

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**

**End Semester Examination – Winter 2018**

**Course: B. Tech.**

**Semester: I**

**Subject Name: Energy and Environmental Engineering**

**Subject Code: EEE1205**

**Max Marks: 60**

**Date: 15/12/2018**

**Duration: 3 Hr**

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
<b>Q.1 Solve Any Two of the following.</b>		
A) Explain with a neat sketch how the nuclear power plant generates electricity. Label all the major parts of the plant and their functions.	Understand/CO2	6
B) Write the working of a hydro power plant with a neat diagram? What are the advantages and disadvantages of using energy from water?	Understand/CO2	6
C) Explain the working of gas turbine based power plant with a neat sketch.	Understand/CO2	6
<b>Q.2 Solve Any Two of the following.</b>		
A) With a neat sketch explain the working of Magneto Hydro Dynamics Generator.	Understand/CO2	6
B) Mention some organic materials used in bio-mass plant. Describe the various sources of bio-mass.	Understand/CO2	6
C) i) Differentiate between the power generation using solar energy and the wind energy.	Understand/CO3	3
ii) Compare the advantages of diesel based power over the coal based power generation.	Understand/CO3	3
<b>Q.3 Solve Any one of the following.</b>		
A) Define energy conservation and energy efficiency. Explain the various measures that are taken to reduce the energy consumption of household refrigerator.	Remember/CO1	12
B) What do you mean by energy star rating? Discuss how do you improve the energy conservation during shopping and transportation.	Remember/CO1	12
<b>Q.4 Solve Any Two of the following.</b>		
A) What are the major indoor pollutants? Where do the following indoor pollutants come from? Formaldehyde, Radon, Smoke, Asbestos, Molds. How can you prevent or control indoor pollutants?	Understand/CO4	6

- |   |                |   |
|---|----------------|---|
| B) What are the six criteria pollutants in the original clean air act? Why are they chosen? List several illnesses that are caused by the dirty air.                                  | Understand/CO4 | 6 |
| C) What is particulate matter? What are the control measures to be taken to minimize the air pollution in respect of particulate matter? Discuss the effect of above on human health. | Understand/CO4 | 6 |

**Q. 5 Solve the following.**

- |  |                |   |
|--|----------------|---|
| A) Define the term soil pollution. Explain in brief the sources of soil pollution.   | Understand/CO5 | 4 |
| B) What do you mean by Biological magnification? What is the significance of BOD and COD? Explain.                         | Understand/CO4 | 4 |
| C) How do you classify noise under different categories? Explain the causes and effects of noise pollution on human health | Understand/CO4 | 4 |

\*\*\* End \*\*\*

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**Winter Semester Examination – Dec - 2018**

**Course: B. Tech. (Group A/Group B)**

**Sem :- I/II**

**Subject with Subject Code:-Energy and Environmental Engineering (CHE106/ CHE206)**

**Date: 15/12/2018**

**Marks: 60**

**Time:- 3 Hr.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram, etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**Q.1. Solve any Two of the following:**

**(Marks)**

**(6×2=12)**

- (a) Explain how electricity is generated from a nuclear reactor? What are the advantages and disadvantages of nuclear power generation?
- (b) Why most of the thermal power plants are set near coal mines or oil reservoirs? Explain the cooling water circuit in a thermal power plant.
- (c) List the auxiliary equipment of Diesel engine power plants and state any four advantages and disadvantages each of diesel engine power plants.

**Q.2. Solve any Two of the following:**

**(6×2=12)**

- (a) Define Biogas energy? List different types of bio fuels? Describe working of biomass gasification plant with neat sketch.
- (b) What is the source of tidal energy? What are the potential sites of tidal energy in India? List the advantages and limitations of tidal energy.
- (c) How the Wind mills are classified? Sketch the diagram of a HAWT, and explain the function of its main components.

**Q.3. Attempt the following:**

**(6×2=12)**

- (a) Define energy efficiency? How do you increase the energy efficiency of the electric motor? Explain the various measures.

(b) What is energy conservation? What are the measures to be taken to reduce the energy consumption while shopping and transportation? Explain.

**Q.4. Attempt the following:**

**(6×2=12)**

(a) What is particulate matter? What are its types? How do particulate matters harm human health?

(b) What is noise pollution? Discuss the source and effects of noise pollution.

**Q.5. Solve the following.**

**(6×2=12)**

(a) Explain the characteristics of watershed? What are its benefits to the society and environment?

(b) What are the six criteria pollutants in the original clean air act? Why are they chosen? Explain.

**Q.6. Solve the following:**

**(6×2=12)**

(a) List the various acts of the governments that protect the environment. Explain the wildlife protection act.

(b) Write about the process of Biological magnification. Explain the terms BOD and COD in connection with water pollution. Describe how these terms are different with one another.

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**End Semester Examination – Winter 2018**

**Course: F. Y.B. Tech.**  
**Subject: Engineering Chemistry**  
**Date: 14/12/2018**

**Duration: 3 Hr.**

**Sem: I**  
**Subject code: CHM1202**  
**Marks: 60**

**Instructions to the Students:**

1. Each question carries 12 marks.
2. All questions are compulsory.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and mention it clearly in the answer.

	(CO)	Marks
<b>Q.1 Solve Any Two of the following.</b>		<b>2 X 6</b>
a) Explain in detail Hot lime Soda process with its advantages and disadvantages.	01	
b) Explain the determination of Dissolve Oxygen by Winkler's Method.	01	
c) What is Hardness of water and Explain the determination of hardness of water by EDTA method?	01	
<b>Q.2 Solve Any Two of the following.</b>		<b>2 X 6</b>
a) Explain the term Component with suitable examples in Phase Rule equation.	02	
b) Describe in detail Phase Diagram of Water system.	02	
c) Explain Phase Diagram of two component alloy system.	02	
<b>Q.3 Solve Any One of the following.</b>		<b>12</b>
a) What are the types of ores and explain the reduction of ore by Pyrolysis?	03	
b) Explain Physical methods of concentration of ore.	03	
<b>Q.4 Solve Any Two of the following.</b>		<b>2 X 6</b>
a) Explain different types of Coal with their characteristics and uses.	04	
b) Write a note on: Types of Lubricant.	04	
c) Explain Proximate analysis of Coal.	04	
<b>Q.5 Solve Any One of the following.</b>		<b>12</b>
a) Explain Debye- Huckel theory of strong electrolyte.	05	
b) What is Cell Constant and Explain the method of Conductometric titration with example of Strong acid -Strong base and Weak acid-Strong base.	05	

End





Course : B. Tech

Subject Name : Engineering Physics

Max. Marks : 60

Date 13/12/2018

Sem. I

Subject Code : PHY1202

Duration: 3 Hrs.

