KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog 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 electrical circuit and network. State and explain KVL and KCL.   08

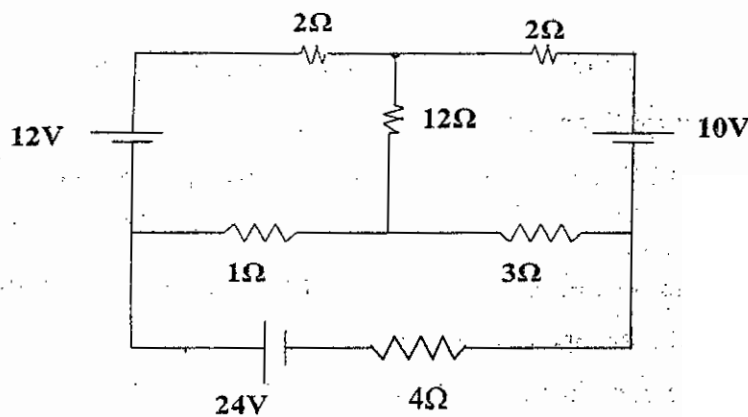1(b) Determine the current through the 4Ω branch using loop analysis of the fig.1(b)   13

Fig.1(b)

1(c) State Thevenin's theorem. Find the Thevenin equivalent circuit for the network shown in   10
following fig.1(c).
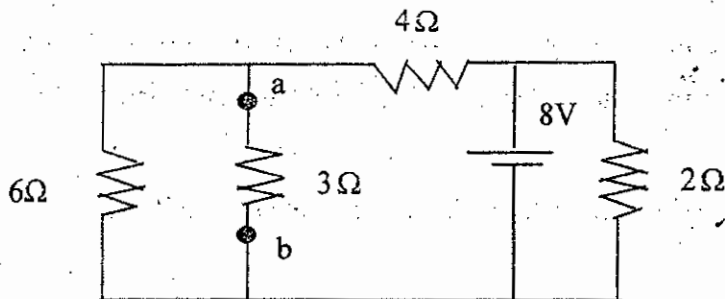

Fig.1(c)

1(d) State and mention some applications of maximum power transfer theorem.   04

2(a) Define instantaneous value, r.m.s value, form factor and crest factor. Prove that the average   12
value of a sinusoid over one half cycle is 0.636 times of its maximum value. Also calculate form
factor and crest factor for sinusoid.

2(b) Show that the impedance of a pure inductive branch is given by $Z_L = \omega L \angle 90°$.   08

2(c) Define power factor. For the circuit shown in Fig.Q2(c), calculate real power, reactive power, apparent power, power factor and also draw the complete vector diagram of this circuit.
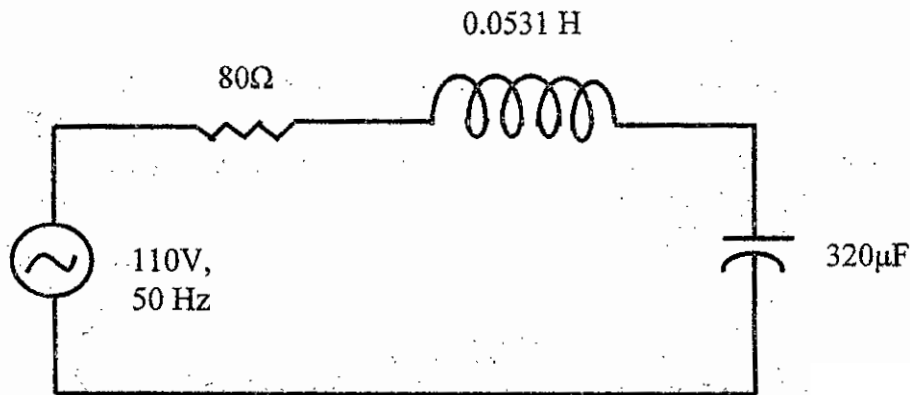
0.0531 H

80Ω

110V,
50 Hz

320μF

Fig. 2(c)

3(a) What is doping? How depletion layer is formed in a pn Junction? Explain. 12

3(b) How transistor acts as an amplifier and as a switch? 10

3(c) "In full wave rectification, 81.2% of ac power is converted to dc power"-Justify the statement. 13

4(a) Mention the requirements for operation of a circuit breaker. Also classify circuit breaker. 09

4(b) What is trip circuit? Describe the operation of a trip circuit. 10

4(c) What are the properties of a good insulator? 08

4(d) Write down the difference between neutral wire and earthing wire. Why grounding is required? 08

SECTION-B

5(a) Explain Faraday's law of electromagnetic induction. Derive the E.M.F equation of a DC generator. 11

5(b) Mention the essential parts of DC generator and also write down the function of commutator. 06

5(c) Draw and explain the open circuit characteristic and external characteristic of a DC shunt generator. 08

5(d) Define critical resistance. Explain the voltage build-up process for self-excited DC generator. 10

6(a) Define counter EMF. Derive the speed equation of DC series motor. 12

6(b) Mention the methods of speed control of DC motor. Describe how speed of DC motor can be controlled above base speed. 11

6(c) What is starter? Describe the working principle of 4 point starter. Also mention the advantages of 4 point starter over 3-point starter. 12

7(a) Why transformer rating is KVA? Derive the condition for maximum efficiency of a transformer. 12

7(b) Draw the exact equivalent circuit of a transformer. Mention the use of conservators and breathers in transformer construction. 13

7(c) A 25 KVA transformer has 500 turns on the primary and 50 turns in the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Find the full load primary and secondary currents, the secondary EMF and the maximum flux in the core. Neglect leakage drops and no-load primary current. 10

8(a) Why does the rotor of an induction motor rotate? 07

8(b) Draw and explain the torque-speed curve of an induction motor. 08

8(c) How does a synchronous generator operate? What are the advantages of rotating field and stationary armature system? 14

8(d) Mention some applications of induction motor. 06

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KHULNA UNIVERSITY OF ENGINEERING &TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog 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 chart will be provided on request.

SECTION-A

1(a) Define the following terms with example: 15

i) Primary data, (ii) Secondary data, (iii)CV%, (iv) Population, and (v) Sample.   10

1(b) Describe the suitable methods of collecting primary data.   10

1(c) Write the importance of frequency distribution. Construct a frequency distribution from following data:

49,37,62,58,41,48,54,36,55,74,70,57,38,62,43,53,68,36,45,28,75,63,31,28,49,42,60,49,

71,42.

2(a) From the following frequency table, calculate mean, median, and mode: 15

Weekly wages	200-400	400-600	600-800	800-1000	1000-1200	1200-1400	1400-1600
No of persons	6	9	11	14	20	15	10

2(b) Calculate the first four moments about the mean for the following set of numbers: 14

45,32,37,46,39,36,41,48,36.

2(c) Differentiate between skewness and kurtosis.   06

3(a) Suppose two events A and B are mutually exclusive. What is the probability of the   04
joint occurrence?

3(b) A recent survey of the hourly wages of the spinning workers showed that mean hourly   15
wages was Tk. 2020 with a S.D. 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 workers earn-

(i) Between Tk. 2020 and Tk. 2400 per hour

(ii) About 95 % of the wages

(iii) About 68 % of the wages

3(c) Professor Robert has determined that the scores in the statistics course are   16
approximately normally distributed with a mean of 80 and a S.D. of 5. He announces to
the class that the top 15% of the scores will earn an A. What is the lowest score a

student can earn and still receive an A?

4(a) A recent study shows that 15% of American households owned a video camera. For a   15
sample of 200 homes -

(i) How many of the homes would you expect to have a video camera?

(ii) Compute the variance and S.D.

(iii) What is the probability that less than 40 homes in the sample have video cameras?

4(b) What is co-efficient of correlation? Did a computed r comes from a population of   14
paired observations with zero correlation?

