

Enroll.No.of Examinee \_\_\_\_\_

CO11301

**GOVERNMENT POLYTECHNIC MUMBAI**  
**TERM END EXAMINATION**  
**EVEN 2014-15**

Programme: Diploma in Computer Engg.

Course Code: CO11301

Course Title: C Programming

Time Allotted: 03 Hrs.

Max Marks: 80

Min Marks: 29

Instructions:

1. Use **separate** answer book for section I and section II.
2. Attempt **all the questions** from each section.
3. Illustrate your answers with **neat sketches** wherever necessary.
4. **Use** of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
5. Marks on **Right Hand Side** indicate **full marks** for the question.
6. Assume suitable **additional data**, if necessary.

**SECTION – I**

**Q.1 Attempt any SIX (6 x 2 marks)**

**12 Marks**

- a. What is Variable? Give two examples.
- b. Define operator? Give two relational operators.
- c. Explain putchar() with one example
- d. Write the general format of scanf()
- e. What is Ternary operator?
- f. Write the basic format of the while statement. Also draw the flow chart of the basic format.
- g. Define string. Give one example of How string is initialized?
- h. How two dimensional array is declared and initialized?

**Q.2. Attempt any FOUR (4 x 4 marks)**

**16 Marks**

- a. List the Datatypes in C. Explain any two in detail.
- b. Write a C program to read a single character from keyboard and check whether it is uppercase or lowercase.
- c. Write a C program to calculate sum of 1 to 10 numbers using for loop.
- d. Explain in detail goto statement.
- e. Write a C program to add two 3 x 3 matrices.
- f. What is array? How Three dimensional array is declared and initialized?

**Q.3. Attempt any TWO (2 x 6 marks)**

**12 Marks**

- a. Write a C Program to display multiplication table from 2 to 10. Also draw the flowchart for the program.
- b. Write short note on
  - i) Array of string
  - ii) do-while loop.
- c. Write a C Program to add diagonal elements of 3 x 3 matrix. Also draw flow chart for the program.

## SECTION II

Q.4

Attempt any SIX

12 Marks

- Define structure.
- What is the difference in structure and union?
- Give any four string functions with their use.
- Define global variable.
- Define pointer.
- Define pointer. How will you declare void pointer?
- What are different types of files?
- Give any four file functions.

Q.5

Attempt any FOUR

16 Marks

- Explain the use of union with example.
- Explain automatic and register storage class with example.
- Write a program to sort an array using function.
- Explain relation between array and pointer.
- Explain pointer arithmetic.
- What is the difference between text and binary file.

Q.6

Attempt any TWO

12 Marks

- Write a program to explain the use of array of structure.
- Explain static and extern storage class with proper example.
- Write a program to copy content of one file to another.



# GOVERNMENT POLYTECHNIC MUMBAI

## TERM END EXAMINATION

### EVEN 2014-15

Programme : Electronics Engineering  
Course Title : Basic Electronics

03Hours / 80 marks

Enrolment No.

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#### Instructions:

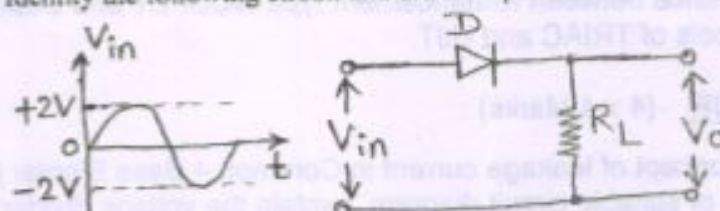
1. Use separate answer book for section I and section II.
2. Attempt all the questions from each section.
3. Illustrate your answers with neat sketches wherever necessary.
4. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
5. Marks on Right Hand Side indicate full marks for the question.
6. Assume suitable additional data, if necessary

### SECTION - I

#### Q.1 Attempt any SIX

12 Marks

- a. Write examples of trivalent impurity and pentavalent impurity (two examples of each)
- b. Draw circuit diagram and input and output voltage waveform of half wave rectifier.
- c. Draw symbol of Schottky diode, LED, photodiode and zener diode.
- d. Define PIV and knee voltage with reference to diode.
- e. Draw labelled reverse V-I characteristics of zener diode.
- f. Identify the following circuit and draw output waveform for given sine wave input.