**Instructions:**

1. All the questions are compulsory.
2. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

**Level/CO Marks****Q.1 Solve any two of the following**

- A) In case of forced vibration, prove that

CO1 6

$$A = \frac{f}{\sqrt{(\omega^2 - p^2)^2 + 4b^2p^2}}$$

- B) Explain Pizoelectric effect and Magnetostriction effect.

CO1 6

What will be the Young's modulus of quartz plate if 5.5 mm thick quartz is used to produce an ultrasonic waves of frequency 0.4999 MHz. The density of the quartz is  $2.65 \times 10^3 \text{ kg/m}^3$ .

- C) Explain with diagrams different types of polarization in dielectrics.

CO6 6

**Q.2 Solve any two of the following**

- A) In case of wedge shaped film, prove that
- $\beta = \lambda / 2\theta$
- .

CO2 6

- B) Explain the principle and working of He-Ne Laser.

CO2 6

- C) i. A 20 cm long glass tube filled with a sugar solution of 15 gm of cane sugar in 100 cc of water is kept in the path of polarized light. Calculate the angle of rotation of cane sugar, specific rotation of cane sugar is
- $66^\circ$
- .

CO3 3

ii. Calculate the refractive index of core and cladding of an optical fiber such that the numerical aperture of fiber is 0.27 and relative refractive index is 0.015.

CO3 3

**Q.3 Solve any two of the following**

- A) With neat diagram explain the construction and working of G.M. Counter.

CO3 6

- B) What is Heseinberg's Uncertainty Principle?

CO3 6

If the uncertainty in position of an electron is  $4 \times 10^{-10} \text{ m}$ . Calculate the uncertainty in its momentum

- C) Derive Schrodinger's time independant wave equation

CO3 6

**Q.4 Solve any two of the following.**

- A) Deduce the relation between interplaner spacing
- $d$
- and lattice constant
- $a$
- . Calculate the interplaner spacing for a (311) plane in a simple cubic lattice whose lattice constant is
- $2.109 \times 10^{-10} \text{ m}$
- .

CO4 6

- B) State and prove Moseley's law. What is its importance?

CO4 6

- C) Derive an expression for electromagnetic wave in free space and find the value of velocity of light in free space.

CO6

6

### Q.5 Solve the following.

- A) What are magnetic domain and domain wall? Explain the B-H curve based on domain theory.
- B) Derive an expression for conductivity of a conductor in terms of relaxation time of electron.

CO5

6

CO3

6

End



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**End Semester Examination – Winter 2018**

Course: B. Tech

Subject Name: Basic Civil Engineering

Max Marks:60

Date: 12/12/2018

Semester: I/II

Subject Code: CV105/ CV205

Duration: 3 Hr.

**Instructions to the Students:**

1. Solve ANY FIVE questions out of the following.
2. The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Illustrate your answers with neat sketches, diagrams etc. where ever necessary.
4. Assume suitable data wherever necessary and mention it clearly.

**Q. 1** Solve any two:

(6x2)

- a) Write the uses of stones in civil engineering construction work.
- b) What are the properties of good timber?
- c) List any twelve types of cement used for various construction works.

**Q. 2** a) What are the functions of doors and windows?

(6)

b) What are the functional requirements of flooring material?

(6)

**Q. 3** a) What are the required aspects for various parts of the building in the northern hemisphere of earth?

(4)

b) Enlist the different elements of a building.

(4)

c) What are the main functions of walls and columns?

(4)

**Q. 4** Solve any two:

(6x2)

a) What are the fundamental principles of surveying?

b) Draw a neat sketch of telescopic leveling staff.

c) Define: Contour, Reduced Level, Change Point, and Bench Mark.

**Q. 5** a) Draw neat sketches for the following road signs: No parking, Speed Limit 30 kmph, and Overtaking prohibited.

(6)

b) Explain in brief the classification or types of roads based on location and function in India.

(6)

**Q. 6** a) What are the physical characteristics of drinking water?

(6)

b) Write a short note on rain water harvesting.

(6)

----- End of Paper -----



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**Semester Examination – December - 2017**

**Course:** B Tech in Electrical Engineering

**Sem.:-1**

**Subject with Subject Code:-** Engineering Economics (BTHM306)

**Date:** 12/12/2018

**Marks:**60

**Time:- 3 Hr**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

- (Marks)**
- Q.1. a)** Distinguish micro and macroeconomics. (06)
- b)** Explain production possibility curve with points below, beyond and on the curve. (06)
- Q.2. a)** Explain the need and types of capital budgeting. (06)
- b)** What is time value of money? Explain Basic Time Value of Money Formula. (06)
- Q.3. a)** Explain law of demand & determinants of demand. (06)
- b)** What is demand forecasting? Explain its importance & various techniques. (06)
- Q.4. a)** What is breakeven point? What is its importance? Explain with graph. (06)
- b)** What is production? Explain factors of production. (06)
- Q.5. a)** Distinguish Monopoly, Monopolistic, Oligopoly. (06)
- b)** Explain the role of demand and supply in price determination (06)
- Q.6. Write a note on (any Three)**
- a) LPG      b) SENSEX      c) IMF      d) WTO (12)

\*\*\* End \*\*\*



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**RAIGAD -402 103**  
**End Semester Examination Dec-2018**

**Branch: B. Tech. (Group A/Group B)**

**Sem.: I**

**Subject with Subject Code:-Basic Electronics Engineering (EXE105/EXE205)**

**Date: 11/12/2018**

**Marks: 60**

**Time:- 3 Hr.**

**Instructions:-**

1. Attempt any Five questions.
2. All questions carry equal marks.
3. Illustrate your answer with neat sketches, diagrams etc. wherever necessary.
4. Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of that component is a part of examination.
5. If some part or parameter is noticed to be missing, you may appropriately assume and state it clearly in the answer book.

