

Bharatiya Vidya Bhavan's SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

Re - Examination (SemI) for F.Y.BTech (Civil/Mechanical/Electrical)
2017-18

08/06/2018

Duration: 3

Total marks: 75

Hrs

Class/Sem: F.Y.BTech (C/M/E) Sem-I

Subject : APPLIED PHYSICS-I
Course code: BT105

- Question no 1 is compulsory!
- Attempt any FIVE questions out of remaining SIX questions
- **Answers to all sub questions should be grouped together.**
- Draw diagrams wherever necessary.
- Assume suitable data if necessary and state the assumptions clearly!
- Figures to the right indicate full marks, Course Outcome number(CO) and Module number (MN) respectively

Good luck!

Q. No.	Max Mark	CO	MN
1	25		
(a)		4	V
(b)		2	III
(c)		1	I
(d)		3	IV
(e)		1	II
(f)		4	V
(g)		2	III

Answer any five

- 2
- (a) Explain the formation of Newton's rings and show that the radii of the bright rings are proportional to the root of odd natural numbers. 6 1 I
- (b) A 0.1 W He-Ne laser with an aperture of 5mm emits light. Calculate the areal spread and intensity of the image when the beam is focused with a lens having focal length 100mm. 4 2 III
- 3
- (a) Write a note on Nd:YAG laser by giving details about its construction and pumping scheme. 6 2 III
- (b) A diffraction phenomenon is observed using a double slit illuminated with light of $\lambda=5000\text{\AA}$. The slit width is 0.02mm and spacing between the slits is 0.10mm. Distance of screen from the slits is 100cm. Calculate: Distance between any two consecutive double slit dark fringes 4 1 II
- 4
- (a) Explain magnetostriction oscillator with a neat labeled diagram 6 3 IV
- (b) A thin film, with a thickness of 272.7nm and with air on both sides is illuminated with a beam of white light normally. In the light reflected by the film, light with a wavelength of 600 nm undergoes fully constructive interference. At what wavelength does the reflected light undergo fully destructive interference? 4 1 I
- 5
- (a) Explain the concept of wave group and hence the concept of group velocity. Prove Heisenberg's uncertainty principle of position and momentum using this concept. 6 4 V
- (b) An ultrasonic beam of frequency 70 kHz is sent down to the sea bed. The velocity of ultrasonic waves in sea is 1400 m/s. If time required for the wave to be received is 0.65 s, calculate depth of sea and wavelength of ultrasonic waves. 4 3 IV
- 6
- (a) Derive an expression for intensity when Fraunhofer diffraction takes place through a single slit. 6 1 II
- (b) Prove that electron cannot be a nucleon using Heisenberg's uncertainty principle. 4 4 V
- 7
- (a) Explain the construction and reconstruction methods of Holography using LASERS 6 2 III
- (b) The position and momentum of a 1keV electron are simultaneously measured, if the position is located within 1\AA , what is the percentage of uncertainty in momentum? 4 4 V



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End-Sem-I Re-Exam

June 2018



Max. Marks:

Class: F.Y B.TECH C/M/E

Name of the Course:

Instructions:

75marks

Semester: I

Applied Chemistry –I

Duration: 180 Min

Program:

Course Code : BT-106

1 Question 3 and 5 are compulsory

2 Attempt any 2 from Q1 Q2 Q4

3 $\text{CaCl}_2 = 111$ $\text{Mg}(\text{HCO}_3)_2 = 146$ $\text{CaSO}_4 = 136$ $\text{CaCO}_3 = 100$

Question No	Question	Max. Marks	Course Outcome Number	Mod . No.
Q1				
a	Explain EDTA method for detection of hardness	5	1	1
b	Write short note on reverse osmosis	5	1	2
c	Explain cation ion exchange and anion exchange method with its advantageous	10	1	1
Q2				
a	Write short note on acid value of lubricant with significance	5	2	3
b	Define lubricant. Explain Viscosity and viscosity index with its significance	5	2	3
c	Explain chemical testing if Lubricant	10	2	3
Q3				
a	Define polymer? Write short note on liquid crystal polymer	5	3	4
b	What is plain carbon steel? write limitation of plain carbon steel	5	3	5
c	Explain different types of conducting polymer	10	3	5
Q4				