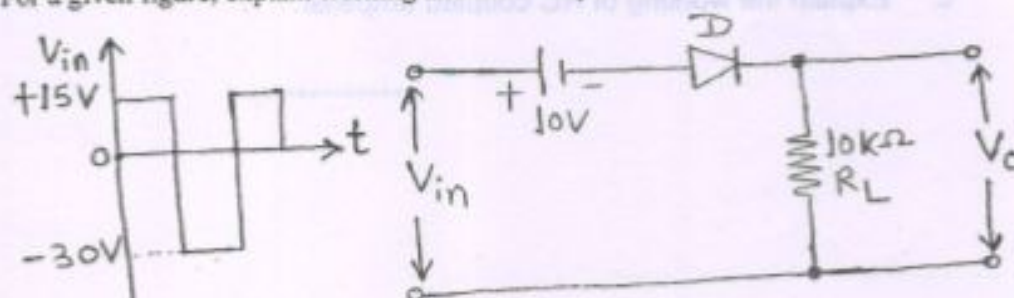


- g. Compare shunt capacitor filter and  $\pi$  filter on the basis of components used for filtering and ripple factor.
- h. Compare Silicon diode and Germanium diode. (any two points)

#### Q.2 Attempt any FOUR

16 Marks

- a. Describe formation of P-N junction at room temperature.
- b. Describe working of bridge rectifier with neat circuit and waveforms.
- c. A half wave rectifier is used to supply 50V D.C. to a resistive load of  $800\Omega$ . The diode has resistance of  $25\Omega$ . Calculate AC voltage required.
- d. Describe working of photo diode.
- e. For a given figure, explain working and draw output waveform.



- f. Describe working of PN junction in forward biased condition with neat circuit and waveform.

**Q.3 Attempt any TWO**

**12 Marks**

- With the help of neat circuit and waveform, describe working of center tap full wave rectifier with  $\pi$  filter.
- With the help of neat diagram, describe working of LED. (04 marks)
  - Write applications of LED and photodiode (two points each) (02 marks)
- Draw block diagram of regulated power supply. Explain function of each block. Draw waveforms across each block. Define load regulation and line regulation.

**SECTION - II**

EC11203

**Q.4 Attempt any SIX (6 x 2 Marks)**

**12 Marks**

- Define stability factor.
- A transistor has  $I_B = 115 \mu A$  and  $I_C = 2.25 mA$ . Find the value of  $\beta$  and  $\alpha$  of the transistor.
- What is Phase reversal in an Amplifier?
- Draw the ideal frequency response of single stage CE amplifier. Label it properly.
- Draw the dc equivalent circuit of single stage CE amplifier.
- What is the need of coupling in amplifiers?
- Write the difference between Enhancement type MOSFET and Depletion type MOSFET.
- Draw the symbols of TRIAC and UJT.

**Q.5 Attempt any FOUR (4 x 4 Marks)**

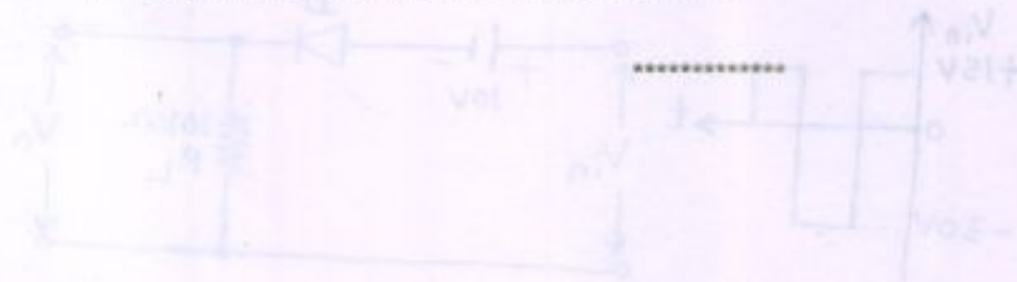
**16 Marks**

- Explain the concept of leakage current in Common – Base Bipolar junction transistor.
- With the help of suitable circuit diagram, explain the voltage divider biasing technique.
- Explain the working of single stage common emitter amplifier.
- Write a comparison between BJT and JFET.
- Draw and explain the characteristics of DIAC.
- Elaborate the difference between SCR and TRIAC (any four points)

**Q.6 Attempt any TWO (2 x 6 Marks)**

**12 Marks**

- With the help of suitable circuit diagram and  $V - I$  characteristic curves, explain the working of Enhancement type MOSFET.
- Draw the circuit diagram of circuit used for obtaining the output characteristics of transistor in CE mode. Draw its output characteristics curve and explain it in brief.
- Explain the working of RC coupled amplifier.