Q.1. A) Classify the engineering materials from materials science point of view. 06

B) Compare insulator, semiconductor and conductors. 06

Q.2. Attempt any two of the followings:

A) Describe the direct and indirect band gap semiconductors. 06

B) The resistivity of Cu is  $1.72 \times 10^{-8}$  ohm-m. Calculate the mobility of electrons in Cu. Given that the number of electrons per unit volume is  $10.41 \times 10^{28} / m^3$  06

C) Determine the concentration of conduction electrons in a sample of silicon, if one in every million silicon atom is replaced by a phosphorus atom. Assume every phosphorus atom to be singly ionized. Silicon has a molar mass of 0.028 kg/mole and density of 2300 kg/m<sup>3</sup>. 06

Q.3. A) Find the built-in voltage for a Si p-n junction with  $N_A = 10^{15} cm^{-3}$  and  $N_D = 10^{17} cm^{-3}$  06

B) Write a note on depletion layer capacitance and diffusion capacitance. 06

Q.4. Define transistor biasing. List and explain different transistor biasing techniques with suitable diagram and expressions. 12

Q.5. Attempt any two of the followings:

A) Describe the working of bridge rectifier with neat diagram and waveforms. Explain: Peak inverse voltage, ripple factor and efficiency with respect to a center tap full wave rectifier. 06

B] Explain different types of inductors in detail.

06

C] Describe construction and working of a LVDT. State any two advantages and disadvantages of LVDT.

06

Q.6 A] Do as directed:

06

a) Obtain 2's complement of 00111001

b) Add  $(AFF.B3)_H + (FFF.E)_H$

c) Determine the floating point representation of  $(-142)_{10}$  using IEEE single precision format.

B] What are the Universal Gates? Realize a NAND gate using universal gates.

06

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,

LONERE - RAIGAD - 402 103

SEMESTER EXAMINATION: DECEMBER - 2018

Course: B. Tech (All Branches)

Subject with Subject Code: Engineering Mathematics - I (BTMA101)

Date: 11/12/2018

Marks: 60

Semester: I

Time: 3 Hrs.

Instructions to the Students:-

1. Each question carries 12 marks.
2. All the questions are compulsory.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1. Attempt any three

(Marks)

(12)

- (a) Verify the Cayley-Hamilton theorem for the matrix  $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{bmatrix}$  hence find the  $A^{-1}$
- (b) For what values of  $\lambda$  and  $\mu$  the equations  $2x + 3y + 5z = 9$ ,  $7x + 3y - 2z = 8$ ,  $2x + 3y + \lambda z = \mu$  have (i) no solution (ii) a unique solution or (iii) an infinite number of solutions.
- (c) Use Gauss-Jordan method to find the inverse of the matrix  $A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & 2 & -1 \\ 5 & 2 & -3 \end{bmatrix}$
- (d) Find the rank of a matrix A by reducing it to normal form, where  $A = \begin{bmatrix} 1 & -12 & 3 \\ 4 & 10 & 2 \\ 0 & 31 & 4 \\ 0 & 10 & 2 \end{bmatrix}$

Q.2. Attempt any three

(12)

- (a) If  $z(x+y) = x^2 + y^2$  show that  $\left(\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)^2 = 4\left(1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)$
- (b) If  $u = \sin^{-1} \frac{x^2 + y^2}{x+y}$ , Show that  $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \frac{1}{4} \tan u [\tan^2 u - 1]$
- (c) If  $u = x^2 + y^2$ ,  $v = 2xy$  &  $z = f(u, v)$  then show that  $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = 2\sqrt{u^2 - v^2} \frac{\partial z}{\partial u}$
- (d) If  $u = x \log xy$ , where  $x^3 + y^3 + 3xy = 1$ , Find  $\frac{du}{dx}$

**Q.3. Attempt any two**

(12)

- (a)  $x = \sqrt{vw}, y = \sqrt{uw}, z = \sqrt{uv}$  and  $u = r \sin \theta \cos \phi, v = r \sin \theta \sin \phi, w = r \cos \theta$  then find  $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}$
- (b) Expand  $f(x, y) = e^x \cos y$  at  $(1, \frac{\pi}{4})$  using Taylor's theorem
- (c) Divide 24 into three parts such that the continued product of the first square of the second and cube of the third may be maximum.

**Q.4. Attempt any three**

(12)

- (a) Evaluate  $\int_0^\infty \frac{t^2}{(1+t^2)^2} dt$
- (b) Trace the curve  $x = a(\theta + \sin \theta), y = a(1 + \cos \theta)$
- (c) Trace the curve  $y^2(2a - x) = x^3$
- (d) Trace the curve  $r = 1 + 2 \cos \theta$

**Q.5. Attempt any two**

(12)

- (a) Change the order of integration and evaluate

$$\int_0^{2a-x} \int_{\frac{x^2}{a}}^{xy} xy \cdot dx \cdot dy$$

- (b) Change to polar co-ordinates and evaluate

$$\int_0^4 \int_{y^2}^y \frac{x^2 - y^2}{x^2 + y^2} dx \cdot dy$$

- (c) Find the area included between the curves  $y = x^2 - 6x + 3$  and  $y = 2x - 9$  by double integration

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**Supplementary Examination – December -2018**

**Course: B. Tech** **Sem.: I**

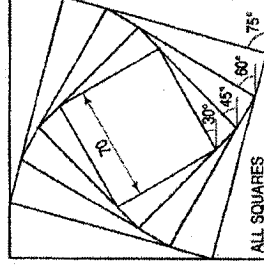
**Subject with Subject Code: Engineering Graphics (ME104/204)** **Marks: 60**

**Date: 08/12/2018** **Time: 4 Hrs**

**Instructions to the Students**

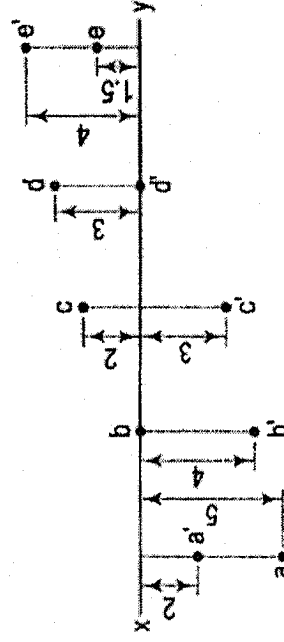
1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

