Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

KT

JUNE 2016

Max. Marks:100
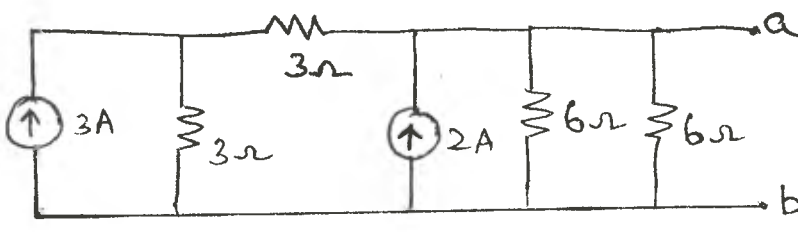
Class: FE(C/M/E)

Name of the Course: **BEE I**

Semester: I

Duration: 3 hours

Program:BTech

Course Code :BT102

Instructions:

* Attempt any FIVE question out of SEVEN questions
* Answers to all sub questions should be grouped together
* Figures to the right indicates full marks
* Any assumptions must be specified clearly.

Master file.

QNo.		Marks	Course outcomes	Module No.
1.a.	An alternating voltage is given by v=141.4sin314t.Find i)frequency, ii)rms value, iii)average value, iv)instantaneous value of voltage when t=3ms	5	3	3
b.	State and explain maximum power transfer theorem.	5	2	2
c.	Using source transformation convert the circuit given below to a single current source in parallel with a single resistance. 	5	1	1
d.	What is the voltage, current and power relation in a balanced star and delta connected load?	5	3	4

2.a.	Explain two wattmeter method of power measurement in three phase circuit with neat phasor diagrams.	12	4	4,7
b.	Using mesh analysis find the unknown emf V in the network which causes mesh current I_1 to be zero.	8	1	1
3a.	Explain the working principle of a transformer .Draw the phasor diagram of a single phase transformer having unity power factor load.	8	4	5
b.	In a series parallel circuit two parallel branches A and B are in series with C. The impedances are $Z_A =(4+j3)\Omega$, $Z_B=(10-j7)\Omega$, $Z_C=(6+j5)\Omega$..If the voltage applied across the circuit is 200V at 59Hz Calculate the values of I_A, I_B ,I_c and total power factor of the circuit.	12	3	3
4	Find the current through the 6 ohm resistor using Super position theorem and verify the same using Thevenin's theorem	20	2	2

		10	3	3
5a	An inductive coil draws 10A current and consumes 1KW power from a 200V,50Hz ac supply.Determine i) impedence in Cartesian and polar forms, ii)power factor,iii) reactive and apparent power.			
b.	Prove that for a three phase balanced delta connected load ,line current is √3 times the phase current.	10	3	4
6a.	Explain any two types single phase induction motors with phasor diagram.	10	4	6
b.	Obtain the equivalent circuit of a 200/400V ,50Hz single phase transformer from the following test data. OC test: 200V 0.7A 70W (on lv side) SC test : 15V 10A 85W (on hv side)	10	4	5
7a.	Explain the working of a DC motor.	5	4	6
b.	Explain the losses in transformer?	5	4	5
c.	Calculate Rxy for the circuit given	10	1	1
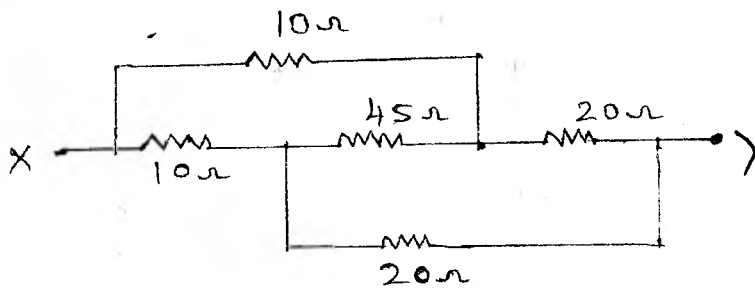
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RE Examination
JUNE: 2016

Max. Marks: 100   Duration: 3 Hours

Class: C/M/E   Semester: I   Program: F.Y.B.Tech

Name of the Course: Communication Skills   **Course Code : BT107**

Instructions: *Master file.*

1. **Question No 1 is compulsory.**
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. **Answers to all the sub questions should be attempted and grouped together.**

Q1. A) Explain the components in the process of communication with the help of a diagram and an example. (10)
     B) Write the Merits & Demerits of Oral Communication? (05)
     C) Identify the sender, receiver, medium, channel, message and feedback in the following situation. (05)
         A student reads the notice on the Notice Board regarding the college festival. He immediately goes to the cultural secretary and gives his name for volunteers.