EE11211

GOVERNMENT POLYTECHNIC MUMBAI  
TERM END EXAMINATION  
EVEN 2014-15

Programme : Diploma in CO/IF/EC/IS

Course Title: Fundamental of Electrical Engineering

3 Hours / 80 Marks

Enrollment No:

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**Instructions:**

1. Use separate answer book for Section I and Section II
2. Attempt all the questions from each section.
3. Illustrate your answers with neat sketches wherever necessary.
4. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
5. Assume suitable additional data, if necessary.

**SECTION - I**

**12 Marks**

**Q.1 Attempt any SIX (6 X 2 Marks)**

- a. List any four power generation station in Maharashtra and write their capacities.
- b. Draw the single line diagram of electrical system.
- c. State the concept of Transmission system in electrical engineering.
- d. Define i) Electrical Current ii) Potential difference.
- e. List the different effect of temperature on resistance.
- f. State Kirchhoff's current law.
- g. Define i) Magnetic flux ii) Magnetic flux density.
- h. Draw the B-H curve for magnetic and non-magnetic materials.

**16 Marks**

**Q.2 Attempt any FOUR (4 X 4 Marks)**

- a. Give the comparison between conventional and non-conventional energy sources. (any four point)
- b. Explain the concept Utilization of electrical energy in domestic and industry.
- c. A copper conductor has its specific resistance of  $1.6 \times 10^{-6}$  ohm-cm at  $0^{\circ}\text{C}$  and a resistance temperature coefficient of  $\frac{1}{254.5}$  per  $^{\circ}\text{C}$  at  $20^{\circ}\text{C}$  find i) specific resistance and ii) resistance temperature coefficient at  $60^{\circ}\text{C}$ .
- d. State the chemical and heating effect of electric current.
- e. Give the comparison between electric and magnetic circuit (any four point)
- f. Explain the force on a current carrying conductor in magnetic field with suitable diagram

**12 Marks**

**Q.3 Attempt any TWO (2 X 6 Marks)**

- a. An electric kettle needs six minute to boil 2 kg of water from the initial temperature of  $20^{\circ}\text{C}$ . The cost of electrical energy required for this operation is 12 paise, the rate being 40 paise per Kwh. Find the Kw rating and the overall efficiency of the kettle.
- b. Explain the Kirchhoff's Voltage law with any suitable network.
- c. Explain the terms and their units.
  - i) Magnetic field strength
  - ii) Magnetic potential
  - iii) Flux density (B)

**SECTION- II****Q.4 Attempt any SIX (6 x 2 Marks)****12 Marks**

- State Fleming's Right Hand Rule.
- State the formula for eddy current loss.
- Define RMS value.
- Define i)impedance ii)power factor .
- State why transformer rating is in KVA.
- State the working principle of transformer.
- Draw the circuit diagram of staircase wiring.
- State the full form of MCB and ICTP.

**Q.5. Attempt any FOUR (4 x 4 Marks)****16 Marks**

- State Faraday's Laws of Electromagnetic Induction.
- Explain self induced emf with neat diagram.
- State the advantages of ac over dc.
- A 2000/220V, 20KVA transformer has 66 turns in the secondary. Calculate
  - primary turns
  - primary & secondary full load currents Neglect the losses.
- State the types of transformer & their applications.
- State the types of wiring for Domestic Installation
  - State the importance of fuse.

**Q. 6. Attempt any TWO (2 x 6 Marks)****12 Marks**

- Define the terms:
  - Cycle
  - Amplitude
  - frequency
  - Time period
  - peak factor
  - Form factor.
- Draw circuit diagram, phasor diagram & wave-form of a.c.circuits through
  - pure resistance
  - pure capacitor
- State the safety precautions in Electrical
  - Indoor installations
  - outdoor installations (any three each)

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# GOVERNMENT POLYTECHNIC MUMBAI

## TERM END EXAMINATION

EVEN 2014-15

Programme : IF/EE/EC/IS/EC/CO  
Course Title : Applied Physics

03 Hours / 80 marks

Enrolment No.

