EVEN 2025-26 EC19204/EC19R204

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Circuit & Networks**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define potential source with example. **[CO-1, L-R]**
b. State concept of branch & node. **[CO-1, L-U]**
c. State Thevinin's theorem and draw Thevenin's equivalent circuit. **[CO-3, L-R]**
d. Write statement of Norton's theorem and draw Norton's equivalent circuit. **[CO-3, L-R]**
e. Define Q factor for resonance. **[CO-4, L-R]**
f. Write the formula for resonant frequency of series and parallel resonant circuits. **[CO-4, L-R]**
g. Draw voltage and current curves of series resonant circuit. **[CO-4, L-R]**
h. Give classification of filters. **[CO-4, L-R]**
i. Define neper. How decibels and neper are correlated? **[CO-4, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Find the mesh currents I, $I_2$ and $I_3$ for the network shown in fig.2a. **[CO-1, L-A]**

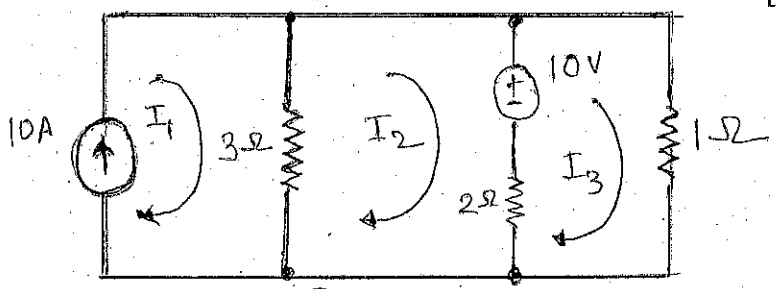
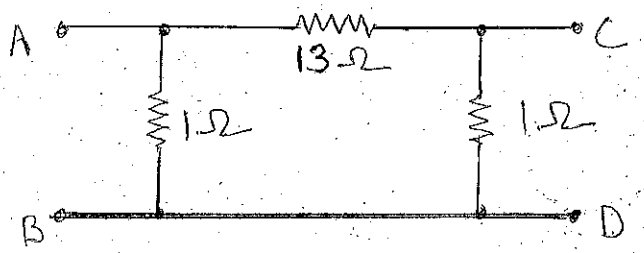


Fig. 2(a)

b. Obtain the T equivalent of the π network shown in fig.2b. **[CO-2, L-A]**



c. Determine the maximum power delivered to the load in the fig.2c. **[CO-3, L-A]**

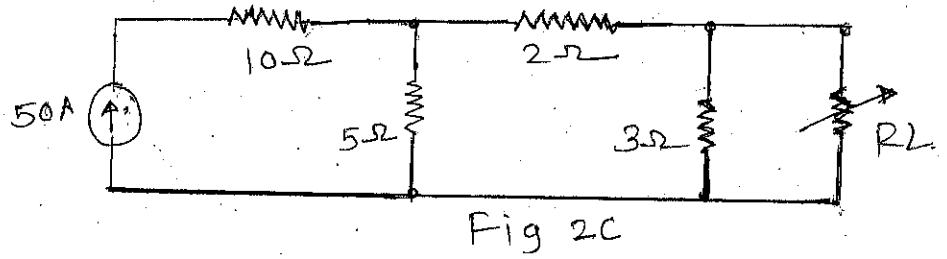



Fig 2C

d. Explain concept of image impedance with example. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Define ABCD parameters for two port network. **[CO-4, L-R]**

b. Find y parameters for the network shown in fig.3b. **[CO-4, L-A]**

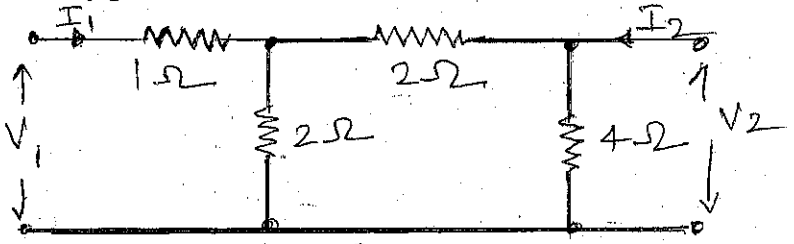



fig 3b

c. For series R-L-C circuit with R=10Ω, L=0.1mh and C=50μf, $V_s$=100v. Determine resonance frequency and voltage across inductor at resonance. **[CO-4, L-A]**

d. Design a constant k high pass filler having cut off frequency of 1KHz with a load resistance of 600Ω. **[CO-4, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. State principle of duality and give one example. **[CO-1, L-U]**