**Q.1. a) Redraw the following figure (dimension is given in mm). (Marks) (6)**

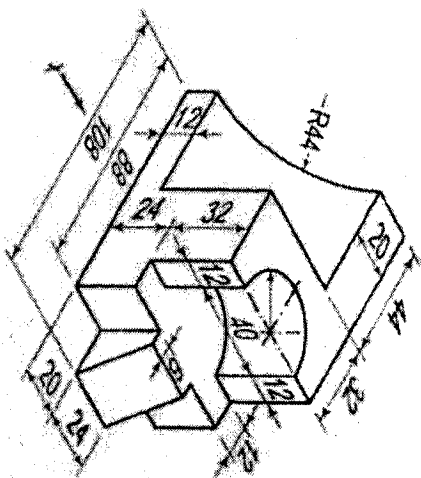


**b) What are the two systems of placing dimensions on a drawing? Illustrate your answer with sketches (6)**

**Q.2. a) Projections of various points are given in following figure. State the position of any four points with respect to the planes of projection, giving the distances in centimetres. (4)**



- i) Front view
- ii) Top view



Q.3. a) The top view of 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. Its one end A is in the H.P. and 12 mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P. and the V.P. (6)

b) Draw the projections of a circle of 50 mm diameter having its plane vertical and inclined at  $30^\circ$  to the V.P. Its centre is 30 mm above the H.P. and 20 mm in front of the V.P. (6)

Q.4. Draw the projections of a pentagonal prism, base 25 mm side, and axis 50 mm long, resting on one of its rectangular faces on the H.P. with the axis inclined at  $45^\circ$  to the V.P. (12)

Q.5. Solve any one of the following questions

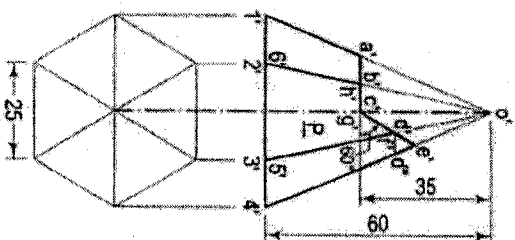
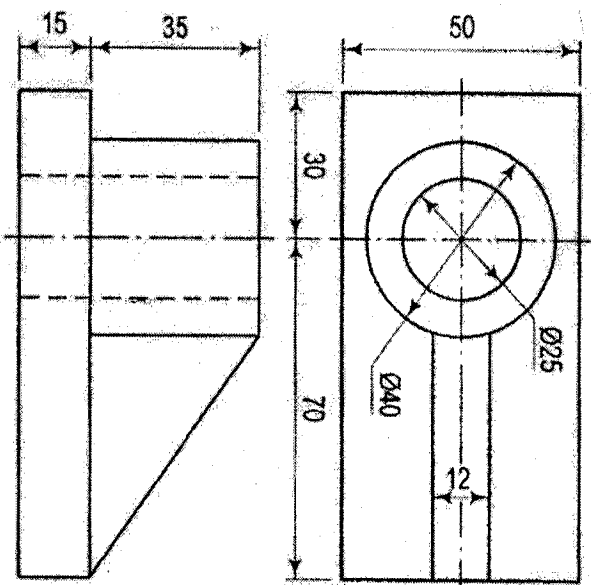
A hexagonal pyramid, base 30 mm side, and axis 70 mm long is resting on its slant edge of the face on the horizontal plane. A section plane, perpendicular to the V.P., inclined to the H.P., passes through the highest corner of the base and intersecting the axis at 25 mm from the base. Draw the projections of the solid and determine the inclination of the section plane with the H.P.

**OR**

Following figure shows Front View (FV) and Top View (TV) of an object by third angle projection method. Draw its isometric view.

4452706A15C42C8064EA682DAF9F93DD

Q.6. Draw the development of the lateral surface of the part P of the hexagonal pyramid shown in fig. (12)



**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE - RAIGAD -402 103**  
**Semester Examination - December - 2018**

**Branch: Computer Science and Engineering**

**Subject with Subject Code:- Computer Architecture & Organization(BTCOC304)**

**Date:-7/12/2018**

**Sem.:- I**

**Marks: 60**

**Time:- 3 Hr.**

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

	(Marks)
Q.1. a) Describe the structural overview of computer.	(5)
b) Define stored program concept and Explain Von Neumann's Architecture with diagram.	(7)
Q.2. a) List assembler directives? Assuming any assembler, give the necessary directives required for any program.	(5)
b) Explain in detail different types of addressing modes.	(7)
Q.3. a) Convert $(100.125)_{10}$ in IEEE-754 single precision floating point representation.	(5)
b) Sketch and explain flowchart for multiplication of floating point numbers.	(7)
Q.4. a) Encode the data 1101 in even parity by using Hamming Code.	(5)
b) Elaborate various types of ROM: Magnetic as well as optical	(7)
Q.5. a) Discuss Micro operations to execute an instruction MOV R1,R2.	(5)
b) Explain Wilki's design of Micro programmed Control Unit.	(7)
Q.6. a) Explain Instruction Pipelining.	(5)
b) Discuss Interrupt Driven I/O. Compare it with Programmed I/O and explain types of Interrupts	(7)





**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**End – Semester Examination (Supplementary): November 2018**

**Branch:** B. Tech (Common to all)

**Semester:** I

**Subject with code:** Engineering Mathematics – I (MATH 101)

**Date:** 26/11/2018

**Marks:** 60

**Duration:** 03 Hrs.

**INSTRUCTION:** Attempt any FIVE of the following questions. All questions carry equal marks.

**Q.1** (a) Find the rank of the matrix  $A = \begin{bmatrix} 1 & -1 & 2 & 3 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 1 & 4 \\ 0 & 1 & 0 & 2 \end{bmatrix}$  by reducing it to normal form

[6 Marks]

(b) Find the eigen values and eigen vectors of the matrix  $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ .

[6 Marks]

**Q.2** (a) If  $y = e^{a \sin^{-1} x}$ , prove that  $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - (n^2 + a^2)y_n = 0$ .

