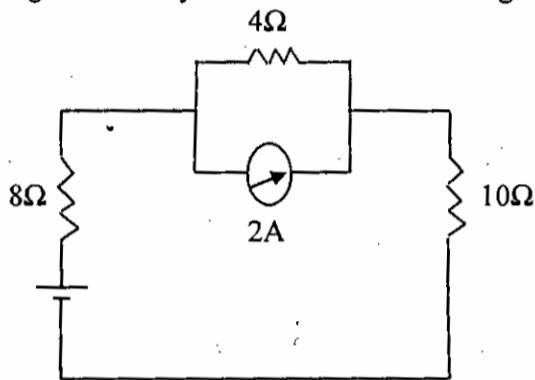


Fig.1(b)

- 1(c) State the Thevenin theorem. Find the thevenin equivalent circuit of Fig 1(c) 11

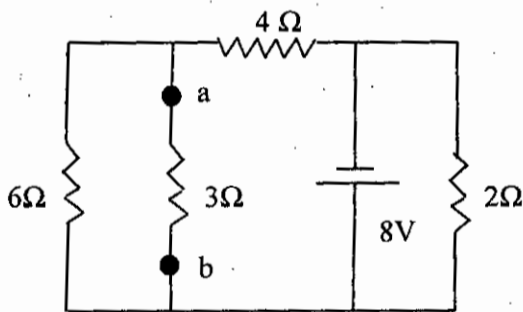


Fig. 1(c)

- 1(d) Write short notes on source conversion. 04
 2(a) For a series RLC branch. Show that $V = I_m Z \sin(\omega t + \theta)$ where $Z = \sqrt{R^2 + (X_L - X_C)^2}$ and $\theta = \tan^{-1}\left(\frac{X_L - X_C}{R}\right)$ 12
 2(b) Define RMS value and average value. For a sinusoid show that average value is 0.636 times of its maximum value. 12
 2(c) Draw the vector diagram of a series RLC circuit. 06
 2(d) Write down the 3- ϕ power equations for both Y and Δ connections. 05
 3(a) Mention the effect of temperature on semiconductor devices. 06
 3(b) Draw and explain the working principle of a full wave bridge rectifier. 10
 3(c) Why transistor is named so? How transistor acts as an amplifier and as a switch? 12
 3(d) Differentiate between BJT and FET. 07

- 4(a) Mention the basic functions of Circuit breaker, relay, and current transformer. 09
- 4(b) What are the properties of a good insulator? 07
- 4(c) A room 50ft X 20ft is illuminated by twenty 200 watts lamps. The M.S.C.P. of each lamp is 250. Assuming a depreciation factor of 1.2 and utilization factor 0.6, find the average illumination produced on the floor. 09
- 4(d) Write short notes on (i) Conduit wiring (ii) Neutral wire (iii) Space-Height ratio and (iv) Utilization factor. 10

SECTION-B

- 5(a) Mention the functions of yoke; commutator and armature core of a DC generator. Explain how the AC voltage in the armature winding is converted to DC in the brushes? 10
- 5(b) Draw the circuit diagram of short-shunt and long-shunt compound generator and write down the expression of shunt field current, terminal voltage, electric power developed and electric power delivered. 10
- 5(c) Write down the conditions for voltage build up process in DC shunt. Is voltage build up process possible for DC series at no load? If possible explain with necessary diagram. 08
- 5(d) Draw and explain the different characteristics curves of a DC shunt generator. A 4 pole generator having wave wound armature winding with 51 slots each slot containing 20 conductors. What will be the voltage generated when driven at 1500 r.p.m.? Assuming the flux per pole to be 7 mWb. 07
- 6(a) Define torque and counter e.m.f. Show that the torque produced by the DC motor is proportional to the main field flux and armature current. 10
- 6(b) Derive the speed equation of DC shunt motor. From that equation prove "DC shunt motor is a constant speed motor". 07
- 6(c) Write down the necessity of starter. Draw and explain the operation of 3 point starter with its advantages and disadvantages. 10
- 6(d) A 25KW, 250V D.C. shunt motor has armature and field resistance of 0.06Ω and 100Ω . Determine the total power when taking 25 KW as input. 08
- 7(a) Describe the working principle of a single phase transformer. 11
- 7(b) Why transformer rating is in KVA? Describe the open circuit test of transformer. 14
- 7(c) The primary and secondary windings of a 300KVA, 6000/230V transformer have resistance of 10Ω and 0.016Ω respectively. The total reactance of the transformer referred to the primary is 3Ω . Calculate the percentage regulation of the transformer when supplying full load current at a power factor of 0.8 lagging. 10
- 8(a) Describe the working principle of synchronous generator. Mention the advantage of rotating field and stationary armature system. 13
- 8(b) Draw and explain the torque-speed curve of induction motor. What is meant by plugging of induction motor? 09
- 8(c) What are the different stages of power development in an induction motor? 06
- 8(d) A 3- ϕ induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate (i) the rotor speed, when slip is 4% and (ii) the rotor frequency when rotor runs at 600rpm. 07