b. Explain open and short circuit impedance for T and π network. **[CO-2, L-R]**

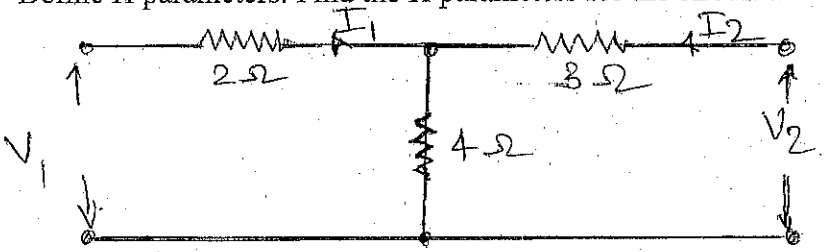
c. Give statement of millman's theorem and state its importance. **[CO-3, L-A]**

d. State and explain superposition theorem. **[CO-3, L-R]**

e. Define attenuator. List its types. Draw and explain any one type. **[CO-4, L-R]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Define H parameters. Find the H parameters for the circuit shown in fig.5a. **[CO-3, L-A]**




Fig(5a)

b. Draw and explain the DC response of R-L-C circuit. **[CO-4, L-U]**

c. State the drawbacks of constant K filters. Design M derived low. Pass filter having cut off frequency of $1KH_z$, design impedance of 400Ω and resonant frequency of $1100H_z$. **[CO-4, L-U,A]**

****End****

EVEN 2025-26 **EC19207/EC19R207**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electrical Engineering (Sandwich Pattern)**
**Course Title : Elements of Electronics Engineering**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. Convert the binary number 110001 to its equivalent decimal number. **[CO-5, L-A]**
b. Draw symbol and truth table of EX-OR gate. **[CO-5, L-R]**
c. Draw symbol of JFET and MOSFET. **[CO-3, L-R]**
d. Define DC load line and operating point. **[CO-3, L-R]**
e. State types of BJT biasing. **[CO-3, L-R]**
f. Define rectifier. State types of rectifier. **[CO-2, L-R]**
g. Draw circuit diagram of centre tapped full wave rectifier. **[CO-2, L-R]**
h. Draw symbol of LED and Zener diode. **[CO-1, L-R]**
i. Define forward biasing of a diode. **[CO-2, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. State each two applications of following diode i) P N junction diode ii) Zener diode iii) LED iv) Photodiode. **[CO-2, L-A]**
b. Describe the working of bridge type full wave rectifier with circuit diagram & waveform. **[CO-2, L-A]**
c. Explain working principle of PNP transistor with diagram. **[CO-3, L-U]**
d. Draw and explain block diagram of ADC. **[CO-5, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Draw symbol, equation and truth table of AND gate, NOR gate. **[CO-5, L-R]**
b. Compare Field effect transistor (FET) with Bipolar junction transistor (BJT) (any four). **[CO-3, L-U]**
c. Compare CE and CC configuration of BJT with respect to following points i) Input impedance ii) Output impedance iii) Current gain iv) Voltage gain. **[CO-3, L-U]**
d. Define the following i) Ripple factor ii) PIV of diode iii) TUF iv) Efficiency of rectifier. **[CO-2, L-R]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Differentiate PN junction diode and Zener diode (any three point). **[CO-2, L-A]**

b. Explain working of $\pi$ filter with waveform. **[CO-2, L-U]**

c. Explain single stage CE amplifier with diagram. **[CO-3, L-U]**

d. Explain source self bias of FET with diagram. **[CO-3, L-U]**

e. Explain the working of D flip flop with diagram and truth table. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Convert following numbers from decimal to octal and then binary i) 375 ii) 27.125. **[CO-5, L-A]**

b. i) Draw block diagram of DC regulated power supply.
ii) Explain Zener diode as voltage regulator with diagram. **[CO-4, L-U]**

c. i) Draw V-I characteristic of following i) Zener diode ii) LED iii) Photodiode. **[CO-2, L-U]**

ii) Explain working of enhancement type MOSFET with diagram. **[CO-3, L-U]**

****End****

EVEN 2025-26 **SC19104/SC19R104**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Basic Physics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. Write two requirements of a good unit. **[CO-1, L-U]**
b. Define : Time period, Frequency. **[CO-2, L-R]**
c. Define charge and state its SI unit. **[CO-3, L-R]**
d. Derive : $V=n\lambda$. **[CO-4, L-U]**
e. Define nanoscale and nanometer. **[CO-4, L-R]**
f. State the audible range of sound wave. **[CO-4, L-R]**
g. Write the difference between elastic body and plastic body. **[CO-5, L-U]**
h. Define velocity gradient and state its SI unit. **[CO-5, L-R]**
i. State the number of significant figures in the following measurements : i) 0.0025 ii) 0.0250 iii) 0.002500 iv) $5.98\times10^{24}$. **[CO-1, L-A]**