4(c) Distinguish positive and negative correlation with example   —   06

SECTION-B

5(a) What is ANOVA? Write the steps involved in one way analysis of variance.   20

5(b) ANOVA for no. of knitting factory and city types-   15

Knitting factory	City type		
	a_1	a_2	a_3
2016	5	7	2
2017	6	9	4

Is there any significance of variance? (Here, $t_{.05}$; df 2/3; 9.55)

6(a) Write short notes on: 12

(i) Defects, (ii) Defectives, (iii) t-test, and (iv) f-test.

6(b) Briefly discuss the steps of hypothesis testing.   09

6(c) A process that produces water proof textile materials is investigated. Ten samples of   14
size 100 are selected.

Sample No.	1	2	3	4	5	6	7	8	9	10
Non-Conf. No	5	2	3	8	4	1	2	6	3	4

Is this process operating in statistical control?

7(a) What is test of significance? Write down the steps of significance.   10

7(b) Mention the methods of hypothesis testing. Explain Type I & Type- II error.   10

7(c) What is χ^2 (chi) test? Point out the steps involved in χ^2 test.   15

8(a) If you can't interpret a process accurately, what will be the consequences?   07

8(b) How can you recognize an in-control and out of control process? Show the ranges of   12
in-control process with normal distribution curve.

8(c) Briefly discuss the process of developing a control chart for variables.   16

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog Examination, 2018
TE 2127
(Textile Physics)

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.

SECTION-A

1(a)　Discuss the relationship between fiber properties and fiber structure.　　10

1(b)　Describe X-ray diffraction method to investigate fiber structure.　　15

1(c)　Show a schematic diagram of a SEM with brief description.　　10

2(a)　Prove that, Specific flexural rigidity $= \frac{1}{4\pi} \cdot \frac{\eta E}{\rho}$, where the symbols have their usual　15 meanings.

2(b)　Define torsional rigidity. Prove that specific torsional rigidity $= \frac{\eta E}{\rho}$ where the symbols　15 have their usual meanings.

2(c)　Show the effect of water on fiber.　　05

3(a)　Define swelling. Classify swelling with brief description and sketch.　　15

3(b)　How the swelling phenomenon can be used practically in textiles to improve　08 functionality?

3(c)　Establish the relationship between transverse area swelling and transverse diameter　12 swelling.

4(a)　Write about the effect of fiber fineness, and moisture on yarn strength.　　08

4(b)　Establish that, the spirality of a weft knitted fabric depends on the number of feeders of a　12 machine with the help of an equation.

4(c)　Explain the stress-strain curve where a load is applied on a fiber.　　08

4(d)　Discuss the factors which have influences on lusture.　　07

SECTION-B

5(a)　What are the assumptions taken for idealized helical geometry?　　06

5(b)　From idealized yarn geometry, prove that, $\tan\alpha = 0.0112\ V_y^{1/2}\tau$, Where the symbols　12 have their usual meanings.

5(c)　Show that twist contraction factor $C_y = \frac{1}{2}(1+\sec\alpha)$, where the symbols have their usual　12 meanings.

5(d)　Define open packing and close packing of fiber.　　05

6(a)　Derive the equation of yarn diameter for filament yarn.　　10

6(b) Considering pierce's model of fabric geometry, prove that $h_1 = \frac{4}{3} P_2 \sqrt{C_1}$, where the symbols have their usual meanings.

6(c) Define crimp interchange. Establish the equation of crimp interchange. 10

7(a) For weft jamming, show that $h_2^2 = D^2 - p_2^2$, where the symbols have their usual meanings. 10

7(b) If l_1=0.0448 cm, l_2=0.042 cm, C_1=0.12 and EPI=72; Calculate D, θ_1, and $C_2\%$. 06

7(c) Discuss the effect of static electricity on the soiling of cotton fabric. 09

7(d) Discuss the problems created by friction in textile processing. 10

8(a) Describe Riding's Experiment to estimate the measurement of fiber migration in yarn. 13

8(b) How the dielectric constant of a textile material can be measured? Discuss with diagram. 12

8(c) Discuss a suitable method to measure the co-efficient of friction of a textile material. 10

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog Examination, 2018

TE 2227
(Mechanics of Textile Structures)

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 Necessary parameters.

SECTION-A

1(a) Discuss the analysis of crystallinity of fiber by X-ray diffraction method.   10

1(b) Show infrared absorption spectrum of a textile fiber mentioning the disadvantages of it.   10

1(c) Discuss the relationship between fiber properties and fiber structure.   10

1(d) Tabulate the important differences between SEM and TEM.   05

2(a) Explain the stress-strain curve where a load is applied on a fiber.   08

2(b) Discuss the factors which have influences on lusture.   12

2(c) With the help of an equation establish that, the spirality of a weft knitted fabric depends   15
      on the number of feeders of the machine.

3(a) Define torsional rigidity. Prove that specific torsional rigidity = $\frac{\eta E}{\rho}$, where the symbols   15

      have their usual meanings.

3(b) Breaking twist of cotton fiber is 60 and diameter of it is 0.017 mm. Find out the BTA of   05
      it.

3(c) Define flexural rigidity. Prove that, Specific flexural rigidity = $\frac{1}{4\pi} \cdot \frac{\eta E}{\rho}$, where the   15

      symbols have their usual meanings

4(a) Discuss the factors which affect the dielectric properties of textile fiber.   10

4(b) Describe the process of measuring dielectric constant of a textile material.   10

4(c) How tensile properties of fabrics can be predicted? Discuss.   10

4(d) Briefly discuss the mechanism of fiber migration.   05

SECTION-B

5(a) State the problems created due to friction in textile processing.   10

5(b) Discuss the problems caused by static electricity and their solutions.   15

5(c) What is dichroism? Mention the requirements of dichroism.   10

6(a) Considering pierce's model of fabric geometry, prove that $h_1 = \frac{4}{3} P_2 \sqrt{C_1}$, where the   18

      symbols have their usual meanings.

6(b) Derive the equation of yarn diameter for filament yarn.   10

6(c) State the concept of similar cloth.

7(a) Explain the hysteresis diagram of fabric shear.   10
7(b) Define swelling. Sketch a swollen fiber and show different types of swelling.   10
7(c) Show the relation $S_V = S_L + S_A + S_L \cdot S_A$ where S_V=Volume of swelling, S_A=Area of 15
swelling, and S_L=Axial swelling.

8(a) Derive the equation for crimp interchange.   12
8(b) For weft jamming, Prove that, $h_2^2 = D^2 - p_2^2$, where the symbols have their usual 10
meanings.
8(c) In warp jamming condition, D = 0.02 cm, $\theta_1 = 20°$, $C_1 = 0.15$. Find out the value of h_1. 08
8(d) Explain cover factor.   05

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 4th Year Backlog Examination, 2018
TE4113
(Textile Testing and Quality Control-II)

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.

SECTION-A

1(a)   What is WRAP? State the WRAP certifications levels.   12

1(b)   What is Oeko-Tex-100$^+$? Write down the different categories of textiles according to Oeko-Tex.   15

1(c)   Write short notes on: i) GOTS, and ii) REACH.   08

2(a)   How will you express the hardness of water?   05

2(b)   Describe a standard test to show the presence of starch and/or PVA in fabric.   15

2(c)   State the dye-house water quality.   08

2(d)   What is BAN? What precautions should be taken for dye bath for a particular fabric dyeing depending on the higher and lower value of BAN?   07

3(a)   Explain the fabric properties those have effects on air permeability.   14

3(b)   Differentiate between water proof and water repellent.   06

3(c)   Explain the widely used test for water penetration and absorption of fabric.   15

4(a)   Write short note on flame retardant finish.   05

4(b)   Write about the factors affecting the flame resistance.   10

4(c)   Describe the 45° flame test for standard ASTM D-1230-94.   15

4(d)   List some chemicals which reduce the flammability of the treated fabric.   05

SECTION-B

5(a)   What is color fastness? Describe a test of color fastness to wash according to an established standard.   15

5(b)   Show a format of a test report of color fastness to light mentioning the standard.   15

5(c)   Write short note on blue wool.   05

6(a)   What is pilling? Explain a pilling test with an established evaluation procedure.   10