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 2nd Year 1st Term Examination, 2018

CSE 2121

(Computer Fundamentals and Programming)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Discuss about the functional units of computer with necessary diagram. 08
- 1(b) Classify computers on the basis of size and speed. Explain each of them with proper characteristics & examples. 10
- 1(c) Briefly describe about 2nd & 4th generation computers. 10
- 1(d) "Information means processed data"-explain this term with appropriate reason. 07
- 2(a) Find the equivalent octal form of $(C39B.A5E)_{16}$. 07
- 2(b) Assume that we are working with unsigned five-bit numbers. Subtract $b=27$ from $a=11$ using two's complement representation. 06
- 2(c) What is universal gate? How can you make XOR and XNOR gate using universal gate? 10
- 2(d) What is algorithm? Distinguish between algorithm and flowchart using an example. 07
- 2(e) What are the elements that the performances of a processor depend? 05
- 3(a) Explain about the Von Neuman architecture with appropriate figure. 08
- 3(b) How input is received from the keyboard? Describe with appropriate figure. 08
- 3(c) Define bit, byte and nibble. 06
- 3(d) Mention the working principle of optical mouse. 07
- 3(e) Define the following terms: 06
- (i) Refresh rates
 - (ii) Pixels
 - (iii) Resolution
 - (iv) LCD
- 4(a) What is an operating system? Explain the major functions of modern operating systems. Define Kernel. 08
- 4(b) What is Computer Network? Briefly discuss about the basic elements of a communication system. 07
- 4(c) Briefly describe about the OSI model of networking. 08
- 4(d) Write short notes on: 12
- (i) Cache memory
 - (ii) Magnetic storage device
 - (iii) LAN
 - (iv) WAN
 - (v) The World Wide Web
 - (vi) Bus

SECTION-B

- 5(a) What are the variable naming rules? How can you declare a variable as constant? 08
- 5(b) What are the escape sequence characters? How could you extend the range of basic data types? 07
- 5(c) Write a program which will find the value of $\sin x$ evaluating series. 10
- 5(d) What is the difference between keyword and Identifiers? What are the advantages of using shorthand assignment operator? 10

- 6(a) Write the output of the following code segment for (i=1; i<=20/3; i++){ 08
- ```

if (i%2){
 print f("%d", i);
}

```
- 6(b) Write a program that reads a character from keyboard and then will print it in reverse case. If 15  
input is upper case letter, the output will be lower case and vice-versa.
- 6(c) Write the importance of using switch statement. Draw the flow chart of else if ladder. 12
- 7(a) Write a program which will search a value within an array or not. 12
- 7(b) What are the limitations of using scanf( ) in case of string? How you will remove it? 08
- 7(c) Discuss with example of call by value and call by reference in respect of function. 10
- 7(d) Distinguish between do-while and while-loop. 05
- 8(a) Write a program which will calculate the factorial of a number using recursion method. 15
- 8(b) What is file? Describe how to open file in different modes? 10
- 8(c) Why user defined function is necessary? Create an exchange function to swap two values. 10

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**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

**Department of Textile Engineering**

B. Sc. Engineering 2nd Year 1<sup>st</sup> Term Examination, 2018

**TE 2111**

(Statistical Analysis and Quality Control)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.  
iii) Assume reasonable data if missing any.  
iv) Necessary table/chart will be provided on request.