Q2. A) Define Non-Verbal communication and its importance. What role does it play in the process of face-to-face communication? (10)
     B) Identify and explain the barrier arising in the following situation: - (05)
         Case Study: Manager Prabhu Babu believed that managers can only communicate with their clerks by using a "Memo" paper. The clerks were used to receiving memos for coming late, for not doing their work properly, for taking leaves without permission. Information given by Prabhu Babu on memo paper was never properly received by the clerks because of the unpleasant association that a memo had in their minds. Typist Rima was not happy to receive a Memo of Congratulations from Prabhu Babu when she got a promotion.
     C) Fill in the blanks: (05)
     i. The cycle of communication is incomplete without _____ from the receiver.
     ii. There are _____ basic components of communication.
     iii. _____ is the study of relationships between signs and symbols and what they represent to their interpreter.
     iv. Communication is a _____ process.
     v. _____ is known as the vehicle which carries the message to the receiver.

Q3. A) You have received wooden furniture for your newly renovated office. However, the delivery has been delayed due to which you had to postpone the opening of your office. The furniture is also damaged and scratched at various places. Draft a suitable complaint cum claim letter asking for appropriate compensation. (Use Complete Block Form). (12)
     B) What is Grapevine communication? Explain the different types with diagram. (08)

Q4. A) Summarize the passage within 60 words: (06)
         A blind reverence for the past is bad and so also is contempt for it, for no future can be founded on either of

these. The present and the future inevitably grow out of the past and bear its stamp, and to forget this is to build without foundations and to cut off the roots of national growth. It is to ignore one of the most powerful forces that influence people. Nationalism is essentially the memory of the past achievements, traditions, and experiences; and nationalism is stronger today than it has ever been. Many people thought that nationalism had its day and must inevitably give place to ever-growing international tendencies of the modern world. Trade and commerce, easy communications and rapid transport, the ratio and cinema, all helped to create an international atmosphere and to produce the delusion that nationalism was doomed. Yet whenever a crisis has arisen, nationalism has emerged again and dominated the scene, and people have sought comfort and strength in their old tradition.

B) Give the meanings of the following words: (02)
reverence --------- contempt ----------- inevitably ----------- delusion ---------
(hate, a false belief, great respect, decidedly)

C) Give One Word Substitutes for the following: (02)
1) One abstains from alcoholic drinks T ----------- [11]
2) A note to help memory M ----------- [10]
3) Writing that is difficult to understand I----------- [9]
4) An official number of population C--------[6]

D) Choose the words from below that appropriately describe the given phrases: (05)
1) A word of one syllable
2) Cut into two part
3) Animal with two feet
4) A treatise on one subject
5) Government in the hands of one ruler
(Biped, monotone, monologue, monarchy, bisect)

E) Give antonyms for the given words :- (05)
past, forget, strength, tradition, doomed

Q5. You are a wholesaler located at Ludhiana. You have receieved an enquiry regarding woolen garments from a department store located at Indore. Draft an attractive reply giving details about Quality, sizes, type variety and pricelist in the form of a quotation. Also offer attractive incentives to make sure you get the order.(Invent necessary details). Use Modified Block form.-12-

Q6. A) Explain in brief the five principles of Business Correspondence for writing effective letters. (10)
B) Describe *any one* of the following objects with a definition, diagram, description of components,

and working.   **-10-**

i. Mobile phone   ii. micrometer

Q7. A) Write in short the guidelines for effective Listening skills. (10)
B) . Write a set of instructions to use an Overhead Projector. Insert warning, caution, precaution at appropriate places.
(10)

ALL THE BEST

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Re Exam Sem I Applied Physics I

June 2016

Max. Marks: 75   **Duration:** 3 Hrs.