6(b)   Write down the factors affecting abrasion resistance.   08

6(c)   Discuss the Bundesmann water repellency test with the assessment of the result.   10

6(d)   Briefly explain the reasons and remedies of pilling.   07

7(a)   What is serviceability? State the merits and demerits of both wearer trials and laboratory test.   15

7(b)	Show different light sources used in textile testing.	
7(c)	Write short notes on: i) Multi-fiber fabric, and ii) Gray scales.	08
7(d)	What is grab test?	05

8(a)	Define snagging. Show a snagging test with an established evaluation procedure.	09
8(b)	Discuss the procedure of carrying out a crease recovery test.	10
8(c)	Describe a carpet thickness test.	08
8(d)	State a durability measurement test of a carpet with necessary diagram.	08

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KHULNA UNIVERSITY OF ENGINEERING &TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog Examination, 2018
ME-2221
(Solid Mechanics and Machine Design)
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)   What is meant by normal stress, shearing stress and bearing stress?   10

1(b)   Show that the tangential stress in a thin walled cylindrical shell of diameter D and wall   10
thickness t subjected to internal pressure P are given by $\sigma_1 = \frac{PD}{2t}$

1(c)   The rigid bars AB and CD as shown in figure are supported by pins at A and C and the   15
two rods. Determine the maximum force P which can be applied as shown if its vertical
movement is limited to 5 mm. Neglect the weights of all members.
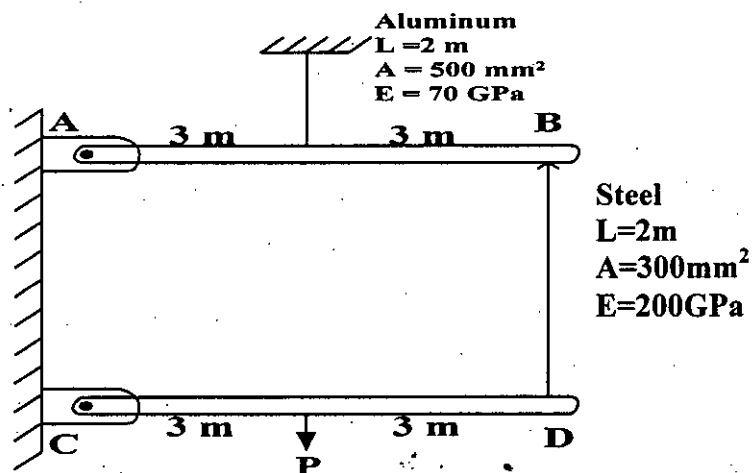
Fig. 1(c)

2(a)   A rigid horizontal bar of negligible mass is connected to two rods as shown in figure. If   17
the system is initially stress-free, determine the temperature change that will cause a
tensile stress of 60MPa in the steel rod.
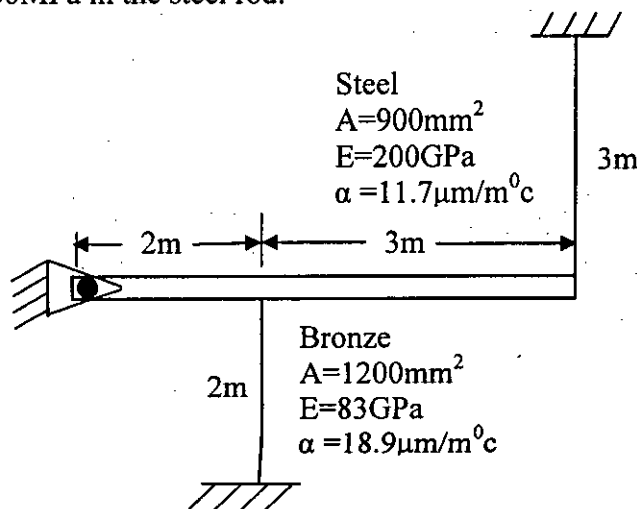
Fig. 2(a)

2(b)   Show that a hollow circular shaft whose inner diameter is half the outer diameter has a torsional strength equal to $\frac{15}{16}$ of a solid shaft of the same outside diameter.

3(a)   Derive the torsion formula for circular shaft mentioning appropriate assumptions.   17

3(b)   A rigid bar, hinged at one end, is supported by two identical springs as shown in figure.   18
Each spring consists of 20 turns of 10mm wire having a mean diameter of 150mm.
Compute the maximum shearing stress in the springs. Neglect the mass of the rigid bar.
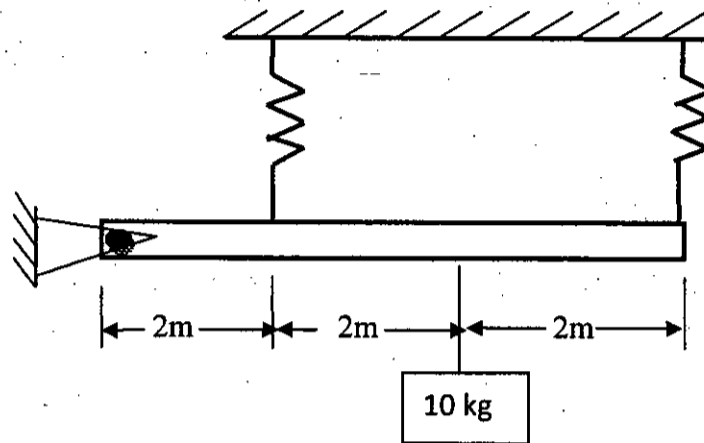
Fig. 3(b)

4(a)   Without writing shear and moment equations, draw shear and moment diagrams for the   18
beams as shown in figure. Give the numerical values at all change of loading positions
and at all points of zero shear.
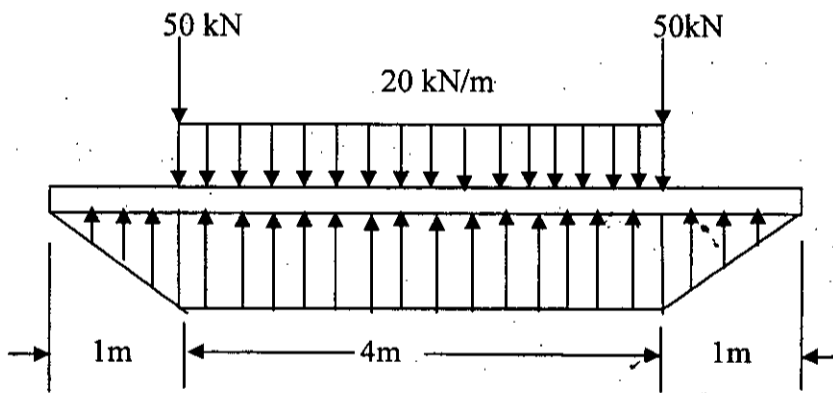
Fig. 4(a)

4(b)   Determine the minimum width 'b' of the beam as shown in figure, if the flexural stress   17
in not to exceed 10MPa.
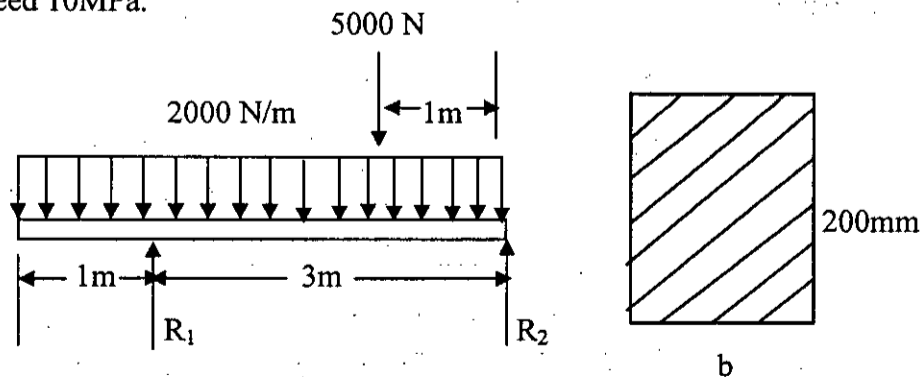
Fig. 4(b)

SECTION-B

5.   The link shown in figure is machined from AISI 1035 steel as rolled and subjected to a   35
repeated tensile load that varies from zero to 10 k$_i$ps; h=1.5b.