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**Instructions:**

1. Use separate answer book for section I and section II.
2. Attempt all the questions from each section.
3. Illustrate your answers with neat sketches wherever necessary.
4. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
5. Marks on Right Hand Side indicate full marks for the question.
6. Assume suitable additional data, if necessary

### SECTION - I

**Q.1 Attempt any SIX**

**12 Marks**

- a. Define derived physical quantity and write its two examples.
- b. State triangle law of vectors.
- c. Define : i) uniform circular motion ii) radial acceleration
- d. Define amplitude and frequency in SHM.
- e. State Hooke's law of elasticity.
- f. Distinguish between streamline flow and turbulent flow.
- g. State ideal gas equation with usual meanings of symbol.
- h. Define : i) terminal velocity ii) absolute zero temperature

**Q.2 Attempt any FOUR**

**16 Marks**

- a. State the characteristics of scalar product of two vectors.
- b. Distinguish between centripetal and centrifugal force.
- c. Show that SHM is a motion of projection of circular motion on its diameter.
- d. Define bulk modulus and obtain the expression for bulk modulus of elasticity.
- e. A steel ball of density  $7 \times 10^3 \text{ kg/m}^3$  falls vertically in a tall jar containing an oil of density  $1.4 \times 10^3 \text{ kg/m}^3$  and acquires a terminal velocity  $0.2 \text{ m/s}$ . If radius of ball is  $2 \text{ mm}$ , find coefficient of viscosity of oil. [ $g = 9.8 \text{ m/s}^2$ ]
- f. A gas has volume of  $0.6 \text{ m}^3$  at  $27^\circ \text{C}$  and pressure of  $78 \text{ cm}$  mercury. Find its volume at N.T.P.

**Q.3 Attempt any TWO**

**12 Marks**

- a. i) Explain types of errors in measurement.  
ii) The resultant of two vectors acting right angles to each other is  $2 \text{ N}$ . If one of the force is  $\sqrt{2} \text{ N}$ , find the other force.
- b. i) State the formula for viscous force given by Newton's law of viscosity with usual meanings of symbol, hence define 1 poise.  
ii) A particle is rotating at  $300 \text{ rpm}$ . If the radius of rotation is  $1.5 \text{ m}$ , calculate linear velocity.
- c. i) Differentiate between heat and temperature.  
ii) A longitudinal stress of  $8 \times 10^7 \text{ N/m}^2$  produces an extension of  $1 \text{ mm}$  in a wire of length  $2 \text{ m}$ , find Young's modulus of the material of the wire.

## SECTION – II

## Q.4 Attempt any SIX (6 x 2 Marks)

12 Marks

- State coulomb's inverse square law of electrostatics.
- Define electric potential and state its unit.
- State equation for capacity of parallel plate capacitor.
- Define :
  - specific resistance
  - Internal resistance of a cell
- State Fleming's left hand rule.
- The photoelectric work function for certain metal is  $3 \times 10^{-19} \text{ J}$ . Calculate threshold frequency.  $h=6.63 \times 10^{-34} \text{ JS}$ .
- Define critical angle and angle of incidence.
- Draw a neat circuit diagram to compare the e.m.f. of two cells by single cell method using potentiometer.

## Q.5 Attempt any FOUR (4 x 4 Marks)

16 Marks

- Two charges of 4 micro-coulomb and 16 micro-coulomb are placed 40cm apart in air. Calculate the force between them.
- Obtain an expression for the resultant capacitance when the capacitors are connected in series.
- When a resistance of  $200\Omega$  is connected in the left gap of a meter bridge, the null point is situated at 65cm on the wire. What is the resistance in right gap.
- Obtain an expression for the force acting on a conductor placed in a uniform magnetic field.
- State characteristics of photoelectric effect.
- The angle of prism is  $60^\circ$  and the angle of minimum deviation is  $45^\circ$ . Find RI of material of prism.

## Q.6 Attempt any TWO (2 x 6 Marks)

12 Marks

- State the four properties of electric lines of force.
  - Obtain an expression for potential difference between two points in electric field due to given charge.
- Explain principle of condenser.
  - What is shunt resistance? Write its applications.
- A circular coil has 40 turns of radius 5cm. If it carries a current of 5A. Find the magnetic induction at its centre, if the medium is air. Given ( $\mu_0=4\pi \times 10^{-7} \text{ Wb/Am}$ )
  - State the applications of optical fibre.



# GOVERNMENT POLYTECHNIC MUMBAI

## TERM END EXAMINATION

Programme : CO/ETX/EE/IS/IF  
Course Title: Engineering Mathematics  
3 Hours / 80 Marks

E-14-15

Enrollment No:

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### Instructions:

1. Use separate answer book for Section I and Section II.
2. Attempt all the questions from each section.
3. Illustrate your answers with neat sketches wherever necessary.
4. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
5. Assume suitable additional data, if necessary.