**Q.2 Attempt any THREE** **12 Marks**

a. Define error. Explain types of errors. **[CO-1, L-U]**
b. Distinguish between centripetal and centrifugal force (any four points). **[CO-2, L-U]**
c. State four properties of electric lines of force. **[CO-3, L-R]**
d. A train crosses a tunnel in 25 seconds. At the entry of the tunnel, its velocity is 54km/hr and at the exit of the tunnel the velocity is 72km/hr. Find the length of the tunnel. **[CO-2, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Distinguish between longitudinal and transverse waves (any four points). **[CO-4, L-U]**
b. Write any four applications of Nanotechnology. **[CO-4, L-A]**
c. Write four properties of Uultrasonic waves. **[CO-4, L-R]**
d. Two charges of + 16 C and -9C respectively are placed 8cm apart in air. Determine the position of a point at which their is no resultant electric field. **[CO-3, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. State and explain Hooke's law of elasticity. **[CO-5, L-R]**
b. Draw Stress-strain curve with correct label. **[CO-5, L-U]**

c. State the significance of Reynold's number. **[CO-5, L-A]**

d. Write three applications of ultrasonic waves. **[CO-4, L-A]**

e. Find wave frequency of a wave having velocity 300m/s and wavelength 0.3mm. **[CO-4, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. i) Classify the following units into fundamental and derived units – Candella, Volt, Ampere, Joule. **[CO-1, L-U]**

ii) Write four applications of centrifugal force. **[CO-2, L-A]**

b. i) Distinguish between stream line and turbulent flow. **[CO-5, L-U]**

ii) Define resonance. Write the examples of its. **[CO-4, L-U]**

c. i) Define : Deforming force and restoring force. **[CO-5, L-R]**

ii) A spherical ball of diameter 3mm and density $7.8\times10^3 kg/m^3$ falls vertically through the oil of tall jar and attains a terminal velocity 0.231m/s. If the density of oil is $1.2\times10^3 kg/m^3$, find coefficient of viscosity of oil. **[CO-5, L-A]**

****End****

EVEN 2025-26 EC19R409 | EC19409

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering**
**Course Title : Advance Communication System**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. State advantages of circular wave guide. **[CO-1, L-R]**
b. State applications of directional coupler. **[CO-1, L-R]**
c. Draw constructional diagram of two cavity klystron amplifier. **[CO-2, L-R]**
d. State applications of tunnel diode. **[CO-2, L-R]**
e. List applications of satellite. **[CO-3, L-R]**
f. Enlist different antenna scanning methods in radar. **[CO-4, L-R]**
g. State doppler affect in RADAR. **[CO-4, L-R]**
h. State application of spread spectrum. **[CO-5, L-R]**
i. Define Pseudo Noise sequence. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Compare $TE_{mn}$ and $TM_{mn}$ modes. (any 4 points) **[CO-1, L-A]**
b. Describe propagation of waves through rectangular waveguide. **[CO-1, L-U]**
c. Draw constructional diagram of reflex klystron amplifier and explain its working principle. **[CO-2, L-U]**
d. Explain working principle of duplexer with a neat sketch. **[CO-2, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. With respect to wave guide explain function of directional coupler and isolation. **[CO-2, L-U]**
b. Define with respect to satellite i. Look angle ii. Station keeping. **[CO-3, L-R]**
c. Explain two antenna scanning methods used in radar. **[CO-4, L-U]**
d. State any four points of comparison between direct sequence spread spectrum and frequency hopped spread spectrum. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw diagram of communication link. State uplink and downlink frequencies. **[CO-3, L-U]**

b. List advantages & disadvantages of Geo-stationary satellite. **[CO-3, L-?]**

c. Draw block diagram of pulsed radar and state applications of radar. **[CO-4, L-?]**

d. State the factors influencing maximum range in radar. **[CO-4, L-?]**

e. Draw block diagram of spread spectrum and state its advantages. **[CO-5, L-?]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Rectangular wave guide having dimensions 7 X 3.5cm operates in dominant mode $TE_{10}$ find a) Cut off frequency b) Phase velocity at frequency of 3.5$GH_Z$ c) Guided wavelength at 3.5 $GH_Z$. **[CO-1, L-A]**

b. Draw block diagram of sub-system of satellite and explain any three sub system. **[CO-3, L-U]**

c. Draw block diagram of MTI radar and explain function of each block. **[CO-4, L-U]**