a	Explain COD method for determination of organic matter in water	5	1	2
b	Describe Zeolite method for removal of metal cation ions from hard water with advantages	5	1	1
c	Explain testing of Lubricant. write physical testing of lubricant with its significance	10	3	3
Q5				
a	Convert the unit 20PPM in to $^{\circ}\text{Fr}$, $^{\circ}\text{Cl}$, mg/L 10 $^{\circ}\text{Cl}$ in to $^{\circ}\text{Fr}$, ppm, mg/L	5	1	1
b	Calculate the temporary , permanent and total hardness for water sample contain $\text{Mg}(\text{HCO}_3)_2=30\text{mg/L}$, $\text{CaSO}_4= 30\text{mg/L}$ $\text{CaCl}_2= 30 \text{mg/L}$	5	1	1
c	100 mL standard hard water containing 1.0 mg/mL CaCO_3 consumed 50 mL of EDTA. 100 mL of unknown hard water sample consumed 25 ml of EDTA using EBT as indicator. After boiling, filtration of same hard water(100 mL) consumed 10 mL of EDTA using EBT as indicator Calculate total, permanent and temporary hardness of water	5	1	1



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KT-EXAM

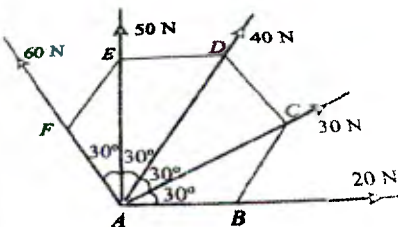


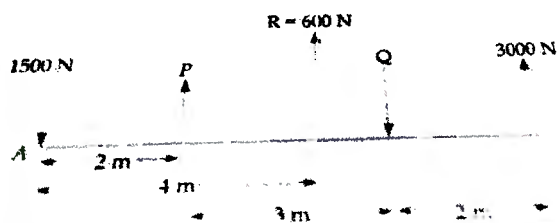
Max. Marks: 100
Duration: 3 hrs
Class: FY B.Tech (C/M/E)
Name of the course: Engineering Mechanics-I

Q.P. Code: BT 104
Course Code : BT 104
Sem- I

Instructions:

- 1) Attempt any FIVE questions out of SEVEN Questions.
- 2) Answers to all sub questions should be grouped together.
- 3) Assume suitable data necessary and state clearly.

Question No		Maximum Marks	Course Outcome Number	Module Number
1a)	<p>The forces 20N,30N,40N,50N and 60N are acting at one of the angular points of a regular hexagon towards the other five angular points,taken in order as shown in fig.Find magnitude and resultant of resultant force</p> 	12	1,2	2
1b)	<p>The following forces act at a point. Find the magnitude and direction of the resultant force.</p> <ol style="list-style-type: none">a) 20N inclined at 30° towards North of Eastb) 25N towards Northc) 30N towards North Westd) 35N inclined at 40° towards South of West	08	1,2	1
2a)	<p>For the system of parallel forces depicted in following figure,the resultant has a magnitude of 600 N vertically upwards and it acts through a point which is 4 m to the right of force 1500N.Workout values of forces P and Q.</p>	06	1,2	2

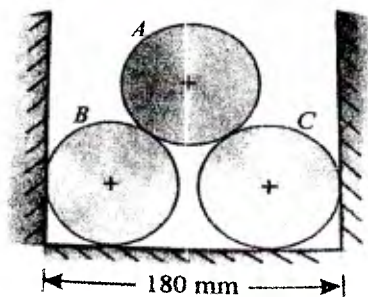


12

1,2

3

Three cylinders weighing 250N each and of 90mm diameter are placed in a channel of 180 mm width as shown in figure. Determine pressure exerted by i) the cylinder A on B at the point of contact ii) cylinder B on base



2b)

12

1,2

4

A vertical pole is guyed by three cables PA,PB,PC tied at a common point P(0,10,0)above the ground. The base points of the cable are A(-3,0,-4),B(1,-1.5),C(5,0,1).If the tensile forces in the cables are adjusted to be 25,28,20 kN ,make calculations for the resultant force on the pole P.