[6 Marks]

(b) Using Taylor's theorem, express the polynomial

$$f(x) = 2x^3 + 7x^2 + x - 6 \text{ in powers of } (x - 1).$$

[6 Marks]

**Q.3** Solve any TWO:

(a) If  $v = \log(x^2 + y^2 + z^2)$ , prove that  $(x^2 + y^2 + z^2) \left( \frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} + \frac{\partial^2 v}{\partial z^2} \right) = 2$ .

[6 Marks]

(b) If  $z$  is a homogeneous function of degree  $n$  in  $x, y$ , prove that

$$x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = n(n - 1)z.$$

[6 Marks]

(c) If  $z = f(x, y)$  where  $x = e^u + e^{-v}$  &  $y = e^{-u} - e^v$ , then show that

$$\frac{\partial z}{\partial u} - \frac{\partial z}{\partial v} = x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y}.$$

[6 Marks]

**Q.4** (a) If  $u = \frac{yz}{x}$ ,  $v = \frac{zx}{y}$  and  $w = \frac{xy}{z}$ , show that  $\frac{\partial(u, v, w)}{\partial(x, y, z)} = 4$ . [4 Marks]

(b) The focal length of a mirror is found from the formula  $\frac{2}{f} = \frac{1}{v} + \frac{1}{u}$ . Find the percentage error in  $f$  if  $u$  &  $v$  are both in error by 2% each. [4 Marks]

(c) Find the maximum value of  $x^m y^n z^p$ , when  $x + y + z = c$ . [4 Marks]

**Q.5** (a) Evaluate the integral  $I = \int_0^1 \int_0^x e^{x+y} dy dx$ . [6 Marks]

(b) Change to polar co-ordinates to evaluate  $I = \int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ . [6 Marks]

(c) Evaluate the integral  $I = \int_0^1 \int_{y^2}^1 \int_0^{1-x} x dz dx dy$ . [6 Marks]

**Q.6** (a) State D' Alembert's ratio test, and hence check the convergence of the series:

$$\sum_{n=1}^{\infty} \frac{n}{(n^n)^2} \quad [6 \text{ Marks}]$$

(b) State Cauchy's root test, and hence check the convergence of the series:

$$\sum \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^{\frac{3}{2}}} \quad [6 \text{ Marks}]$$

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**Dr. Babasaheb Ambedkar Technological University, Lonere-Raigad**  
**Supplementary Examinations Nov 2018**

**Course: B. Tech (All Courses)**

**Semester: I/II**

**Subject Name with Subject Code: Engineering Mechanics (ME102/ME202)**

**Date: 28/11/2018**

**Time: 3 Hours**

**Max Marks: 60**

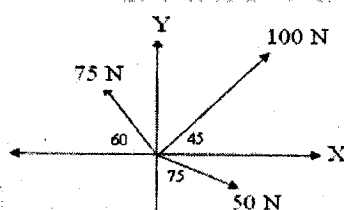
**Instructions to the Students:**

1. Attempt ANY FIVE Questions from Question No 1 to Question No 6.
2. Illustrate your answers with neat sketches, diagrams etc. wherever necessary.
3. Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of that part is a part of examination.
4. Use of non-programmable scientific calculators is allowed.

**Q.1. Attempt the following.**

**(06X2=12)**

- A) What do you understand by resolution of forces and calculate the resultant of following forces shown in figure 1?



*Figure 1*

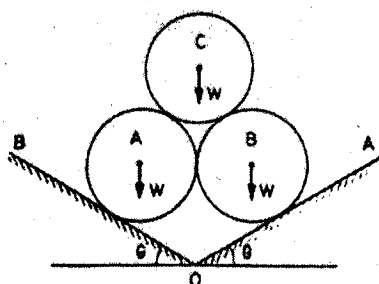
- B) What are the components of accelerations for the curvilinear motion? How will you calculate these components? Explain with some examples.

**Q.2. Attempt the following.**

**(06X2=12)**

- A) Define constraint, action, reaction and types of supports and support reactions with free body diagram.

- B) Three identical right circular cylinders A, B and C, each weight  $W$  are arranged on smooth inclined surface as shown in figure 2. Determine the least value of angle  $\theta$  that will prevent the arrangement from collapsing.



*Figure 2*

**Q.3. Attempt the following.**

**(06X2=12)**

- A) Three spherical balls of mass 2 kg, 6 kg and 12 kg are moving in the same directions with velocities 12 m/s, 4 m/s and 2 m/s respectively. If the ball of mass 2 kg impinges with the ball of mass 6 kg which in turn impinges with the ball of mass 12 kg prove that the balls of masses 2 kg and 6 kg will be brought to rest by the impact. Assume the balls to be perfectly elastic.

- B) What do you understand by trusses and frames? How will you determine the axial forces in the members? Explain method of Joints and method of sections.

(06X2=12)

Q.4. Attempt the following.

- A) What force  $P$  must be applied to the weightless wedges shown in fig 3, to start them under the 1000N block? The angle of friction for all contact surfaces is 10 degree.

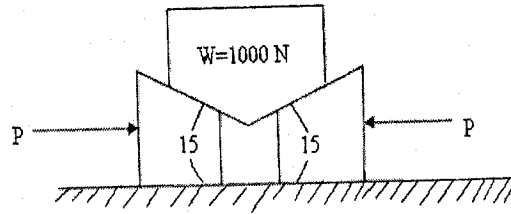


Figure 3

- B) Locate the centroid of the shaded area obtained by removing semicircle of diameter ' $a$ ' from a quadrant of a circle of radius ' $a$ ' as shown in Figure 4.

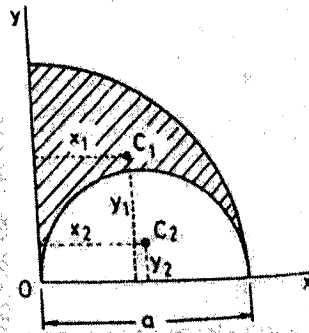


Figure 4

Q.5. Attempt the following.

(06X2=12)

- A) Explain the direct central impact, nature of impact and coefficient of restitution.

- B) A gun of mass 3000 kg fires horizontally a shell of mass 50 kg with a velocity of 300 m/s. What is the velocity with which the gun will recoil? Also determine the uniform force required to stop the gun in 0.6 m. In how much time it will stop.

Q.6. Attempt the following.

- A) Define and explain the D'Alemberts principle. Write and elaborate the equation of this, for rectilinear and curvilinear motion.