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EVEN 2025-26 **EC19411/EC19R411**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Automation**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. List two advantages of PLC. **[CO-1, L-R]**
b. Give 3 comparision instructions. **[CO-2, L-R]**
c. Draw diesel generator set control. **[CO-2, L-R]**
d. Explain benefits of SCADA system. **[CO-3, L-R]**
e. Give two features of PLC software. **[CO-4, L-R]**
f. List the benefits of IOT. **[CO-5, L-R]**
g. Explain AND logical instruction with example. **[CO-2, L-U]**
h. State the concept of mimic diagram. **[CO-3, L-U]**
i. State drum/bottle filling system steps for ladder logic. **[CO-2, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw and explain AC input module used in PLC. **[CO-4, L-U]**
b. Explain timer instruction RTO in detail. **[CO-2, L-U]**
c. Explain the working of SCADA system. **[CO-3, L-U]**
d. Explain IOT applications in various domain. **[CO-5, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Differentiate fixed and modular PLC. **[CO-1, L-A]**
b. Explain batch process control with neat sketch. **[CO-2, L-U]**
c. Explain detail procedure for an installation of PLC software. **[CO-4, L-A]**
d. Describe the sensing the environment and notifying IOT application in detail. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw ladder logic for comparision of two numbers with appropriate instructions. **[CO-2, L-A]**
b. Describe various elements of SCADA system. **[CO-3, L-A]**
c. Describe the configuration of PLC software. **[CO-4, L-A]**
d. Explain PID control instruction. **[CO-2, L-U]**
e. Describe ADD and SUB instruction with example. **[CO-2, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. List the types of automation system. Explain each in detail. **[CO-1, L-U]**
b. Draw ladder logic for traffic light control system. **[CO-2, L-A]**
c. Describe the types of various SCADA systems. **[CO-3, L-A]**

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EVEN 2025-26 **EC19R208/EC19208**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering**
**Course Title : Introduction to Communication**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define : (i) Noise factor (ii) Noise figure. **[CO-1, L-R]**
b. Differentiate between simplex and duplex communication system. **[CO-1, L-A]**
c. Draw neat diagram of ground wave propogation. **[CO-3, L-R]**
d. Define : (i) Antenna resistance (ii) Bandwidth. **[CO-4, L-R]**
e. State need of modulation. **[CO-1, L-U]**
f. State two merits & demerits of PAM. **[CO-1, L-R]**
g. List two advantages of adaptive delta modulation. **[CO-1, L-R]**
h. Name four different line coding formats. **[CO-2, L-R]**
i. Draw neat waveform of BPSK. Assume suitable data. **[CO-2, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Describe communication system with neat block diagram. **[CO-1, L-U]**
b. Compare between FDMA and CDMA (four points). **[CO-1, L-A]**
c. Draw block diagram of PWM generator. Also draw it's waveforms. **[CO-1, L-U]**
d. Describe the principle of sky wave propogation with diagram. **[CO-3, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Define AM. Draw AM waveform for modulation index m=1 and m=0.75. **[CO-1, L-A]**
b. Draw neat waveform of polar NRZ-I, NRZ-L & $R_Z$. Assume suitable data. **[CO-2, L-U]**
c. Compare between ASK and FSK (any four points). **[CO-2, L-A]**
d. Describe principle of tropospheric scatter propogation with diagram. **[CO-3, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Define quantization and quantization noise. **[CO-1, L-R]**
b. Draw neat block diagram of digital communication system. State it's advantages. **[CO-2, L-R]**
c. Compare coherent and non coherent detection. **[CO-3, L-A]**
d. Describe line of sight propogation. **[CO-3, L-U]**

e. Draw construction and radiation pattern of dish antenna. State it's applications. **[CO-4, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Define error. State causes of error and its effect. Describe longitudinal redundancy check with suitable example. **[CO-2, L-U]**

b. Draw transmitter and receiver block diagram of FSK. Describe its working. **[CO-2, L-U]**

c. Draw neat construction of yagi-uda antenna. Draw radiation pattern. State its applications. **[CO-4, L-U]**