3 a)

08

1,2

4

A force of 100N is directed along the line drawn from point A (5,2,3) to the point B(2,-5,8) .Determine the moment of this force about a point C(4,3,1).The distances are in metres.

3 b)

10

1,2

6

Find the force required to move a load of 300N up a rough plane,the force being applied parallel to the plane The inclination of the plane is such that when the same load is kept on a perfectly smooth plane inclined at the same angle,a force of 60N applied at an inclination of 30° to the plane ,keeps the same load in equilibrium. Assume μ between rough plane and load =0.3

4 a)

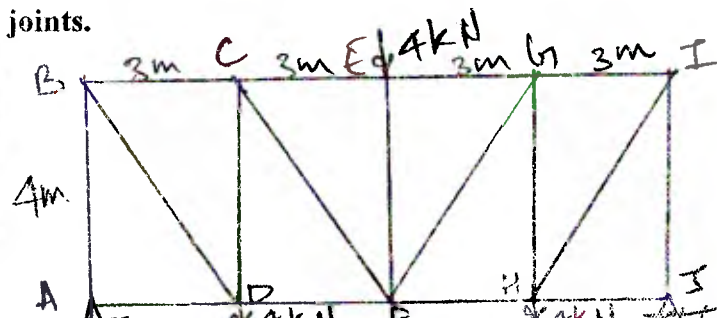
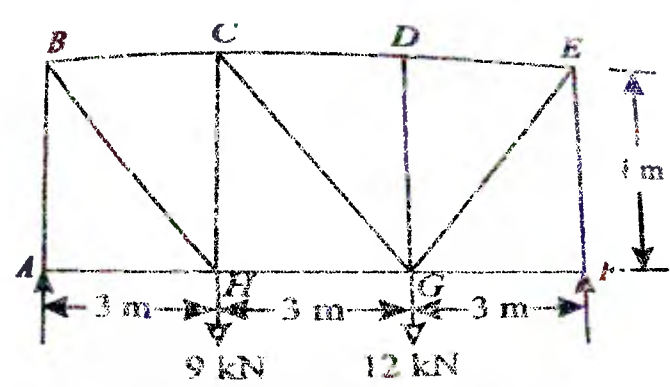
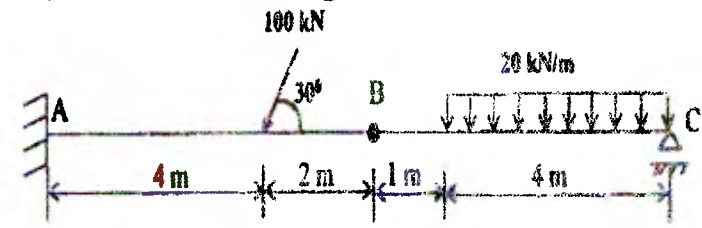
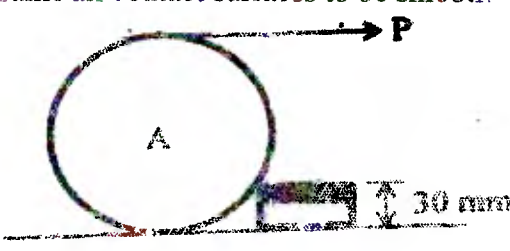
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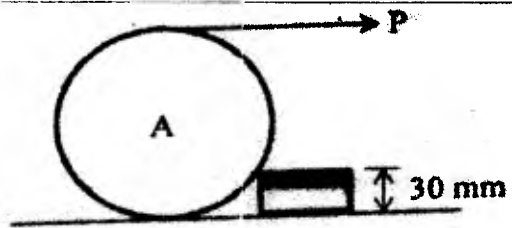
1,2

6

A uniform ladder of weight 450N and length 6m is placed against a vertical wall in a position where its inclination to the vertical is 30° .A man weighing 900N climbs the ladder .At what position will he induce slipping ?Take coefficient of friction $\mu =0.5$ at both the contact surfaces of the ladder.