(04)

- B) If the coefficient of kinetic friction is 0.25 under each body in the system shown in fig. 5, how far and in what direction will body B move in 5 sec. starting from rest. Pulleys are frictionless.

(08)

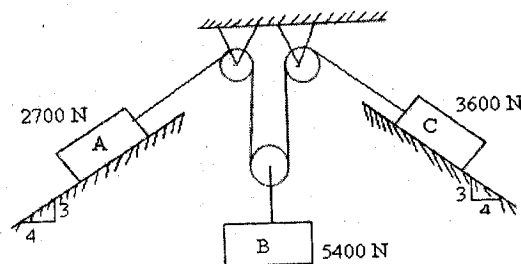


Figure 5

\*\*\*END\*\*\*

**Dr. Babasaheb Ambedkar Technological University, Lonere-Raigad**  
Supplementary Examination November-2018

Course: B. Tech. (All Courses)

Semester: I/II

Subject Name and Code: Communication Skills (HS102/HS202)

Date: 29/11/2018

Max. Marks: 60

Duration: 03 hours

**Instructions:**

1. Attempt **any FIVE** out of the given six questions.

- Q.1a) Write a detailed note on importance of communication for professional students. (06)
- b) Illustrate the importance of non-verbal communication in the process of communication. (06)
- Q.2 a) Assume that you are a press reporter and you are interviewing a retired justice of High Court of Mumbai. The topic for the discussion is the issue of reservations in Maharashtra. Explore the views of the retired justice about this issue. (06)
- b) Write a note on the do's and don'ts while participating in a GD. (06)
- Q.3 a) Transcribe the following words using phonemic script: (06)
- i) precise                      ii) paradigm                      iii) dance
- iv) education                      iv) charisma                      v) channel
- b) Answer the following questions:
- i) Write three words where 'mn' represents the sound /n/. (03)
- ii) Write three words where 'ch' represents the sound /j/. (03)
- Q.4 a) Write the antonyms for the following words: (06)
- i) grudge                      ii) hamper                      iii) alien
- iv) best                      v) blunt                      vi) eminent
- b) Rewrite the following sentences using appropriate articles wherever required (06)
- i) Yesterday I met Shri. Vijay Patil, ..... minister for Public Health.
- ii) Many news channels showed that ..... birds from ..... other continents are migrating to the Indian sea coast.
- iii) ..... candle has ..... burning flame. .... flame is harmful for us.
- Q.5 Write a job application for the post of Trainee Engineer in Paramount Engineers, Wagle Estate, Thane. Address the application to the Personnel Manager of the organization. Include your bio-data with the application. (12)
- Q.6 a) What are the different barriers to listening and what are the strategies we can use to overcome these barriers? Explain with suitable examples. (06)
- b) Read the following passage and answer the questions below:
- Sociolinguistics as an independent discipline is primarily concerned with systematising the intricacies of the relationship between language and society with empirical evidences. The language used in a society corresponds to the social structure of that particular society at various levels. Individuals' preference of one language or language variety over the others is, thus,

determined by several socio-cultural aspects of the society the individuals belong to. Sociolinguistics attempts at answering the questions of how linguistic choice is related to patterns of social behaviour, what the social conditions are under which individuals of a society involves in code switching and code mixing, how individuals' preference of their one language or its varieties over others affects their relationships with the others and how members of one particular speech community perceive the language of those belonging to the different speech communities. To answer these questions would mean to describe various relationships between language and society. These relationships operate throughout a society at both macro and micro levels.

Language attitude studies are the subject of interest within the realm of sociology of language - particularly 'dynamic sociology of language' - that seeks to provide an answer to the question "What accounts for differential changes in the social organization of language use and behavior toward language~" (Fishman 1972: 2-3). Before proceeding towards a research on language attitude, a researcher requires to understand various issues, concepts and concerns associated with this area, as they have bearing on any research in the sociology of language. Attitude is a vital concept in social psychology as Allport claims that it is 'social psychology's most distinctive and indispensable concept' (cited in Eiser 1986: 9) and therefore it is necessary to discuss various problems and issues related to attitude in social psychology. In the present article we shall discuss in some detail various definitions of attitude, relationship between attitude and behaviour and structure of attitude. We shall also investigate the factors that lead to an inconsistent relationship between attitude and behaviour, etc.

1. What is sociolinguistics? (01)
2. What does language attitude study refer to? (01)
3. What is the pre-requisite to study language attitude? (02)
4. What are the different definitions that are referred to in the given article? (01)
5. Suggest a suitable title for the passage. (01)

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**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**  
**End Semester Examination (Supplementary) – Dec. 2018**

**Course:** B. Tech (All Branches)  
**Subject:** Engineering Chemistry  
**Date:** 01/12/2018

**Marks:** 60

**Semester:** I/II  
**Sub Code:** CHM103/ CHM203  
**Duration:** 3 Hr.

**Instructions to the Students**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

**(Marks)**

Q.1. Attempt Any Two questions of the following.

- a) Explain Zeolite process of softening of water with its advantages and disadvantages. 06
- b) How does the Hardness of water determined by EDTA Complexometric method? 06
- c) Write note on: Dissolved Oxygen. 06

Q.2. a) Explain the term Components and Degrees of Freedom involved in it with examples. 06  
b) Explain one component Sulphur system with phase diagram. 06

Q.3. a) Explain any two physical methods of concentrations of ore. 06  
b) Describe the process of Electrolytic Refining of crude copper metal. 06

Q.4. Attempt Any Two questions of the following.

- a) What are the types of fuels and characteristics of good fuel? 06
- b) Explain in detail the Proximate Analysis of Coal. 06
- c) Describe the Thick film and Extreme pressure lubrication with examples? 06

Q.5. a) How does Ethyl alcohol manufactured from molasses by Fermentation process? 06  
b) Explain synthesis, physical-chemical properties and uses of Pyridine. 06

Q.6. Attempt Any Two questions of the following.