(a) Determine these dimensions for N=1.40 (Soderberg) at a section without stress concentration.

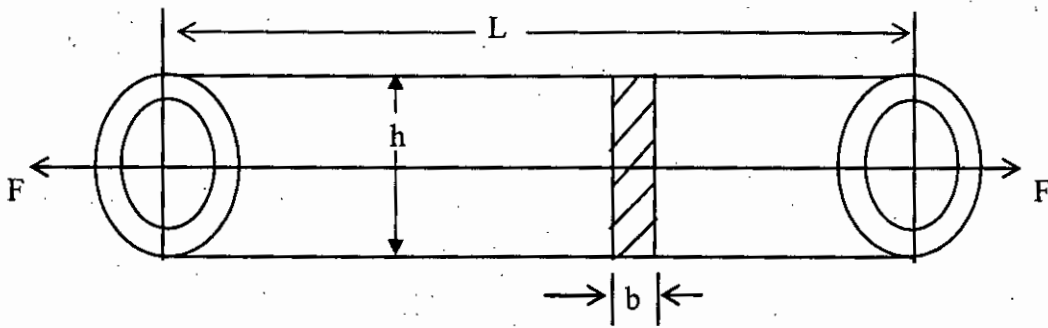(b) How much would these dimensions be decreased if the surfaces of the link were mirror polished?

Fig. 05

6.   A carbon-steel spring is to be subjected to a load that varies from 500 to 1200 lb. The   35
outside diameter should be between 3.5 and 4 in., the spring index between 5 to 10: approximate scale of 500 lb/in. Choose a steel and for a design factor of 1.4 by the wahl line, find the wire diameter. Also determine the free length for squared-and-ground ends,the number of active coils, and pitch angle. Conform to good practice showing checks for all significant parameters.

7.   A 6x6 inch full bearing has a frictional loss of fhp = 11 when the load is 68500 lb and   35
n = 1600 rpm; C$_r$/r = 0.001 (a) Compute the minimum film thickness. Is this in the vicinity of that for an optimum bearing? (b) What is the viscosity of the oil and a proper grade for an operating temperature of 160° F. (c) For the same h$_o$, but for the maximum-load optimum, determine the permissible load and the fhp.

8.   A pair of gears with 20° full-depth teeth are to transmit 10 hp at 1750 rpm of the 3 inch   35
pinion; velocity ratio desired is about 3.8; intermittent service. Use a strength reduction factor of about 1.4, with the load at the tip and teeth are commercially cut. Determine the pitch, face width, and tooth numbers if the material is cast iron, class -20.

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog Examination, 2018
TE 2213
(Textile Testing and Quality Control-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.

SECTION-A

1(a)	Define moisture content and moisture regain.	05
1(b)	Establish a relation between M.R & M.C.	10
1(c)	Explain the effects of moisture on textiles.	03
1(d)	Describe the working principle of wet and dry bulb hygrometer with sketch.	12

2(a)	What is yarn evenness? Describe a yarn evenness test.	10
2(b)	What is CSP? Describe a process of measuring single yarn strength.	10
2(c)	Write short notes on the followings:	15
	(i) Multifiber fabric, (ii) Grey scales, and (iii) Uster tester 5.	

3(a)	What is yarn hairiness? Discuss an established yarn hairiness test.	12
3(b)	Define irregularity. Discuss the causes of irregularities of a yarn.	13
3(c)	Write short note on Twist factor.	10

4(a)	Define drape. Briefly explain the process of determining drape of a fabric.	10
4(b)	Show a format of a lab report.	10
4(c)	Write short notes on : (i) HVI, and (ii) AFIS.	05
4(d)	Define shear. State the process of measuring shear of a fabric.	10

SECTION-B

5(a)	Show a relation between yarn diameter and count.	12
5(b)	Define count. Describe different systems which are available for the determination of yarn count with example.	13
5(c)	Calculate the CIW of 70/30 Cotton/Nylon, if oven dry weight of the consignment is 150kg.	04
5(d)	If 240yds of cotton yarn weighs 40grains, what is count of yarn in Ne? Also convert Ne into Tex and Nm.	06

6(a)	What is Twist and TM? State the twist direction with neat sketch.	10
6(b)	Prove that Ne×Tex=590.5.	10
6(c)	Describe the working principle of Shirley twist tester.	10
6(d)	Find out the resulting yarn count in both direct & indirect system when you have 60s and	05

80^s yarn count.

7(a)	Write the aims of testing. Differentiate between testing and inspection.	10
7(b)	What criteria's are needed to be fulfilled for a factory to want Oeko-tex standard 100?	10
7(c)	What is GOT$_s$ and DIN?	08
7(d)	Explain REACH and WRAP.	07

8(a)	Show a relation between yarn count & twist angle.	10
8(b)	What is meant by EPI and PPI? Explain cover factor effect for fabric structure.	10
8(c)	What is crimp and take up%? Prove that $C = \dfrac{100\,T}{100 - T}$; where C=crimp% and T= Take up%.	15

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog 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.
ii) Figures in the right margin indicate full marks.

SECTION-A

1(a)   A 61.2 kg block is supported by two cables AC and BC. (i) For what value of α is the   17
tension in cable AC is minimum? (ii) What are the corresponding values of tension in
cable AC and BC?
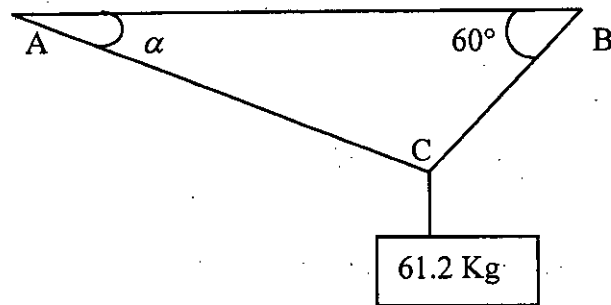
Fig. 1(a)

1(b)   A 5000kg sphere rests on a smooth plane inclined at an angle $\theta = 40°$ with horizontal and   18
against a smooth vertical wall. What are the reactions at the contact surfaces A and B?
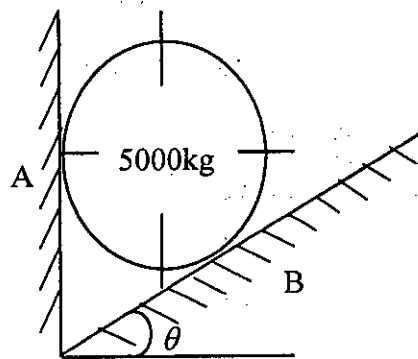
Fig. 1(b)

2(a)   Three cables are joined at D, where two forces $\underline{P} = (3.5KN)\underline{i}$ and $\underline{Q} = (1.5KN)\underline{k}$ are   17
applied. Determine the tension in each cable.
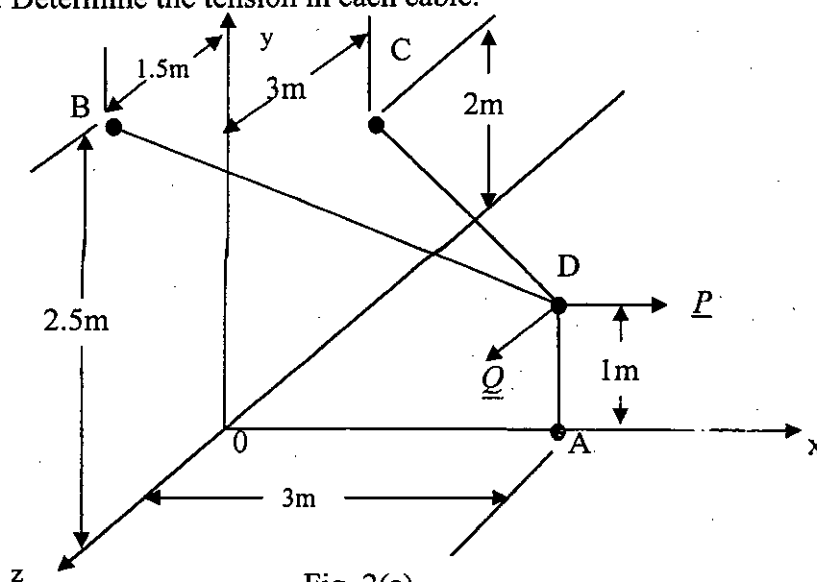
Fig. 2(a)