4b)

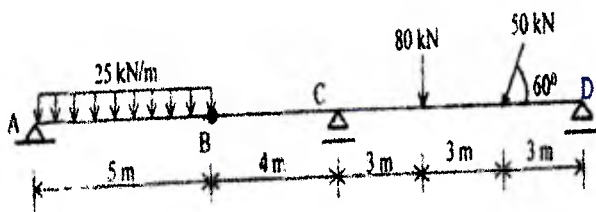
a)	<p>Find forces in each member of the truss using method of joints.</p> 	12	1,2	5
b)	<p>A 9m span truss is loaded as shown in figure. Find the forces in the members BC, CH and HG of the truss using method of sections only.</p> 	08	1,2	5
a)	<p>Find the support reactions using equations of equilibrium only. B is an internal hinge.</p> 	10	1,2	3
b)	<p>A cylinder weighing 500N and radius 100mm is to be lifted over a block of height 30mm with the help of horizontal force P as shown in the figure below. Find the value of force P required to just lift the cylinder over the block. Assume all contact surfaces to be smooth</p> 	10	1,2	2



7a) State and explain Varignon's theorem. 05 1,2 2

7b) What are the assumptions made in analysis of truss. 05 1,2 5

7c) Using **virtual work theorem only** find support reactions of the beam. **Internal hinge at B.** 10 1,2,3 7



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Re-Examination

June-May 2018

FY.B.Tech (Civil/Mechanical/Electrical)

Duration : 3 hours

Course code : 107

Name of the Course : Communication Skills

Maximum Marks : 100

Semester : I

- Instructions: 1) Question 1 is compulsory
2) Attempt any 4 questions out of the remaining six.
3) Figure to right indicates full marks
4) Answers to all sub-questions should be attempted and grouped together.

Question No.		Max Marks	CO	Module No.
Q1				
A	Explain in detail the different types of semantic barriers in communication. Give suitable examples.	06	01	02
B	Write short notes on any 2: 1. Horizontal communication 2. Kinds of listening 3. Commercial jargon in a business letter	06	02 05 02	03 05 06
C	Define the following terms: i. Warning ii Machine iii Voltmeter	03	02	04
D	State whether true or false i. The process of putting ideas into words and symbols is known as decoding. ii. Listening improves with age. iii. Para-language is like language but not language, therefore we cannot fully rely on it. iv. To make an oral communication effective it is best to avoid hackneyed phrases and clichés. v. Formal channels are slow and rigid. Therefore, they are time consuming.	05	01 05 03 05 02	02 05 02 05 03
Q2				
A	As a librarian of your college, draft a letter of enquiry to a publisher for their latest catalogue/ pricelists and details of discount offered to the libraries and any other concession/ favourable terms you can get (use complete block form).	12	02	06

	Invent necessary details.			
B	Identify the barriers: i. Student unable to understand clear instructions in Hindi. ii. A wedding hall/auditorium near a college building. iii. A Nigerian not able to converse with Indian. iv. A student unable to answer question paper even though well-prepared.	04	01	02
C	Explain the importance of gestures and eye-contact in non-verbal communication.	04	03	02
Q3				
A	You are organizing a conference on Soft Skills Development next month. Place an order for 100 conference kits, Souvenirs, with Surabhi exports Pvt. Ltd, Jaipur (use semi block form).	12	02	06
B	Why does an organization need multiple channels of communication? Describe some of the communication channels that an organization can use.	06	02	03
C	Explain the following terms in a sentence or two: i. Haptics ii. Chronemics	02	03	02
Q4				
A	Describe an electric bulb under the heading – definition, components and working. Draw a neat and labelled diagram with pencil.	10	02	04
B	Explain the process of electrolysis along with warning, caution, precaution and note at appropriate places.	06	02	04
C	Fill in the necessary details in the following table: Object Class/Category Use i. Micrometer ii Calculator iii Oven iv Jack plane	04	02	04
Q5				
A	Mention the steps for writing an Enquiry letter and reply to an enquiry.	08	02	06
B	What are the ways in which we can inculcate positive attitude?	06	04	07
C	“A speaker can face a lot of barriers while speaking in front of a large crowd.” Give reasons for this statement.	06	05	05
Q6				
A	As the purchase manager of Satyam Computers, 9 Naidu Road, Hyderabad 500007, you had ordered two dozen personal computers from Hindustan Computers Limited, 140 Mg Road, Bangalore – 500001. When the consignment arrived, you found some pieces in damaged condition. Write a complaint letter to the sales manager of the company asking for repair, replacement, or compensation. (Use modified block form).	12	02	06
B	Distinguish between:	06		