Class: FY (C/M/E)   **Semester:** I   **Program:** C/M/E

Name of the Course: Applied Physics   **Course Code :** BT105

- Question No. 1 is compulsory.   *Master file.*
- Answer any four questions out of remaining six questions.
- Figures to the right indicate full marks, module number and course outcome number respectively.
- Answers to all sub questions should be grouped together.
- Assume data (if necessary) and state the assumptions clearly!
- Diagrams have to be drawn wherever necessary.

    Good luck!

Question No		Max Marks	Module No.	CO No.
Q1				
(a)	Write a short note on ruby laser.	5	4	CO1
(b)	Differentiate between STIN and GRIN fibers.	5	3	CO1
(c)	Write a note on antireflection coatings and hence derive the condition for minimum thickness for the coating.	5	1	CO1
Q2				
(a)	Derive an expression for intensity when light undergoes Fraunhofer diffraction through a single slit and hence draw the diffraction curve.	6	2	CO1
(b)	A step index fiber in air has numerical aperture of 0.16, a core refractive index 1.45 and a core diameter 60μm. Determine normalized frequency of the fiber if light of wavelength 0.9μm is transmitted.	4	3	CO1
(c)	Derive an expression for diameter of dark rings in Newton's rings setup for the reflected system.	5	1	CO1
Q3				
(a)	Derive an expression for energy values for a one dimensional box of length L using Schrodinger's equation.	6	5	CO2
(b)	Light of wavelength 633 nm is incident on a narrow single slit. The angle between the first diffraction minimum on one side of principal maximum and the first minimum on the other side is $1.2°$. What is width of the slit?	4	2	CO1

Question No		Max Marks	Module No.	CO No.
(c)	Calculate the angular spread of ruby laser due to diffraction if the beam emerges through a 3mm diameter mirror. How large would be the diameter of this beam when it is incident on a satellite 300km above earth?	5	4	CO1
Q4				
(a)	Derive an expression for path difference in reflected light when light interferes from a wedge shaped film.	6	1	CO1
(b)	An electron is confined to a box of length 1nm. Calculate minimum uncertainty in its velocity.	4	5	CO2
(c)	Draw the intensity distribution curve for b=2a for a double slit Fraunhofer diffraction.	5	2	CO1
Q5				
(a)	Explain uncertainty principle relating position and momentum. Calculate de Broglie wavelength of a proton whose kinetic energy is equal to rest mass energy of an electron. Given: $m_p = 1836 * m_e$.	6	5	CO2
(b)	Draw intensity curve for $\dfrac{\sin^2 N\gamma}{\sin^2 \gamma}$ for Number of slits N=4.	4	1	CO1
(c)	An optical fiber has refractive index of core 1.5 and cladding refractive index 1.48. Find critical angle, fractional refractive index, acceptance angle and numerical aperture assuming light ray enters into the fiber from ait.	5	3	CO1
Q6				
(a)	Write a note on absorption, spontaneous emission and stimulated emission and hence explain Einstein's coefficients.	6	4	CO1
(b)	A step index fiber in air has NA of 0.16, a core refractive index of 1.45 and a core diameter of 60cm. Determine the normalized frequency for the fiber when light at a wavelength of 0.9μm is transmitted.	4	3	CO1
(c)	An electron and a 150gm baseball are traveling at 220m/s measure to an accuracy of 0.065%. Calculate the uncertainty in position of each bodies. Compare the results and comment!	5	5	CO2
Q7				
(a)	Write a short note on losses in optical fibers.	6	3	CO1
(b)	A parallel beam of sodium light strikes a film of oil floating on water. When viewed at an angle 30° from the normal, eighth dark band is seen. Determine thickness of the film. Given, RI of oil=1.46, λ=5890A°.	4	1	CO1
(c)	The interaction of chromium ions with ruby lattice gives a wavelength spread of 0.53 nm around its wavelength. How many longitudinal cavity modes will the emission contain if length of ruby rod is 2cm and refractive index is 1.75? Also calculate coherence length of the given laser.	5	4	CO1

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End Semester Exam
May 2016

Q. P. Code:

Max. Marks: 100   Duration: 03 hr
Class: F Y B.Tech   Semester: I   Program: C/M/E
Name of the Course: Engineering Graphics I   Course Code : BT 103
Instructions:

Master file.