- a) Explain Quinonoid theory of Acid Base Indicator. 06
- b) Write note on: Glass Electrode. 06
- c) What is Cell Constant and how it can be determined? 06

\*\*\* End\*\*\*



**Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE- RAIGAD**  
**End Semester Examination Dec 2018 (Supplementary)**

**Course:** B. Tech (All Branches)

**Semester:** I/II

**Subject Name with Subject Code:** Engineering Physics (PHY103/ PHY203)

**Date:** 04/12/2018

**Marks:** 60

**Time:** 3 Hrs

**Instructions to the Student:**

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answer with neat sketches, diagrams, etc. Wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**Q. 1 Attempt the following**

- A. What is free vibration? Derive an expression for differential equation of free vibration. (6)
- B. What is Piezoelectric effect? Explain production of ultrasonic waves using piezoelectric oscillator. (6)

**Q. 2 Attempt any two of the following.**

- A. In case of Newton's rings, prove  $D_n \propto \sqrt{n}$ , where  $D_n$  is diameter of  $n^{\text{th}}$  dark ring. (6)
- B. Explain Double refraction using Huygen's wave theory of light. (6)
- C. Explain the construction and working of Ruby laser with neat diagram. (6)

**Q. 3 Attempt the following**

- A. Discuss Thomson's method for determination of  $e/m$  of an electron. (6)
- B. Derive time independent Schrodinger's wave equation. (6)

**Q. 4 Attempt the following**

- A. What are primitive and nonprimitive unit cells? Find the number of atoms per unit cell in SC, BCC, FCC lattices. (6)

**OR**

- A. Define atomic radius. Find the atomic radius in SC, BCC, FCC lattices. (6)
- B. State and Derive Bragg's law of X-ray diffraction. An X-ray is operated at 20 kV. Calculate the minimum wavelength of X-rays emitting from it. (6)

**Q. 5 Attempt the following**

- A. What are Ferrites and Garnets? Write their general formula. Determine the magnetization and flux density of the diamagnetic, if its magnetic susceptibility is  $-0.4 \times 10^{-5}$  and magnetic field in it is  $10^4$  A/m. (6)

OR

- A. Prove Bohr Magnetron  $\mu_B = eh/2m$ . Differentiate between hard and soft magnetic materials. (6)
- B. What is Superconductivity? Explain Meissner effect in superconductor. (6)

**Q. 6 Attempt any two of the following**

- A. What is Hall effect? Derive an expression for Hall coefficient of p and n type semiconductor. (6)
- B. Explain the effect of frequency and temperature on Dielectric material. (6)
- C. What is Displacement current? Write Maxwell's equations in differential and integral form. (6)

\*\*\* End \*\*\*

# Dr. Babasaheb Ambedkar Technological University, Lonere-402103

## Supplementary Examination December 2018

Course: First year (All branches)

Sem: I/II

Subject: Basic Electrical Engineering (EE104/EE204)

Max. Marks – 60

Date – 06/12/2018

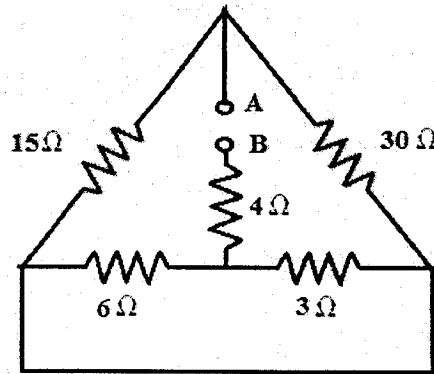
Duration: 03 Hrs.

### Instructions:

- All Question carry 12 marks.
- Attempt any five questions of the following.
- Illustrate your answer with neat diagram wherever necessary.
- If some part or parameter is noticed to be missing, you may appropriately assume it and mention it clearly.

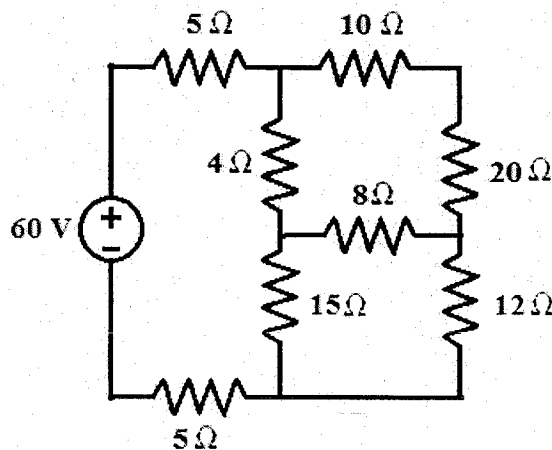
Q 1. a) A copper conductor has its specific resistance of  $1.6 \times 10^{-6} \Omega\text{-cm } ^\circ\text{C}$  and a resistance temperature coefficient of  $1/254.5 \text{ per } ^\circ\text{C}$  at  $20^\circ\text{C}$ . Find (i) the specific resistance and (ii) the resistance temperature coefficient at  $60^\circ\text{C}$ . (4)

b) Find equivalent resistance between terminal A & B. (4)

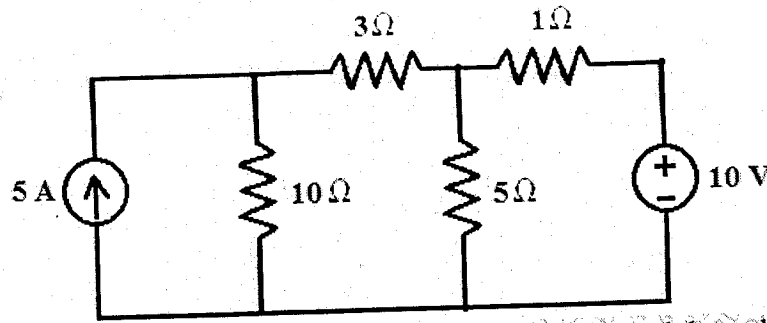


c) Give the definitions for following. (4)  
1) Force    2) Work    3) Power    4) Energy

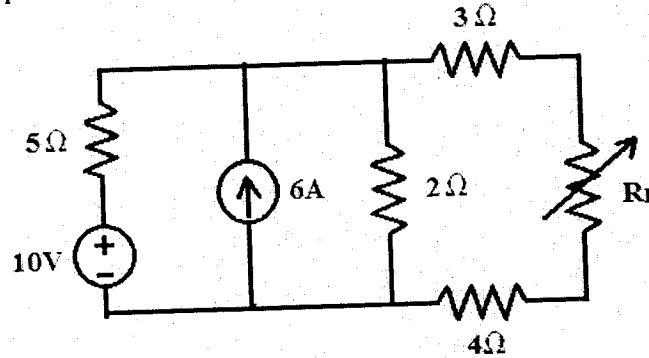
Q 2. a) Find current delivered by battery using star-delta transformation. (4)



b) For the network given below, find current through  $3\Omega$  resistor using nodal analysis. (4)