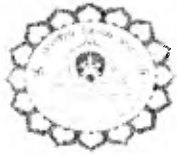
	<ol style="list-style-type: none"> 1. Upward and downward communication 2. Verbal and non-verbal communication 3. Medium and channel in communication 		02 03 01	03 02 02
C	Explain You- Attitude in business letter.	02	02	06
Q7				
A	<p>Read the passage carefully and answer the questions given below:</p> <p>One of the greatest advances in modern technology has been the invention of computers. They are widely used in industries and in Universities. Now, there is hardly any sphere in human life where computers have not been used in service of man. We are heading fast on the close of this present century towards a situation where a computer will be as much a part of man's daily life as a telephone or a calculator.</p> <p>Computers are capable of doing extremely complicated work in all branches of learning. They can solve the most complex mathematical problems or put thousands of unrelated facts in order. These machines can be put to varied uses. For instance, they can provide information on the best way to prevent traffic, or they can count the number of times the word "and" has been used in the Bible. Because they work accurately and at high speed, they save the research workers hard work. This whole process by which machines can be used to work for us has been called "automation." In the future, automation may enable human beings for more leisure than they do today. The coming of automation is bound to have important social consequences. Some years ago, an expert on automation, Sir Leon Bagrit, pointed out that it was a mistake to believe that these machines could 'think.' There was no possibility that human beings will be "controlled by machines." Though computers are capable of learning from their mistakes and improving on their performance, they need detailed instructions form human beings to operate. They can never, as it were, lead independent lives or "rule the world" by making decisions of their own.</p> <p>Sir Leon said that in future, computers would be developed which would be small enough to carry in the pocket. Ordinary people would then be able to use them to obtain valuable information. Computers would be plugged into a national network and be used like radios. For instance, people going on holidays could be informed about weather conditions. Car drivers can be given alternative</p>	12	05	01

routes when there are traffic jams. It will also be possible to make tiny translating machines. This will enable people who do not share a common language to talk to each other without any difficulty or to read foreign publications. It is impossible to assess the importance of a machine of this sort. Computers will also be used in ordinary public hospitals; a doctor will be able to diagnose the nature of the illness with the help of computers. Similarly, machines could be used to keep a check on a patient's health record. Doctors will have immediate access to great many facts which will help in their work. Book-keepers and accountants too, could be relieved of dull clerical work, for the tedious task of compiling and checking lists of figures could be done entirely by machines. Computers will also be able to tell the exact age a man is going to live, with the help of his blood sample. Computers are the most efficient servants man has ever had and there is no limit to the way they can be used to improve our lifestyle and life. (529 words)

1. List the greatest advancement is modern technology.
2. What is the prediction of Sir Leon about computers in the future?
3. Write down the main ideas in the passage and state two sub-points for the main ideas.
4. Name the areas where computers can be effectively used.
5. Provide synonyms from the passage
6. Detect 2. Monotonous
7. Write a summary of this passage in not more than 200 words.

B	<p>Classify the following into precaution, caution, warning, maintenance, description and definition:</p> <ol style="list-style-type: none"> ii. Unplug a refrigerator before cleaning it. iii. Twice a week, wipe the blades of a ceiling fan with a damp cloth. iv. An oven is a kitchen appliance used for baking, cooking, roasting operations with the help of dry 	05	02	04
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	<p>heat.</p> <p>v. Do not use harsh abrasive powder to clean the mixer grinder.</p> <p>vi. Keep pressurized spray can away from exposed flame.</p>			
C	<p>Fill in the blanks with the correct word from the bracket:</p> <p>7) Maya's _____ is beginning to fail. (site, sight)</p> <p>8) One should be _____ about the effects of smoking (anxious, eager)</p> <p>9) Most of my _____ is tied up at the present. (capitol, capital)</p> <p>10) I refuse to give my _____ to the plan. (ascent, assent)</p> <p>11) _____ you reach the top shelf if you stretch? (May, Can)</p> <p>12) The branch manager _____ her staff on the high quality of her work. (complimented, complemented)</p>	03	05	01