1.   Attempt any five questions .
2.   Draw neat diagrams
3.   Assume suitable data if necessary
4.   Use first angle method of projection only.

Question No		Maximum Marks	Course Outcome Number	Module
Q1 (a)	End P of the line PQ is in fourth quadrant, while end Q is in the second quadrant. The elevation of the line is 45 degree to XY. The distance between the end projectors is 80 mm and distance between projectors through traces is 50 mm. Draw its projections. Find its true length and true inclinations, if its HT is 40 mm in front of VP and end Q is 60 mm above HP.	10	I,II	2
Q1 (b)	Construct an Archemedian spiral of one convolution , the greatest radii is 100 mm and shortest radii is 25 mm. Draw normal and tangent to the curve.	10	I,II	1
Q2 (a)	The projections drawn from HT and VT of a straight line AB are 100 mm apart, while drawn from its end are 70 mm apart. The HT is 25 mm infront of VP , the VT is 50 mm above HP and the end A is 10 mm above HP. Draw the projections of the line and determine its true length and inclination with principal plane.	10	I,II, III	3
Q2 (b)	The major and minor axis of an ellipse are 120 mm and 80 mm . Draw an ellipse by arcs of circle method.	10	I,III	1
Q3 (a)	A rectangular plane of 30 × 50 mm is resting on one of its corner on VP. with diagonal passing through that corner inclined to HP at 30 degree and to VP at 45 degree. Draw its projections.	10	I, III	4
Q3 (b)	Construct a equilateral triangle abc of side 50 mm with ab perpendicular to xy. Abc represents the top view of triangle ABC. Points B and C are 30 mm above HP while point A is 45 mm above HP. Draw the FV and determine the true shape	10	I, III	4

	of the triangle ABC			
Q4 (a)	A square pyramid with edge of base 30 mm, axis height 50 mm has its apex in both HP and VP such that the axis is inclined at 30 degree to HP and 60 degree to VP and parallel to profile plane. Draw its projections.	10	I, III	5
Q4 (b)	A hexagonal prism of base 25 mm side and axis 45 long, is positioned with one of its base edges on HP such that, the axis is inclined at 30^0 to hp and 45^0 to VP. Draw its projections.	10	I, III	5
Q5	A cone of 60 mm diameter and 75 mm axis height rest on the ground (HP) on one of its generators so that the axis is parallel to the VP. It is cut by the section plane perpendicular to the HP, inclined at 30 degree to VP. And bisecting the axis. Draw the sectional FV , TV and the true shape of a section.	20	I , II, III, IV	6
Q6	A cylinder of base 80 mm diameter and axis 110 mm long, is resting on its base on HP. It has a circular hole of 60 mm diameter, drilled centrally through such that, the axis of the hole is perpendicular to VP and bisects the axis of the cylinder at right angle . Develop the lateral surface of the cylinder	20	I , II, III, IV	7
Q7 (a)	A pentagonal pyramid side of base 35 mm and height 70mm rests on its base on the HP with one side of base perpendicular to the VP, such that the true shape of the section in an isosceles triangle of maximum possible base and maximum height. Draw its FV, sectional TV and true shape of section.	10	I, III, IV	6
Q7 (b)	A tetrahedron PQRS of 50 mm long edges has edge PQ in the HP. The edge RS is inclined at 30 degree and 45 degree to the HP and the VP respectively. Draw its projections.	10	I, III	5

Maximum Marks: **100**

Class: **F.Y.B.Tech**   Semester: **I**

Name of the Course: **Engineering Mathematics I**

Duration: **3 hour**

Program:C/M/E

Course Code : **BT101**

Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.