2(b)   A 200kg cylinder is hung by means of two cables AB and AC, Which are attached to the   18
top of a vertical wall. A horizontal force P perpendicular to the wall holds the cylinder
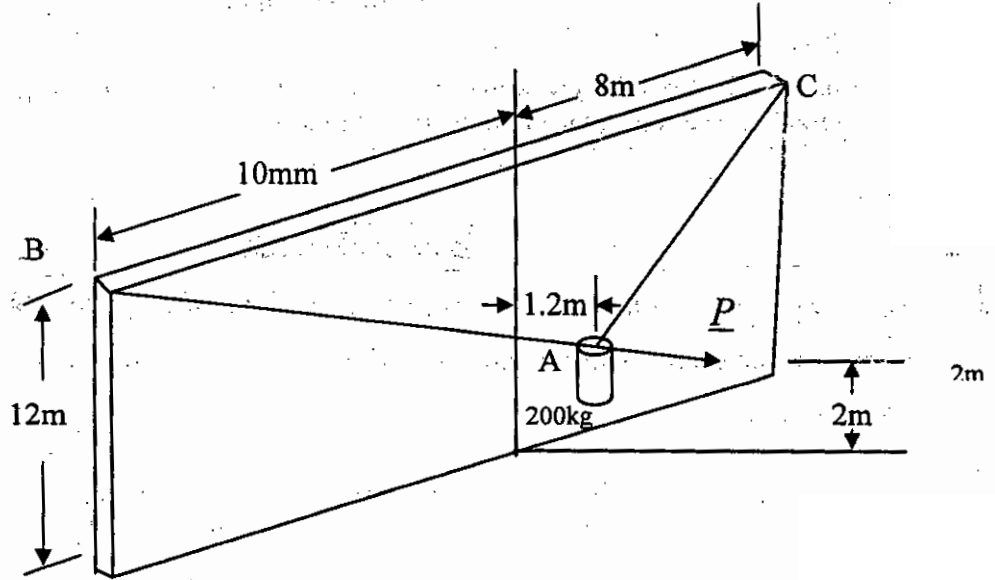in the position shown. Determine the magnitude of P and the tension in each cable.

Fig. 2(b)

3(a)   The bell-crank shown in figure has a load F= 100 N. If $\theta = 30^\circ$, determine the reaction at   15
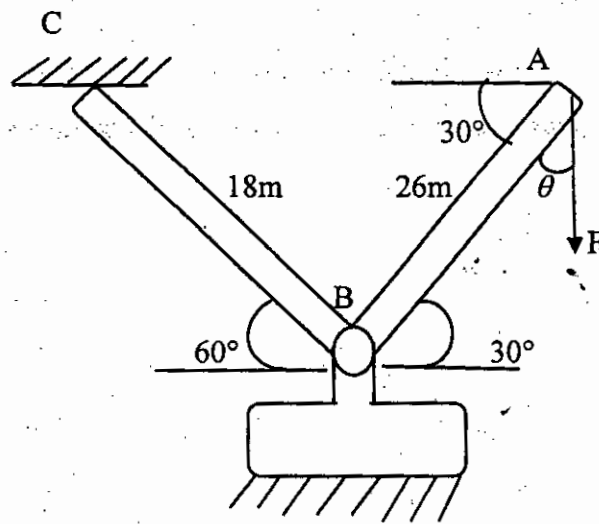B and C.

Fig. 3(a)

3(b)   The member ABC is supported by another member BD. A force F=4.5 KN acts   20
horizontally at C. If $\theta=60^\circ$, find the reaction at A and B.
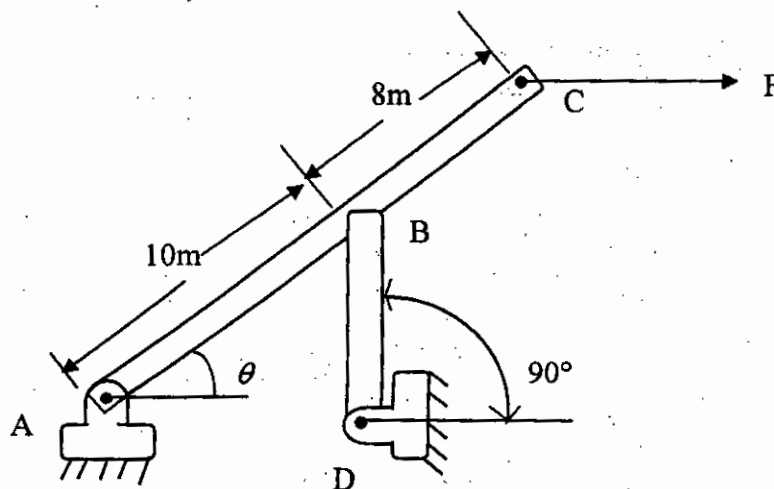
Fig. 3(b)

4(a) A uniform rod AB of length 3R rests inside a hemispherical bowl of radius R as shown. 17
Neglecting friction, determine the angle θ corresponding to equilibrium.
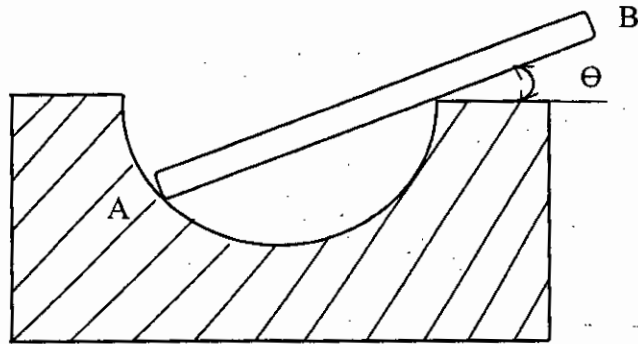

Fig. 4(a)

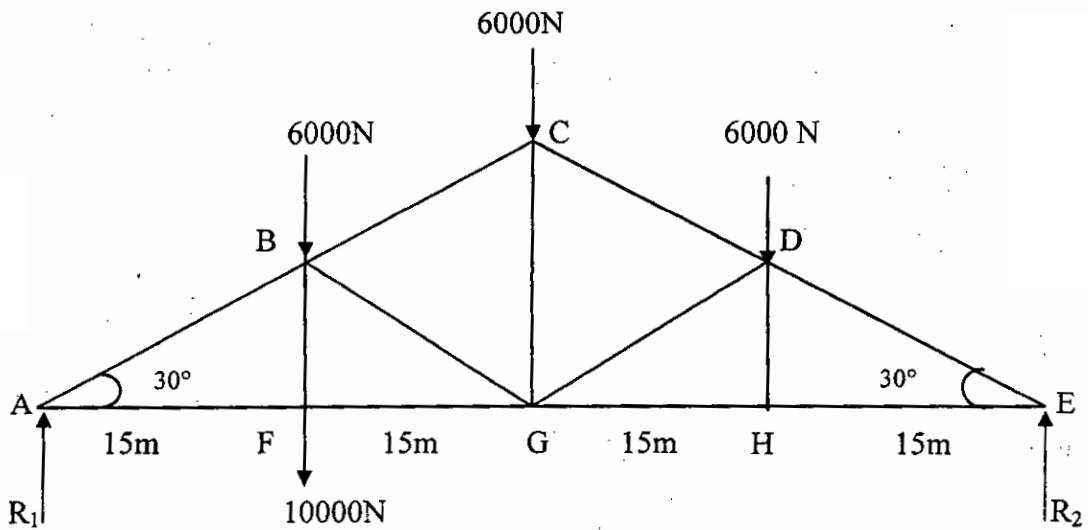4(b) Find the force in members BC,BG and FG of the truss as shown in figure. 18