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Reexam
June 2018



Max. Marks:100

Class: FE(C/M/E)

Semester: I

Duration: 3 hours

Program:BTech

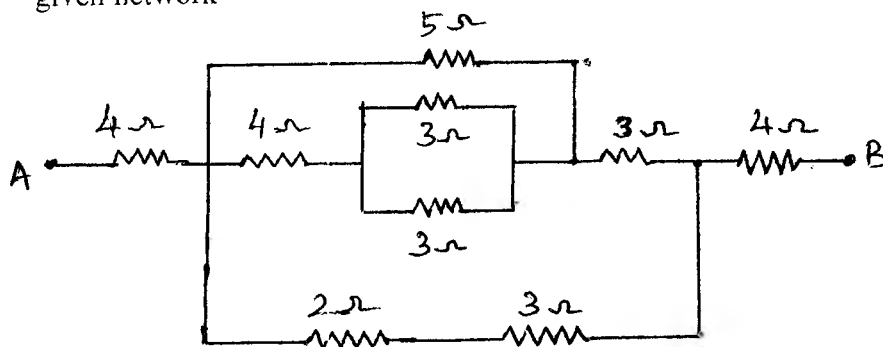
Name of the Course: **Basic Electrical and Electronics engg I**

Course Code :BT102

Instructions:

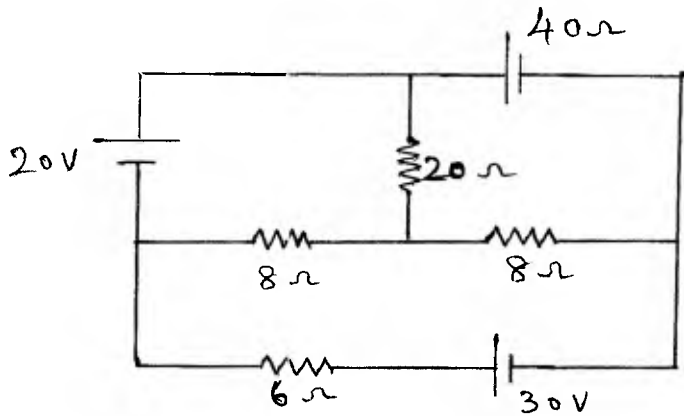
- Question number 1 is compulsory.
- Answer any 4 of the remaining 6 questions
- Answers to all sub questions should be grouped together.
- Any assumptions must be specified clearly..

QN	Mark	CO	Module No.
0.	S		
1.a.	4	2	2
b.	4	4	5
c.	4	1	1

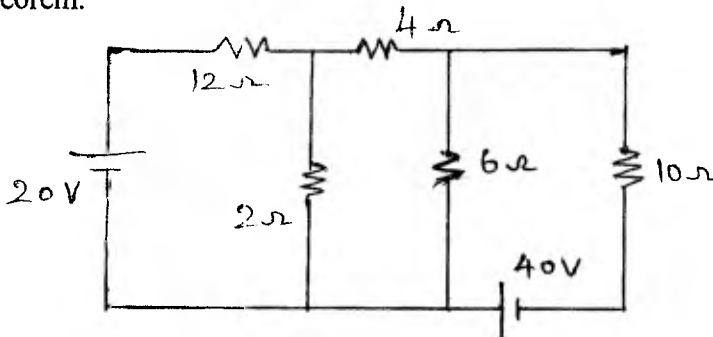


- | | | | |
|----|---|-----|---|
| d. | 4 | 3 | 4 |
| e. | 4 | 1,3 | 3 |
- d. Draw and explain the power triangle for a 3phase lagging load.
- e. Find the rms value of current flowing through a $314\mu\text{F}$ capacitor when connected to a 230V,50Hz ac supply.