Q		Marks	CO	Module
1(a)	Expand $\log(1+\sin x)$ in positive powers of x (up to x^4)	6	1	1
(b)	If $e^z = \sin(u+iv)$ and $z = x+iy$, Prove that $2e^{2x} = \cosh 2v - \cos 2u$	6	2	4
(c)	If $u = x^2 - y^2$, $v = 2xy$ and $z = f(u,v)$, Prove that $$\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 = 4\left(u^2 + v^2\right)^{1/2}\left\{\left(\frac{\partial z}{\partial u}\right)^2 + \left(\frac{\partial z}{\partial v}\right)^2\right\}$$	8	3	3
2 (a)	If $\lim\limits_{x\to 0} \dfrac{ae^x - b\cos x + ce^{-x}}{x\sin x} = 7$ find constants a, b and c.	6	1	2
(b)	If $u = \log(x^3 + y^3 - x^2 y - xy^2)$ Prove that (I) $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = 3$ (II) $x^2\dfrac{\partial^2 u}{\partial x^2} + 2xy\dfrac{\partial^2 u}{\partial x\partial y} + y^2\dfrac{\partial^2 u}{\partial y^2} = -3$	6	3	3
(c)	If $\cot(\alpha + i\beta) = x + iy$, prove that (I) $x^2 + y^2 - 2x\cot 2\alpha = 1$ (II) $x^2 + y^2 + 2y\coth 2\beta + 1 = 0$	8	2	5
3 (a)	Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at (2, 1, 2).	6	2	7

(b)	Prove that $\cos^{-1}(ix) = \dfrac{\pi}{2} - i\log(x + \sqrt{x^2 + 1})$	6	2	6
(c)	Find the Directional Derivative of $x^2 y^3 z$ at $(3, 1, 2)$ along the direction of a vector from A $(2, 3, 5)$ to B$(3, 1, 6)$.	8	2	7
4 (a)	Prove that $\sin^5 \theta = \dfrac{1}{16}\left[\sin 5\theta - 5\sin 3\theta + 10\sin \theta\right]$	6	2	5
(b)	If $u = \dfrac{x^3 y^3 z^3}{x^3 + y^3 + z^3} + \log\left(\dfrac{xy + yz + zx}{x^2 + y^2 + z^2}\right)$, prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} + z\dfrac{\partial u}{\partial z} = 6\dfrac{x^3 y^3 z^3}{x^3 + y^3 + z^3}$	6	2	4
(c)	If $y = \cos\left[\log(x^2 - 2x + 1)\right]$ prove that $(x-1)^2 y_{n+2} + (2n+1)(x-1)y_{n+1} + (n^2 + 4)y_n = 0$	8	1	1
5 (a)	Prove that $\left(\dfrac{1 + \sin\alpha + i\cos\alpha}{1 + \sin\alpha - i\cos\alpha}\right)^n = e^{in\left(\frac{\pi}{2} - \alpha\right)}$	6	2	5
(b)	Evaluate $\lim\limits_{x \to 1}\left[\dfrac{1}{\log x} - \dfrac{x}{x - 1}\right]$	6	1	2
(c)	Find the value of n so that $v = r^n(3\cos^2\theta - 1)$ satisfies the equation $\dfrac{\partial}{\partial r}\left(r^2\dfrac{\partial v}{\partial r}\right) + \dfrac{1}{\sin\theta}\dfrac{\partial}{\partial \theta}\left(\sin\theta\dfrac{\partial v}{\partial \theta}\right) = 0$	8	3	4
6(a)	Prove that $\nabla\left(\dfrac{\phi_1}{\phi_2}\right) = \dfrac{\phi_2(\nabla\phi_1) - \phi_1(\nabla\phi_2)}{(\phi_2)^2}$	6	2	7
(b)	Find n^{th} derivative of $y = \dfrac{2x - 1}{(x + 2)(x + 1)^2}$	6	1	1
(c)	If $\arg(z + 1) = \dfrac{\pi}{6}$ and $\arg(z - 1) = \dfrac{2\pi}{3}$, find z	8	2	5

7(a)	If $u = \dfrac{e^{x+y+z}}{e^x + e^y + e^z}$, Prove that $u_x + u_y + u_z = 2u$	6	3	3
(b)	Prove that $i \log\left(\dfrac{x-i}{x+i}\right) = \pi - 2\tan^{-1} x$	6	2	6
(c)	Find constants a, b and c so that $\bar{F} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$ is irrotational. Hence find scalar potential ϕ such that $\bar{F} = \nabla \phi$.	8	2	7