Fig. 4(b)

SECTION-B

5(a) For the plane area as shown, determine- 17

(i) The first moments with respect to the x and y axes, and
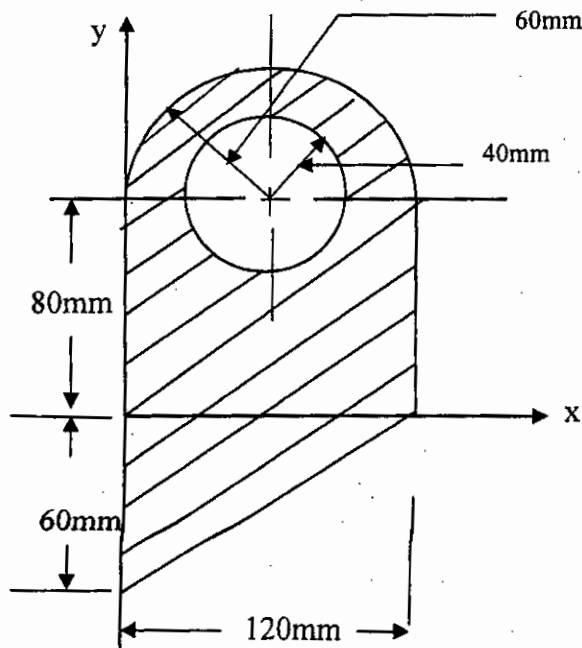
(ii) The location of the centroid.

Fig. 5(a)

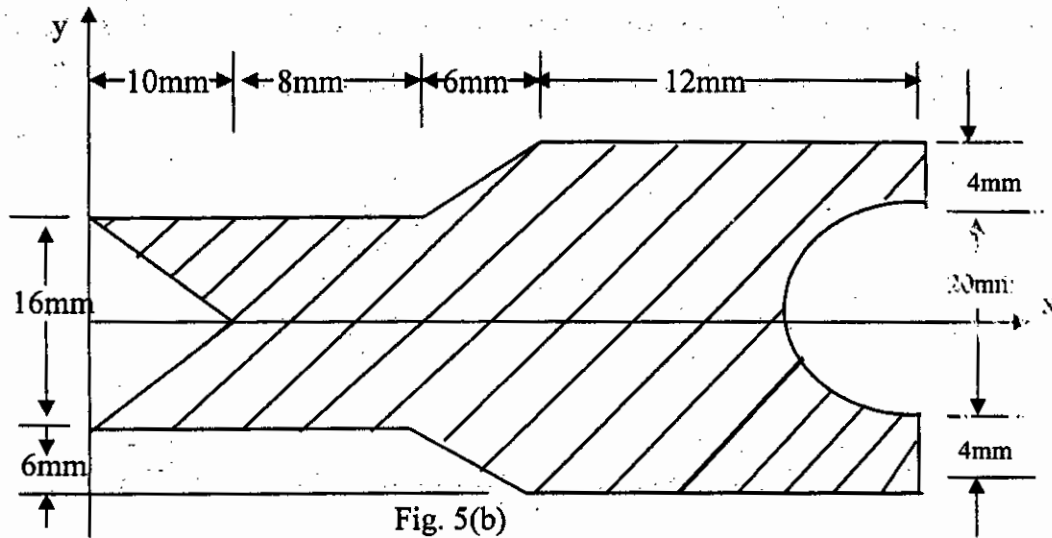5(b) Find the centroid of the shaded area as shown in figure.

Fig. 5(b)

6(a) Determine by direct integration the location of the centroid of a parabolic spandrel as shown in figure below-   18
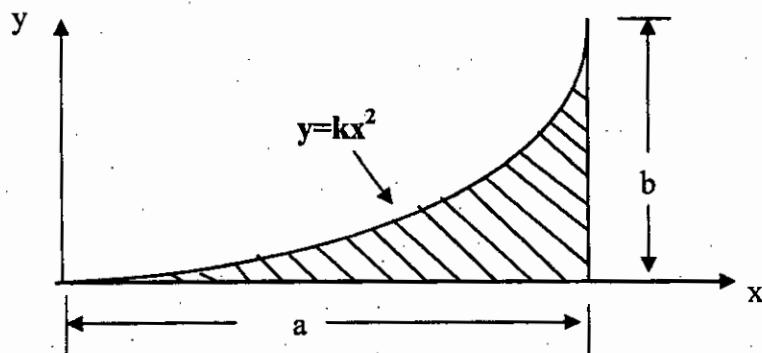

Fig. 6(a)

6(b) An area bounded by the parabola $y^2=8x$ and the straight line x=5cm. Determine by integration the centroid of this area.   17
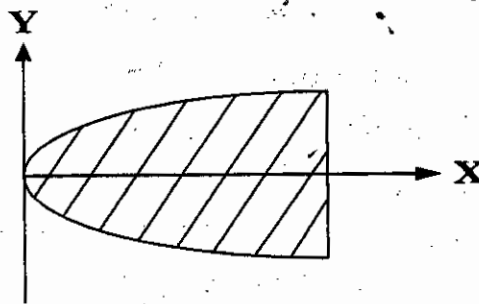

Fig. 6(b)

7(a) A ladder AB with a mass of 51kg as shown in figure is held in impending motion toward the right by the horizontal force Q. If f_A=0.2 and f_B=0.3, What is the value of Q?   17
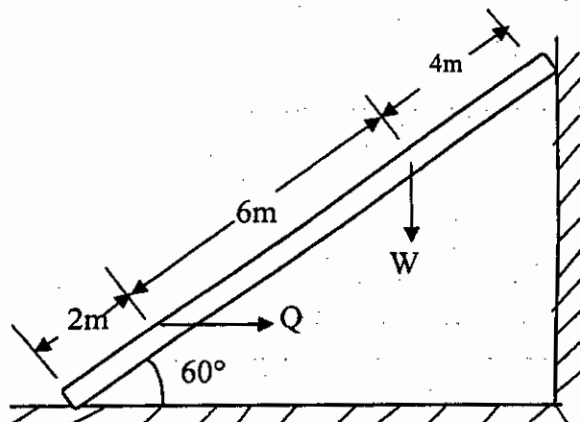

Fig. 7(a)

7(b)   Determine the minimum value of P which must be applied to the wedge in order to move   18
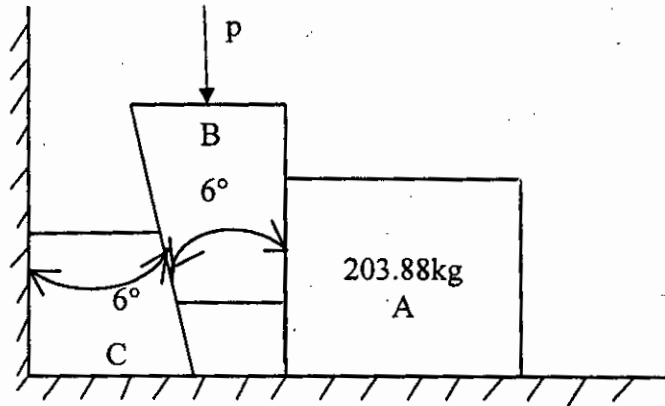   the 203.88 kg block.   `Co-efficient of friction value needed ?`

Fig. 7(b)

8(a)   Two fixed cylinders as shown in figure below have radii γ_A=1m and γ_B=2m and θ= 1   18
        radian. The load W is increased until W=14kg, when it is on the verge of moving
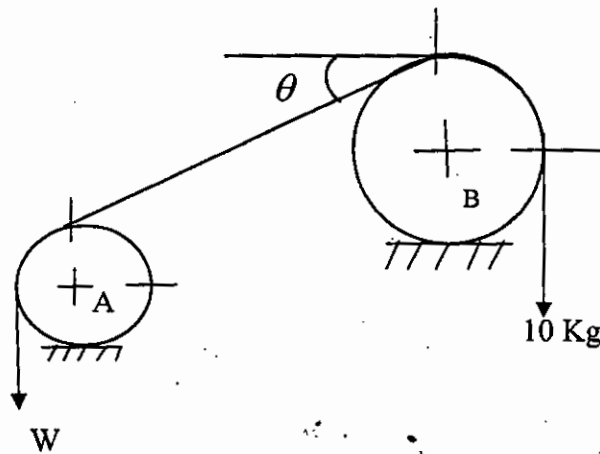   downward. Find f.