****End****

EVEN 2025-26 **EC19403/EC19R403**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Control System**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. List examples of closed loop control system. (any four) **[CO-1, L-R]**
b. Define steady state error. **[CO-2, L-R]**
c. List advantages of frequency response analysis. **[CO-2, L-R]**
d. Define stability and classify it. **[CO-3, L-R]**
e. State necessary conditions for stability. **[CO-3, L-U]**
f. Enlist different components of servo system. **[CO-4, L-R]**
g. List application of servo motors. **[CO-4, L-R]**
h. Define Neutral zone for ON/OFF controller. **[CO-4, L-R]**
i. Draw block diagram of PD controller. **[CO-4, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Define : (i) Delay time (ii) Rise time (iii) Peak time (iv) Settling time. **[CO-2, L-R]**
b. Compare Lead and Lag compensator. (any four points) **[CO-2, L-U]**
c. Write short note on Routh's stability criteria. **[CO-3, L-A]**
d. Describe potentiometer as error detector with neat diagram. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Derive an expression for unit step response of $1^{st}$ order system and draw its response curve. **[CO-2, L-A]**
b. Explain lead lag compensator with neat diagram. **[CO-2, L-U]**
c. Explain necessary condition for stability. **[CO-3, L-A]**
d. Draw circuit diagram of PID controller using op-amp. **[CO-4, L-R]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Calculate number of poles, zero's and order of system. **[CO-1, L-A]**

$$G(S) = \frac{20}{(S+1)(S+4)}$$

b. State any three rules for block diagram reduction technique. **[CO-1, L-R]**
c. Draw time response of $2^{nd}$ order underdamped control system with neat labelling. **[CO-2, L-R]**
d. Define Phase margin and Gain margin. **[CO-3, L-R]**
e. Compare armature controlled and field controlled DC servo motors (any three points). **[CO-4, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Write a short note on open and close loop systems with examples. **[CO-1, L-A]**

b. A unity feedback control system has a open loop feedback function, $G(S) = \frac{10}{S(S+2)}$, find the rise time, % overshoot, peak time & settling time for a step i/p of 12 units. **[CO-2, L-A]**

c. Explain the following with diagram :
   (i) Integral controller
   (ii) Derivative controller **[CO-4, L-U]**

****END****

EVEN 2025-26 **EC19405/EC19R405**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Fiber Optic Communication**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. State four advantages of fiber optic communication. **[CO-1, L-R]**
b. State four applications of fiber optic communication. **[CO-1, L-R]**
c. List types of optical fibers. **[CO-1, L-R]**
d. State any two functions of optical multiplexers. **[CO-1, L-R]**
e. Define attenuation. **[CO-3, L-U]**
f. List various losses occurs in FOC. **[CO-3, L-R]**
g. Define the term quantum efficiency. **[CO-4, L-R]**
h. State the necessity of WDM in fiber optic communication. **[CO-5, L-U]**
i. List advantages of WDM. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Explain the functions of : (i) Isolator (ii) Circulator. **[CO-1, L-U]**
b. Describe bending loss and its types. **[CO-3, L-U]**
c. Compare between LED and LASER diode. (any four points) **[CO-4, L-A]**
d. Explain the working of edge emitter LED with its neat diagram. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Compare mono mode fiber with multimode fiber. (any four points) **[CO-1, L-A]**
b. Explain different types of dispersion and their effect on signal transmission. **[CO-3, L-U]**
c. Discuss the concept of spontaneous emission and stimulated emission. **[CO-4, L-U]**
d. Illustrate power loss model in fiber optic communication along with its diagram. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Explain the concept of reflection and refraction using light theory. **[CO-1, L-U]**
b. Explain following terms : (i) group delay (ii) phase delay. **[CO-3, L-U]**
c. Explain working principle of P-I-N diode. **[CO-4, L-U]**
d. Describe V-groove splicing method. **[CO-2, L-U]**
e. State any three requirements of a good connector design. **[CO-2, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Explain working of a fiber optic communication system with a neat block diagram. **[CO-1, L-U]**

b. Describe attenuation measurement using OTDR along with neat labelled block diagram. **[CO-2, L-U]**