### SECTION - I

Q.1 Attempt any SIX (6 X 2 Marks)

12 Marks

a. If  $f(x) = x^2 + 6x + 10$ , determine  $f(2) + f(-2)$

b. Determine whether  $f(x) = x^3 - 3x + \sin x$  is even or Odd.

c. Evaluate  $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^5 - 32}$

d. Evaluate  $\lim_{x \rightarrow 0} \frac{a^{4x} - 1}{3x}$

e. Evaluate  $\lim_{x \rightarrow 2} \left[ \frac{1}{x-2} + \frac{1}{x^2-2x} \right]$

f. Differentiate  $y = x^4 + 4x + \log_4 x + \log 4$  w.r.t  $x$ .

g. If  $y = x^3 \tan x$ , find  $\frac{dy}{dx}$

h. If  $y = \tan x^3$ , find  $\frac{dy}{dx}$

Q.2 Attempt any FOUR (4 X 4 Marks)

16 Marks

a. If,  $f(x) = 16^x + \log_2 x$ , find the value of  $f\left(\frac{1}{4}\right)$ .

b. Evaluate  $\lim_{x \rightarrow 4} \frac{x^2 - 64x}{\sqrt{x^2 + 9} - 5}$

c. Evaluate  $\lim_{x \rightarrow \infty} (\sqrt{x^2 + x + 1} - x)$

d. If  $y = \cos^{-1} \left( \frac{x^3 + y^3}{x^3 - y^3} \right) = a$ , show that  $\frac{dy}{dx} = \frac{y}{x}$

e. If  $y = x^{\tan x}$ , find  $\frac{dy}{dx}$

f. Find equation of tangent & normal to  $x^2 + y^2 = 4$  at point (2, 2)

Q.3 Attempt any TWO (2 X 6 Marks)

12 Marks

a. If  $y = \tan^{-1} \left( \frac{2t}{1-t^2} \right)$ ,

$x = \sin^{-1} \left( \frac{2t}{1+t^2} \right)$ , find  $\frac{dy}{dx}$

b. If  $y = 2 \cos(\log x) + (3 \sin(\log x))$  then prove that  $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = 0$ .

c. Find maximum and minimum for the function  $f(x) = x^3 + \frac{15}{2}x^2 + 15x + 3$

SC11111

## SECTION - II

## Q.4 Attempt any SIX (6 X 2 Marks)

12 Marks

- Find the absolute mean deviation from mean of the following data.  
12, 6, 7, 3, 15, 10, 18, 5.
- The mean of 200 items was 50. Later on it was found that two items were missed as 92 and 8. Instead of 192 and 88. Find the corrected mean.
- Calculate the standard deviation of the following  
1, 2, 3, 4, 5, 6, 7, 8, 9.
- Express  $2\sqrt{2} (1+i)$  in Polar form
- Prove that  $\sin(-\theta) = -\sin\theta$
- Show that there exist a root of the equation  $x^2 - 2x - 1$  in  $(-1, 0)$
- Using Newton's method evaluate  $\sqrt[3]{100}$ , by performing one iteration.
- Verify that the equation  $x^3 - 9x + 1 = 0$  has a root in  $(2, 3)$

## Q.5 Attempt any FOUR (4 X 4 Marks)

16 Marks

- Calculate the median of the following distribution  

Marks	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
No. of Students	4	6	10	5	7	3	9	6
- Calculate the mode of the following

Wages in Rs./day	10-20	20-30	30-40	40-50	50-60	60-70	40-80	80-90
No. of workers	16	21	20	28	10	3	1	1

- The two sets of observation are given below.

Set I

Set II

$$\bar{x} = 82.5$$

$$\bar{x} = 48.75$$

$$s = 7.3$$

$$s = 8.35$$

Which of two sets is more consistent?

- If  $x = \cos\theta + i\sin\theta$ , show that  $x^n + \frac{1}{x^n} = 2\cos\theta$
- Find the real and imaginary parts of  $\sin h(x + iy)$
- Find the approximate value of  $x^2 + x - 3 = 0$  in the interval of  $(1, 2)$  by performing two iterations using method of false position.

## Q.6 Attempt any TWO (2 X 6 Marks)

12 Marks

- Use the method of step deviation to calculate the Mean and Variance of the following distribution

Wages in Rs	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150
No. of workers	12	18	35	42	50	45	20	8

- If  $x + iy = \sin(A + iB)$  Prove that

$$i) \frac{x^2}{\cos^2 B} + \frac{y^2}{\sin^2 B} = 1 \quad ii) \frac{x^2}{\sin^2 A} - \frac{y^2}{\cos^2 A} = 1$$

- Solve the system using Gauss-Seidel method upto two iterations.

$$10x + y + z = 12, \quad 2x + 10y + z = 13, \quad x + y + 5z = 7$$