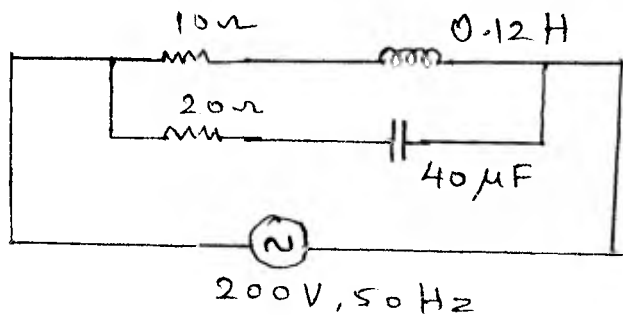
- 2.a. Explain two wattmeter method of power measurement in three phase circuit with neat phasor diagrams. 12 3,4 4,7
- b. Explain the working principle of a transformer .Draw the phasor diagram of a single phase transformer having lagging power factor load. 8 4 5
- 3a. Prove that for a three phase balanced star connected load ,line voltage is $\sqrt{3}$ times the phase voltage. 10 3 4
- b. Find the current through the 20 ohm resistor using Super position theorem . 10 2 2



- 4a. Find the current through the 10 Ω resistor by using Norton's theorem. 10 2 2



- b. Explain any two types single phase induction motors with phasor diagram. 10 4 6
- 5a. For the circuit shown find supply current, current in each branch and total power factor. 10 3 3



- b. Obtain the equivalent circuit of a 5KVA, 1000V/200V, 50Hz single phase transformer from the following test data.
 OC test: 1000V 0.24A 90W (on hv side)
 SC test : 50V 5A 110W (on hv side)
 Obtain the equivalent circuit parameters and draw the equivalent circuit of the transformer as referred to the low voltage side.

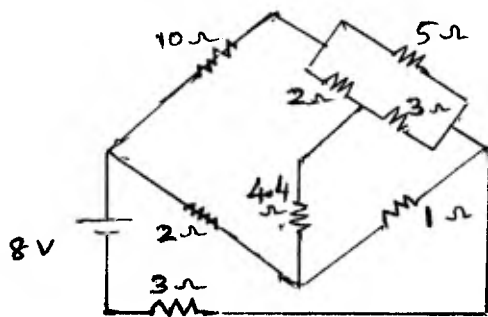
10 4 5

- 6a. The voltage and current in a circuit are given by $V=12\angle 30^\circ\text{V}$ and $I=3\angle 60^\circ\text{A}$. Frequency of the supply is 50Hz.
 Find, i) Equation for current and voltage in both rectangular and standard form,
 ii) impedance, reactance and resistance.
 iii) phase difference, power factor and power loss.
 iv) draw the circuit diagram considering a simple series circuit of two elements indicating their values.

10 3 3

- b. Find the current delivered by the source

10 1,3 1

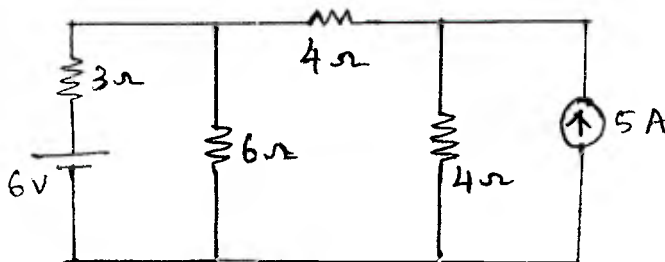


- 7a. Explain the construction and working of a dc motor

10 4 6

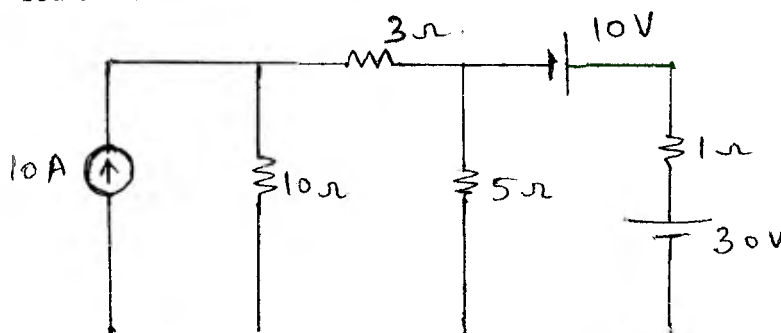
- b. Find the current through the 4 Ω resistance using nodal analysis.

5 1,3 1



- c. For the given circuit find the current through the 10 Ω resistor by source transformation

5 1,3 1





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ATKT Exam
June 2018

Max. Marks: 100

Class: F.Y.B.Tech

Name of the Course: Engineering Mathematics - I

Semester: I

Duration: 3 hours

Program: C/M/E

Course Code : **BT101**

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.