Fig. 8(a)

8(b)   A brake drum of radius r=150mm is rotating clockwise when a force P of magnitude 75N   17
        is applied at D. Knowing that f=0.25, determine the moment about O of the friction forces
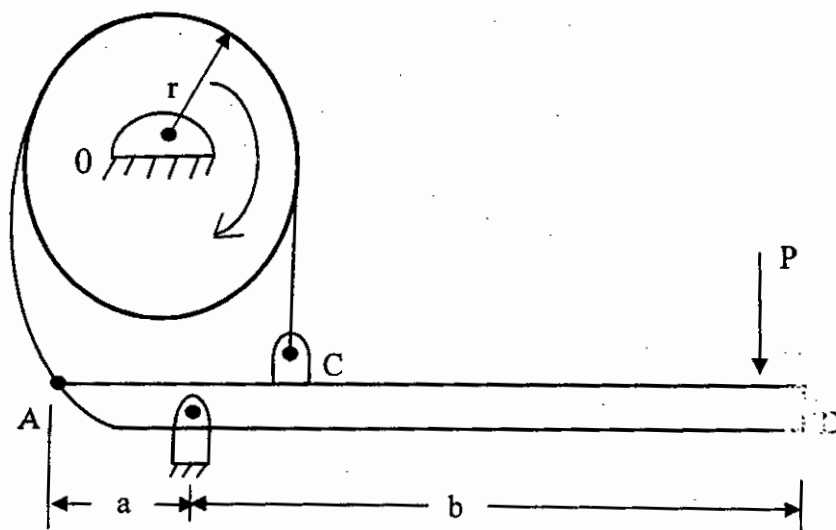   applied to the drum when a=75mm and b=400mm.

Fig. 8(b)

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KHULNA UNIVERSITY OF ENGINEERING &TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog 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) What are the major components of a computer? Explain each of their functions.   08

1(b) Differentiate between data and information. Which is more useful to the people?   07

1(c) Draw a block diagram of a computer system and discuss the functionalities of each in   10
details.

1(d) Compare microcomputer, minicomputer, and mainframe computer in turns of size and   10
cost.

2(a) Write the short notes of the followings-   09
i) Machine Language,
ii) High Level Language,
iii) Assembly Language.

2(b) Find the decimal equivalent of the following numbers: 09
(i) 785.134_8 and (ii) $C51D.A2B_{16}$

2(c) Perform the following binary operation using 2's complement   10
$111101-101010$

2(d) Define the following terms: 07
(i) BCD code, (ii) Unicode, and (iii) Alphanumeric code

3(a) Explain the physical storage media's classification with examples.   08

3(b) Briefly describe the bus organization of a computer system.   10

3(c) Distinguish between RAM and ROM. Explain different types of ROM.   08

3(d) Explain how a scanner works.   05

3(e) Define the following terms: 04
(i) Pixel, (ii) Resolution, (iii) Refresh rates, and (iv) LED

4(a) What is software? Classify and discuss about different types of computer software.   10

4(b) What is computer virus? How do they infect and spread in a computer system? Explain   10
at least three categories of viruses on the basis of their mode of existence.

4(c) What is meant by Kernel? Why is it called the nucleus of the OS? Also describe the   10
operation of the modern OS.

4(d) What are differences between compiler and interpreter?   05

SECTION-B

5(a) What are the variable naming rules? How can you declare a variable as constant? 07

5(b) What are the control structures in C programming language? Explain with appropriate 10
examples.

5(c) What are the basic differences between Keyword and Identifier? Write down the rules 09
for naming identifiers.

5(d) What do you know about the scope of a variable? Differentiate between global and 09
local variables with examples.

6(a) Explain the different type of loops in C with syntax and example. 10

6(b) How array and string data can be used as argument of a function? Give necessary 10
examples.

6(c) Write the output of the following segment 05

```
int i=10;
main( ){
        int i=20, n;
        for (n=0; n<= i ; i++)
        i+ =1;
        printf (" % d ", i);}
```

6(d) Write a program which will print the digits of a number in reverse order. 10

7(a) How can you initialize a 2-D array? Explain with example. 08

7(b) Distinguish between do-while & while loop. 07

7(c) Briefly describe call by value & call by reference with particular examples. 10

7(d) Write a C program to find the sum of 2 matrics of order 4 by 3 using multidimensional 10
arrays.

8(a) What is recursion? Write a program which will calculate the factorial of a number 10
recursively.

8(b) Write the techniques of passing structure variable as arguments. Write the structure of 10
nesting unions.

8(c) Write a program which will calculate the number of words from a text written in a file. 15

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Textile Engineering
B. Sc. Engineering 2nd Year Backlog Examination, 2018
EE 2221
(Instrumentation and Electrical 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.

SECTION-A

1(a) Define error and true value of an instrumentation system. Derive the relative limiting error   10
formula for multiple and difference of two components.

1(b) What is PMMC? Derive the general torque equation of a moving iron instrument and   18
show that the deflection of moving iron instrument is proportional to square of the rms
value of the operating current.

1(c) A PMMC instrument has a coil of dimension 15mm×25mm. The flux density in the air   07
gap is 3×10^{-3}wb/m^2 and the spring constant is 0.24×10^{-6} Nm/rad. Determine the number
of turns required to produce an angular deflection of 90° when a current of 5mA is
flowing through the coil.

2(a) Justify the following statement-   06
"All sensors are transducer but all transducers are not sensor".

2(b) Mention the applications of strain-gauge, and capacitive transducer.   10

2(c) Differentiate wheatstone bridge and AC bridge. Show that the maximum bridge   11
sensitivity is 25% that of S$_v$ and E. Where , the symbols have their usual meanings.

2(d) On a 230 V supply a fault having a resistance of 20 Ω develops between the unearthed   08
ends of the winding of an electric heater and the frame as shown in the figure 2(d). If the
resistance of the substation electrode is 5Ω that of human body 1400 Ω and the safe
maximum resistance is 25 mA, what is the safe maximum resistance of the consumer's
earth electrode?

20 Ω

230 V   **Heater**   **25mA**
                              1400Ω **R**

5Ω

a   **b**
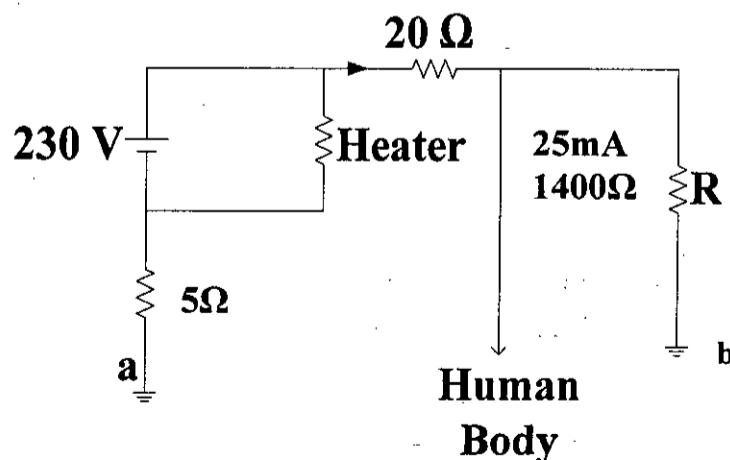   **Human**
                    Body

Fig. 2(d)

3(a) Write down the operating principles of MPPT in solar photovoltaic transducer. Also   08

mention three common strategies that are used in MPPT devices.

3(b) What is meant by piezoelectric effect? Design and describe a system that can perform ~~~~ analog data acquisition.