c. Explain the following with relevant diagrams: **[CO-5, L-U]**

(i) Two fiber UPSR

(ii) Two fiber BLSR

****END****

EVEN 2025-26 EC19R303/EC19303

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering**
**Course Title : Power Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define holding current and latching current. **[CO-1, L-A]**
b. Draw symbol of IGBT & UJT. **[CO-1, L-A]**
c. State the need of equalizing network. **[CO-2, L-R]**
d. Explain dv/dt protection in gate triggering method of SCR. **[CO-2, L-R]**
e. Draw circuit diagram of single phase half wave controlled rectifier with waveform. **[CO-3, L-R]**
f. Draw buck boost converter using MOSFET. **[CO-4, L-A]**
g. Enlist applications of inverter. **[CO-4, L-A]**
h. State advantages of SMPS. **[CO-5, L-R]**
i. State needs of UPS system. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Describe and explain construction and working principle of SCR with its V-I characteristics. **[CO-1, L-U]**
b. With the help of circuit diagram and waveform explain working principle of single phase full wave controlled rectifier. **[CO-3, L-U]**
c. Explain in brief the effect of free-wheeling diodes. **[CO-3, L-U]**
d. Draw and explain McMurray Bed-ford half bridge rectifier. **[CO-4, L-R/U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. With the help of neat diagram explain working principle of UJT triggering using pulse transformer. **[CO-2, L-U]**
b. Explain in brief type B commutation with neat diagram. **[CO-2, L-U]**
c. Describe the working principle with diagram the second quadrant or class B chopper. **[CO-4, L-R/U]**
d. Draw and explain boost converter using SCR. **[CO-4, L-R/U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. State the advantages and disadvantages of IGBT. **[CO-1, L-U/R]**
b. Compare TRIAC and DIAC. **[CO-1, L-A]**
c. Describe working principle of series inverter. **[CO-4, L-U]**
d. Explain in detail single phase half bridge inverter. **[CO-4, L-R/U]**
e. Draw the block diagram and explain in brief about SMPS. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw and explain any one gate triggering circuit with circuit diagram and waveforms. **[CO-2, L-R/U]**

b. List types of chopper and explain any two with diagram and waveform. **[CO-4, L-A/R/U]**

c. List industrial circuits and explain in brief any one with circuit diagram. **[CO-5, L-A/R/U]**

****End****

EVEN 2025-26 **EC19R203/EC19203**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (Sandwich Pattern)**
**Course Title : Basic Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. State materials used in LED's to emit different colour light. **[CO-1, L-R]**
b. Draw the circuit diagram of series inductor and $\pi$ filter. **[CO-2, L-R]**
c. State the need of biasing for BJT. **[CO-3, L-A]**
d. Sketch the symbol of P-channel and N-channel enhancement type MOSFET. **[CO-3, L-R]**
e. Define line regulation. State the formula for its regulation. **[CO-4, L-R]**
f. State need of clipper circuit. **[CO-2, L-A]**
g. Give two points of comparision between half Wave and bridge full wave rectifier. **[CO-2, L-R]**
h. Suggest type of transistor configuration for obtaining highest current gain. **[CO-3, L-R]**
i. State different methods of biasing of FET. **[CO-3, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Explain the energy band diagram for conductors, insulator and semiconductors. **[CO-1, L-A]**
b. Define the following parameters of rectifier (i) Peak inverse voltage (ii) Ripple factor (iii) Efficiency (iv) Transformer utilization factor. **[CO-2, L-R]**
c. Explain the need of stabilization of Q point. **[CO-3, L-A]**
d. List out any two applications of FET and state the function of 'Gate' 'Source' and 'Drain' terminals of FET. **[CO-3, L-R]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Compare P-N junction diode and Zener diode on following parameters.
(i) Doping level (ii) Breakdown voltage (iii) Symbol (iv) Applications **[CO-1, L-U]**
b. Describe the working of transistor as a switch with circuit diagram. **[CO-3, L-A]**
c. Explain the working of N-channel JFET with diagram. **[CO-3, L-U]**
d. Describe the working of Zener as a voltage regulator. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Describe the V-I characteristics of Zener diode. **[CO-1, L-A]**
b. Describe the working of negative clipper with circuit diagram. **[CO-2, L-A]**
c. Sketch fixed bias and self bias BJT biasing circuit. **[CO-3, L-U]**
d. Describe experimental setup for operation of P-N junction diode in forward bias. Draw its characteristics. **[CO-1, L-U]**
e. Draw the circuit diagram of center tapped full wave rectifier. Explain its working. **[CO-2, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Describe the working of positive clamper with circuit diagram and waveforms. **[CO-2, L-U]**
b. Draw the circuit diagram of single stage CE amplifier. Explain its working with input-output waveforms. **[CO-3, L-U]**
c. Describe the function of each block of regulated DC power supply with neat sketch, draw its input and output waveforms. **[CO-4, L-A]**