Q		Marks	CO	Module
Q.1 (a)	Find n^{th} derivative of $y = \frac{2x-3}{(x-1)(x+2)^2}$	6	1	1
(b)	Evaluate $\lim_{x \rightarrow 0} \left[\frac{1}{\sin^2 x} - \frac{1}{x^2} \right]$	6	1	2
(c)	If $\alpha, \alpha^2, \alpha^3, \alpha^4$ are the roots of $x^5 - 1 = 0$, show that $(1-\alpha)(1-\alpha^2)(1-\alpha^3)(1-\alpha^4) = 5$	8	3	6
Q.2 (a)	If $u = (1-2xy+y^2)^{-1/2}$, Prove that $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = y^2 u^3$	6	2	3
(b)	Prove that $\sin^5 \theta = \frac{1}{16} [\sin 5\theta - 5 \sin 3\theta + 10 \sin \theta]$	6	3	5
(c)	Prove that $\sin^{-1} x = x + \frac{x^3}{6} + \frac{3}{40} x^5 + \dots$	8	1	2
Q.3 (a)	If $y = \log(x + \sqrt{1+x^2})$, Prove that $(1+x^2)y_{n+2} + (2n+1)xy_{n+1} + n^2 y_n = 0$	6	1	1
(b)	If $x^2 = au + bv$ and $y^2 = au - bv$ show that $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 2 \left(u \frac{\partial z}{\partial u} + v \frac{\partial z}{\partial v} \right)$	6	2	3
(c)	Prove that $\log \left(\frac{1}{1-e^{i\theta}} \right) = \log \left(\frac{1}{2} \operatorname{cosec} \left(\frac{\theta}{2} \right) \right) + i \left(\frac{\pi}{2} - \frac{\theta}{2} \right)$	8	3	6

Q.4 (a)	Expand $e^{x \sin x}$ in positive powers of x (upto x^6)	6	1	2
(b)	$\cos^{-1}(ix) = \frac{\pi}{2} - i \log(x + \sqrt{x^2 + 1})$	6	3	5
(c)	Find the constants a, b, c if the normal to the surface $ax^2 + yz + bxz^3 = c$ at $(1, 2, 1)$ is parallel to the normal to the surface $y^2 + xz = 61$ at $(10, 1, 6)$.	8	4	7
Q.5 (a)	Evaluate $\lim_{x \rightarrow 0} \frac{\tan x \cdot \tan^{-1} x - x^2}{x^6}$	6	1	2
(b)	If $y = \sin px + \cos px$, Prove that $y_n = p^n [1 + (-1)^n \sin 2px]^{1/2}$	6	1	7
(c)	If $\sinh(\theta + i\phi) = e^{i\alpha}$, Prove that $\sinh^4 \theta = \cos^2 \alpha = \cos^4 \phi$	8	3	5
6(a)	Find constants a and b such that $\lim_{x \rightarrow 0} \frac{ae^x - b \cos x + ce^{-x}}{x \sin x} = \frac{5}{3}$	6	1	2
(b)	Find directional derivative of $\phi = xy^2 + yz^3$ at $(1, -1, 1)$ along the direction of normal to the surface $x^2 + y^2 + z^2 = 9$ at $(1, 2, 2)$	6	4	7
(c)	If $u = \frac{x^2 y^2 z^2}{x^2 + y^2 + z^2} + \cos\left(\frac{xy + yz}{x^2 + y^2 + z^2}\right)$, Prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} = 4 \left(\frac{x^2 y^2 z^2}{x^2 + y^2 + z^2}\right)$	8	3	4
7(a)	If $x + iy = 2 \cosh\left(\alpha + \frac{i\pi}{4}\right)$, prove that $x^2 - y^2 = 2$	6	4	5
(b)	If $u = f(r)$, $r^2 = x^2 + y^2 + z^2$, Prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = f''(r) + \frac{2}{r} f'(r)$	6	3	3
(c)	Verify Euler's Theorem for $u = x^2 \tan^{-1} \frac{y}{x} - y^2 \tan^{-1} \frac{x}{y}$	8	3	4