- c) Find the value of  $R_L$  for which maximum power is transferred through it. Also calculate the power transferred to  $R_L$  (4)



- Q 3. a) Find the following parameters of a voltage  $v = 200\sin 314t$ , (4)  
 1) Frequency    2) Form Factor    3) Crest Factor

- b) Find the resultant of following. (4)

i)  $e_1 = 25\sin \omega t$     ii)  $e_2 = 10 \sin (\omega t + \frac{\pi}{6})$     iii)  $e_3 = 30 \cos \omega t$   
 iv)  $e_4 = 20\sin (\omega t - \frac{\pi}{4})$

- c) Find the average power in pure capacitive circuit. (4)

- Q 4. a) An AC circuit consist of pure resistance and an inductive coil connected in series. The power dissipated in the resistance and the coil are 1000watts and 200 watts respectively. The voltage drop across the resistance and coil are 200V and 300V respectively. Calculate: i) Value of the resistance ii) Current through circuit iv) Resistance of coil iv) Impedance of coil v) Total impedance of circuit vi) Supply Voltage. (6)

- b) Explain with neat circuit resonance in RLC circuit. (6)

- Q 5. a) Explain in brief Self induced emf and Mutually induced emf. (6)

- b) Define the following terms, (3)  
 i) Magnetic field    ii) Magnetic lines of force    iii) Magnetic field strength.

- c) An iron ring of mean circumference 80cm is uniformly wound with 1000 turns of wire. Calculate the value of flux density that a current of 1A would produce in ring. Assume relative permeability of an iron to be equal to 1400. (3)

- Q 6. a) Derive the EMF equation of transformer. (6)

- b) Derive the equation for Energy stored in Capacitor. Also determine the equivalent capacitance of circuit containing a parallel branch of 5 $\mu$ F and 2 $\mu$ F in series with two capacitors of 3 $\mu$ F and 4 $\mu$ F. (6)



DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End – Semester Examination (Supplementary): November 2018

Branch: B. Tech (Common to all)

Semester: II

Subject with code: Engineering Mathematics – II (MATH 201)

Date: 27/11/2018

Max Marks: 60

Duration: 03 Hrs.

INSTRUCTION: Attempt any FIVE of the following questions. All questions carry equal marks.

Q.1 (a) Prove that  $\cos^6\theta - \sin^6\theta = \frac{1}{16}(\cos 6\theta + 15\cos 2\theta)$ . [6 Marks]

(b) If  $\operatorname{an}(A + iB) = x + iy$ , prove that

(i)  $\tan 2A = \frac{2x}{1-x^2-y^2}$  (ii)  $\tanh 2B = \frac{2y}{1+x^2+y^2}$ . [6 Marks]

Q.2 (a) Solve  $\left(1 + e^{\frac{x}{y}}\right) dx + e^{\frac{x}{y}} \left(1 - \frac{x}{y}\right) dy = 0$ . [6 Marks]

(b) Solve

$x - xdy + \log x dx = 0$ . [6 Marks]

Q.3 Solve any TWO:

(a) Solve  $y'' + 4y' + 13y = 18e^{-2x}$  [6 Marks]

(b) Solve  $(D^2 + 5D + 4)y = x^2 + 7x + 9$ . [6 Marks]

(c) Solve by the method of variation of parameters

$\frac{d^2y}{dx^2} + y = \operatorname{cosec} x$ . [6 Marks]

Q.4 (a) Find the Fourier series of  $f(x) = x^2$  in the interval  $(0, 2\pi)$  and hence deduce that

$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$  [6 Marks]

(b) Expand the function  $f(x) = \pi x - x^2$  in a half – range sine series in the interval  $(0, \pi)$ .

[6 Marks]

P.T.O.

- Q.5 (a) The necessary and sufficient condition for vector  $\vec{F}(t)$  to have constant magnitude is

$$\vec{F}(t) \cdot \frac{d\vec{F}(t)}{dt} = 0. \quad [6 \text{ Marks}]$$

- (b) A point moves in a plane so that its tangential and normal components of acceleration are equal and the angular velocity of the tangent is constant and equal to  $\omega$ . Show that the path is equiangular spiral  $\omega s = Ae^{\omega t} + B$ , where  $A$  &  $B$  are constants. [6 Marks]

- Q.6 Solve any TWO:

- (a) Find  $\text{curl} \vec{F}$ , where  $\vec{F} = \nabla (x^3 + y^3 + z^3 - 3xyz)$ . [6 Marks]

- (b) If  $\vec{r}$  is a position vector with  $r = |\vec{r}|$ , show that

$$\nabla \cdot (r^n \vec{r}) = (n+3)r^n \quad [6 \text{ Marks}]$$

- (c) Show that  $\iiint_V \frac{dv}{r^2} = \iint_S \frac{\vec{r} \cdot \hat{n}}{r^2} ds$ . [6 Marks]

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End – Semester Examination (Supplementary): November 2018

Branch: B. Tech (Common to all)

Semester: II

Subject with code: Engineering Mathematics – II (MATH 201)

Date: 27/11/2018

Max Marks: 60

Duration: 03 Hrs.

INSTRUCTION: Attempt any FIVE of the following questions. All questions carry equal marks.

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Q.2 (a) Solve  $\left(1 + e^{\frac{x}{y}}\right) dx + e^{\frac{x}{y}} \left(1 - \frac{x}{y}\right) dy = 0$ . [6 Marks]

(b) Solve

$x - xdy + \log x dx = 0$ . [6 Marks]

Q.3 Solve any TWO:

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- Q.6 Solve any TWO:

- (a) Find  $\text{curl } \vec{F}$ , where  $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$ . [6 Marks]

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$$\nabla \cdot (r^n \vec{r}) = (n+3)r^n \quad [6 \text{ Marks}]$$

- (c) Show that  $\iiint_V \frac{dv}{r^2} = \iint_S \frac{\vec{r} \cdot \hat{n}}{r^2} ds$  [6 Marks]

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