****End****

EVEN 2025-26 EC19401 / EC19R401

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (Sandwich Pattern)**
**Course Title : Microcontroller**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Draw pin diagram of 8051 microcontroller. **[CO-1, L-R]**
b. List types of buses used in microcontroller 8051 and state function of each bus. **[CO-1, L-R]**
c. Differentiate between microcontroller and microprocessor. (any four points) **[CO-1, L-A]**
d. Classify different types of memories. Explain any two of them. **[CO-2, L-R]**
e. List the types of interrupts in microcontroller 8051. Draw vector address table of interrupts. **[CO-4, L-R]**
f. List different modes of serial communication. Explain each in short. **[CO-4, L-R]**
g. State function of SBUF register in 8051. **[CO-4, L-U]**
h. Write an ALP to toggle P1.3 of microcontroller 8051 continuously. Assume necessary data. **[CO-5, L-A]**
i. Draw interfacing diagram of microcontroller 8051 with a DC motor. **[CO-5, L-A]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw internal architecture of 8051 and name different parts of it. **[CO-1, L-R]**
b. Draw and explain internal RAM structure of microcontroller 8051. **[CO-2, L-U]**
c. List the different types of addressing modes of microcontroller 8051. Explain any three with example. **[CO-3, L-R]**
d. Draw bit format of IP register and explain it. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Differentiate between Harvard and Princeton architecture. (any 4 points) **[CO-1, L-R]**
b. Draw and explain bit format of program status word register. **[CO-2, L-U]**
c. Define directive. Give list of assembler directives with example of each. **[CO-3, L-R]**
d. Write an ALP to transfer letter 'A' serial at baud rate 9800 continuously using timer 1 in auto reload mode. **[CO-4, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Find the value of PSW register after execution of following code :
MOV A, # 85 H
ADD A, # 92 H **[CO-2, L-U]**

b. Find the value in accumulator 'A' after execution of following code :
MOV A, # 23 H
RR A
RR A **[CO-3, L-A]**

c. Give different modes of timer and explain them. **[CO-4, L-U]**

d. Explain PCON register of microcontroller 8051 with its bit format. **[CO-4, L-R]**

e. Write an ALP to generate a triangular waveform using 8051. Assume necessary data. **[CO-5, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Give classification of instruction set of 8051. Also give an example of 1-byte instruction, 2-byte instruction and 3-byte instruction. **[CO-3, L-A]**

b. Draw and explain bit format of TMOD register and TCON register of microcontroller 8051. **[CO-4, L-A]**

c. Draw interfacing diagram of 8051 microcontroller with LCD display. How brightness of display can be changed? What is use of register select in interfacing? **[CO-5, L-A]**

****End****

EVEN 2025-26 **EC19R206/EC19206**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronic Engineering**
**Course Title : Digital Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. List any four Boolean law's **[CO2, L-R]**
b. Draw logical symbol for EX-OR and AND gate. **[CO2, L-R]**
c. Define minterms. Give one example. **[CO3, L-R]**
d. List any two applications of multiplexers. **[CO3, L-R]**
e. List different triggering methods used in sequential logic circuits. **[CO4, L-R]**
f. Draw symbol of D-Flip Flop. **[CO4, L-R]**
g. Classify semiconductor memories. **[CO5, L-R]**
h. List specifications of DAC (any two) **[CO5, L-R]**
i. Draw circuit diagram of dual slope ADC. **[CO5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Perform : $(29)_{10}$- $(15)_{10}$ using 2's complement method. **[CO1, L-U]**
b. State and prove De'-Morgan's Theorems. **[CO2, L-U]**
c. Design 8:1 mux using 4:1 Mux. **[CO3, L-A]**
d. Draw and explain Master-Salve JK Flip-Flop with (truth table) **[CO4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Convert : $(10111)_2$ = (gray code) **[CO1, L-A]**
$(45)_{10}$ = (BCD code)
$(32)_{10}$ = (excess 3 code)
$(101101.10)_2$ = (octal)

b. Draw T Flip-Flop using NAND gate. **[CO4, L-U]**
c. Draw basic building block of RAM with read and write operation. **[CO5, L-U]**
d. Perform BCD addition $(45)_{10} + (29)_{10}$ **[CO1, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw Basic gates using NAND gate. **[CO2, L-U]**
b. Draw block diagram of Decimal no BCD encoder. **[CO3, L-U]**
c. Draw full adder using two half-adder. **[CO3, L-U]**

d. Draw and explain clocked SR flip flop with truth table. **[CO4, L-U]**
e. Draw circuit diagram of weighted resistor circuit. **[CO5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. List any four main characteristics of logic family. Compare TTL,CMOS and ECL on any 4 points. **[CO2, L-A]**
b. Simplify given function using K-map and realize equation using gates. $F(A,B,C,D)=\Sigma m(0,1,8,9,10,11,12,13,14,15)$ **[CO3, L-A]**
c. Design MOD-9 asynchronous up counter, explain operation with T.T and waveform. **[CO4, L-A]**