**SECTION-A**

- 1(a) Define Arithmetic Mean, Median and Mode and discuss their uses. 10  
1(b) Which one is the ideal measure of central tendency and why? 08  
1(c) 8 test results of a given yarn count samples are: 30<sup>s</sup>, 28<sup>s</sup>, 29<sup>s</sup>, 35<sup>s</sup>, 32<sup>s</sup>, 27<sup>s</sup>, 25<sup>s</sup> & 20<sup>s</sup>. Find out the CV% for these data and comments on yarn quality. 12  
1(d) Prove that  $AM \geq HM \geq GM$ . 05
- 2(a) The selling price and frequency distribution for the airjet loom is as followed: 15

| Selling Price | Frequency |
|---------------|-----------|
| 15 upto 18    | 8         |
| 18 upto 21    | 23        |
| 21 upto 24    | 17        |
| 24 upto 27    | 18        |
| 27 upto 30    | 8         |
| 30 upto 33    | 6         |

- Determine the measures of dispersion. Assume the information is based on population data.
- 2(b) Calculate the first four moments about the mean for the following sets of numbers: 14  
45, 32, 37, 46, 33, 36, 41, 48, 36
- 2(c) Describe different types of Kurtosis. 06
- 3(a) State the assumption for binomial distribution. Mention the practical applications of Poisson's distribution. 10
- 3(b) ILO reports that 20% of the workforce in Textile is unemployed and interviewed 14 workers. 10  
(i) What is the probability at least six are unemployed?  
(ii) What is the probability that exactly seven are unemployed?
- 3(c) A recent survey of the hourly wages of spinning workers showed that mean hourly wages was TK 2020 with a standard deviation of TK 320. Assume the distribution of hourly wages follows the normal distribution. If we select a worker at random, what is the probability that the worker earns- 15  
(i) Between TK 2020 and TK 2400 per hour.  
(ii) About 95% of the wages.  
(iii) About 68% of the wages.
- 4(a) Define: (i) Scatter Diagram, (ii) Coefficient of determination 07  
4(b) Distinguish positive and negative correlation with examples. 08  
4(c) The owner of Partex Denim was studying the relationship between sales and the amount spent on advertisement. The sales information of the first four months is as followed: 20

| Month | X<br>Advertising<br>Expenses | Y<br>Sales<br>Revenue |
|-------|------------------------------|-----------------------|
|-------|------------------------------|-----------------------|

|          | (million) | (million) |
|----------|-----------|-----------|
| January  | 2         | 7         |
| February | 1         | 3         |
| March    | 3         | 8         |
| April    | 4         | 10        |

Given that  $S_x = 1.29$  and  $S_y = 2.94$

- Determine the correlation coefficient.
- Determine the regression equation.
- Estimate the sales when 5 millions money is spent on advertising.

### SECTION-B

- 5(a) Differentiate between probability and non-probability sampling methods. 08  
 5(b) Briefly discuss the sampling process. 11  
 5(c) What are the statistical process control tools? Briefly explain any one of them with example. 16
- 6(a) Classify the control chart. Write down its importance for controlling product quality. 10  
 6(b) Draw a mean chart from the following data: 20  
 Produce yarn count: 40<sup>s</sup>, 45<sup>s</sup>, 48<sup>s</sup>, 40.5<sup>s</sup>, 42<sup>s</sup>, 45.5<sup>s</sup>, 41<sup>s</sup> & 39<sup>s</sup>. Also make a comment about the process.  
 6(c) Define process control and product control. 05
- 7(a) Differentiate between parametric test and non-parametric test. 08  
 7(b) Write down the methods of hypothesis testing. 04  
 7(c) Explain the  $\chi^2$  (Chi) test. 06  
 7(d) The following table gives the no. of good and defective T-shirt produced by each of three shift in a garment factory: 12

| Shift   | Good | Defective | Total |
|---------|------|-----------|-------|
| Day     | 900  | 130       | 1030  |
| Evening | 700  | 170       | 870   |
| Night   | 400  | 200       | 600   |
| Total   | 2000 | 500       | 2500  |

Is there any association between the shift and the quality of T-shirt produced?

(Here,  $df=2$ ;  $=5.991$ )

- 7(e) State the type-I & type-II error. 05
- 8(a) What is ANOVA? Write the steps involved in one way analysis of variance. 12  
 8(b) Write short notes on: (i) Level of significance (ii) degree of Freedom (iii) Hypothesis. 09  
 8(c) ANOVA for no. of textile factory and city type: 14

| City type    | $X_1$ | $X_2$ | $X_3$ |
|--------------|-------|-------|-------|
| Factory type |       |       |       |
| 2004         | 5     | 7     | 2     |
| 2005         | 6     | 9     | 4     |

Is there any significance of variance?

(Here,  $df=2/3$   $t_{0.05}=9.55$ )

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