3(c) What are the methods for the measurement of low, medium, and high resistance? 15 Describe the equation for unknown capacitance of a low voltage schering bridge.

4(a) Describe the operation of LVDT with proper diagram   10

4(b) Write short notes on: i) Smoke detector , ii) Thermocouple, and iii) Thermistor   15

4(c) Explain data acquisition and PC based process control system with proper diagram.   10

SECTION-B

5(a) Why control system is necessary in the field of Textile Engineering? Draw and explain 10 the block diagram of open loop and closed loop system.

5(b) Define controller. Differentiate PI, PD and PID controller with their advantages and 12 disadvantages.

5(c) For the following electrical circuit in fig.5(c), determine the $TF = \frac{V_o}{V_{in}}$. Also justify its 13 stability.
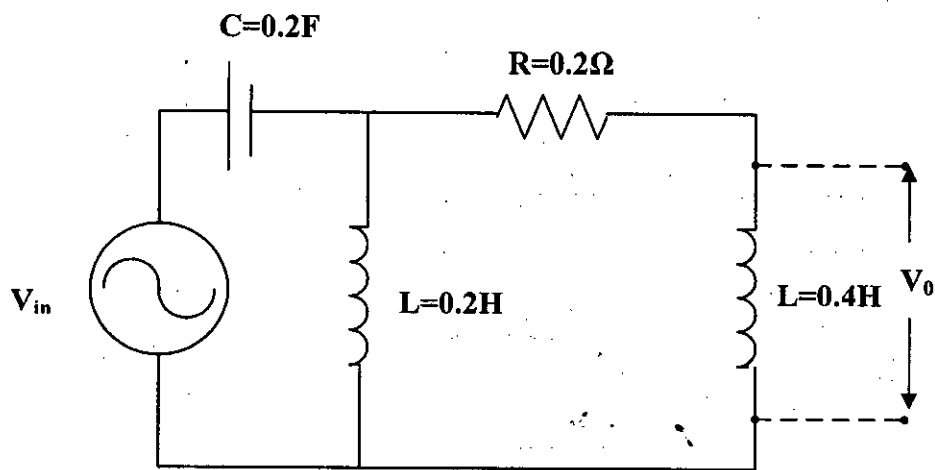

Fig.5(c)

6(a) Reduce the following block diagram of fig. 6(a) to a single transfer function block.   11
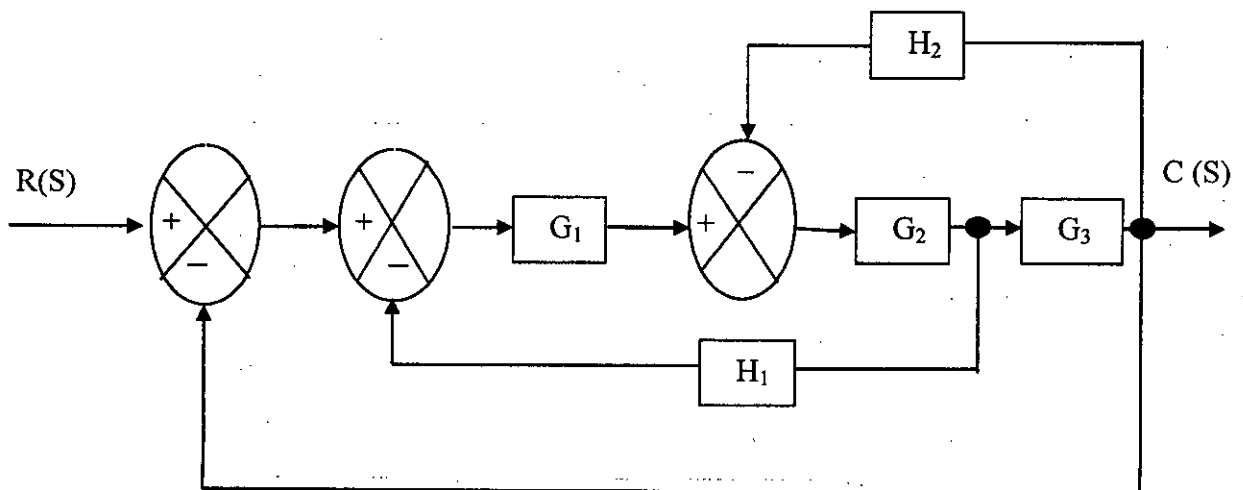

Fig.6(a)

6(b)   Characteristic equation of a system is given by   1:

$$Q(S) = S^4 + 2S^3 + 11S^2 + 18S + 18$$

Is the system is stable or unstable? Find the number of roots in LHP, RHP and imaginary axis.

6(c)   What is SFG? For the SFG as shown in Fig.6(c), find the overall transmittance of the   1:
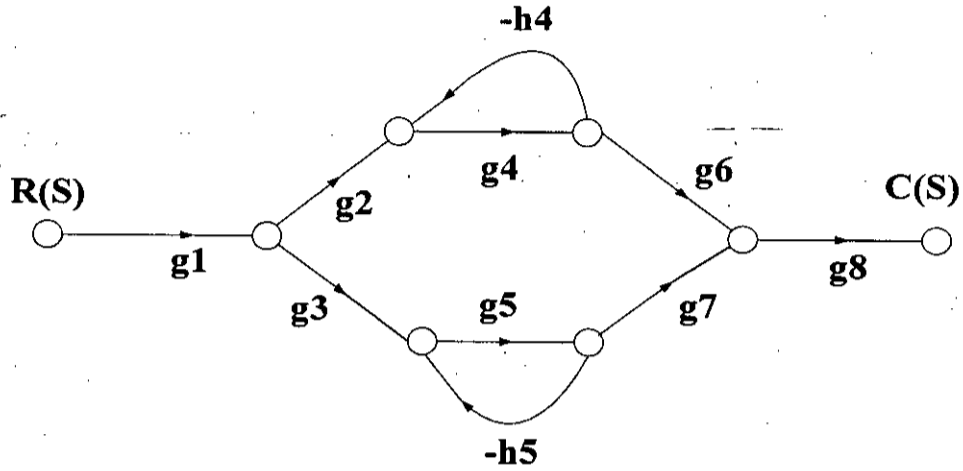system.

Fig.6(c)

7(a)   Show that transient response of a system is given by $C_{tr}=Ae^{\sigma t}\sin(\omega_d t+\phi)$, when all roots   13
are complex.

7(b)   Show that , for quadratic characteristic equation,   12
Damping coefficient, $\sigma = -\zeta \omega_n$ and

Damped natural frequency , $\omega_d = \omega_n\sqrt{1-\zeta^2}$

The symbols have their usual meanings.

7(c)   Design the value of gain K for the feedback system in the figure 7(c), so that the system   10
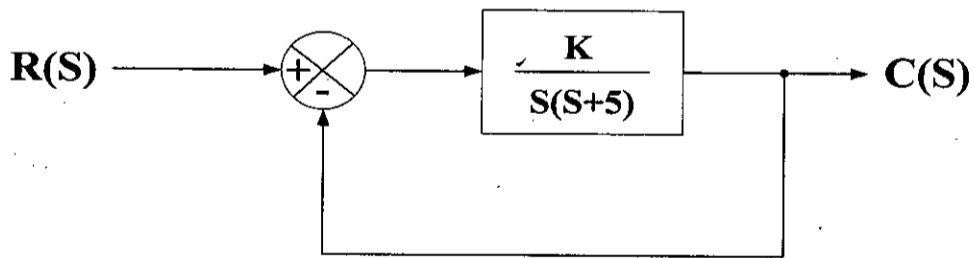will response with a 5% overshoot.

Fig.7(c)

8(a)   Find the damping ratio, undamped natural frequency, damped natural frequency, damping   12
co-efficient, and setting time of the system whose closed loop transfer function is

$$\frac{10}{4s^2 +13s + 20}.$$

8(b)   What is PLC? Draw the block diagram of typical PLC.   10

8(c)   Define microprocessor and microcontroller. Draw the bus architecture of 8085   13
microprocessor.

--) END (---