****End****

EVEN 2025-26 **EC19302/EC19R302**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Linear Integrated Circuits and Applications**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define i) Input Offset voltage ii) CMRR. **[CO-1, L-R]**
b. Draw equivalent circuit of Op-Amp. **[CO-1, L-U]**
c. State any four electrical characteristics of Op-Amp. **[CO-1, L-U]**
d. Draw circuit of unity gain amplifier and state its output expression. **[CO-2, L-U]**
e. Draw the circuit diagram of Non-Inverting Comparator. **[CO-4, L-U]**
f. State any four applications of Timer. **[CO-3, L-A]**
g. Define: i) Q factor ii) Cut-off frequency with respect to filters. **[CO-2, L-U]**
h. Define Active filter and Passive filter. **[CO-2, L-U]**
i. Classify filters based on frequency response. **[CO-2, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw pin diagram of IC741.State function of each pin. **[CO-1, L-U]**
b. Compare open loop and closed loop configuration of Op-Amp. **[CO-2, L-A]**
c. Draw and explain the functional block diagram of IC555. **[CO-3, L-U]**
d. State merits and demerits of active filter and passive filter. **[CO-2, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Refer following figure $R_i$=10KΩ, $R_f$=100KΩ, $V_i$=1v, $R_L$=25KΩ.
Calculate i) $I_1$ ii) $I_L$ iii) $I_o$ iv) $V_o$ **[CO-2, L-A]**

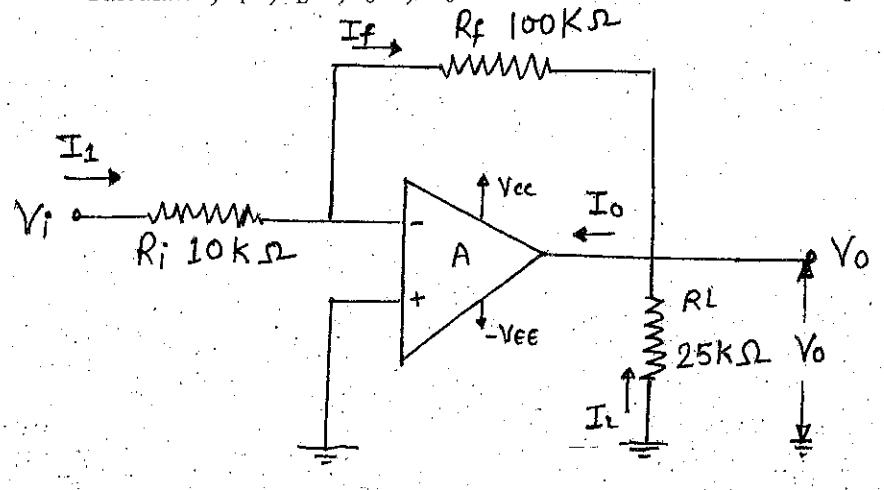



fig 3 (a)

EVEN 2025-26

b. Draw circuit diagram of zero crossing detector. Draw its input-output waveforms. **[CO-4, L-R]**
c. Draw block diagram of PLL. State function of each block. **[CO-3, L-R]**
d. State important parameters of Band Pass Filter. Explain how we get notch filter from band pass filter. **[CO2-, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Explain Positive Peak detector with neat circuit diagram. **[CO-2, L-U]**
b. Draw and explain Instrumentation amplifier whose gain is controlled by an adjustable resistance. **[CO-2, L-A]**
c. Draw inverting type Schmitt trigger. Draw its input output waveforms. **[CO-4, L-U]**
d. Draw pin diagram and block diagram of IC 565. **[CO-3, L-U]**
e. Draw the circuit diagram of First Order Butterworth High Pass filter. Also draw its frequency response. **[CO-2,L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw block diagram of Op-Amp. Explain the function of each block. Draw Ideal voltage transfer curve of Op-Amp. **[CO-1,L-U]**
b. With the help of neat circuit diagram ,explain the concept of V-I converter if the load is i) Floating ii) Grounded **[CO-2, L-U]**
c. Design First order Butterworth's Low pass Filter for high cut-off frequency of 2 Khz and pass band gain of 2. **[CO-2, L-A]**

****End****

EVEN 2025-26

EC23102

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering(Sandwich Pattern)**
**Course Title** : **Basic Electronics**

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | | |

*Instructions*:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. Draw symbol of (i) P-N junction diode (ii) Photo diode. **[CO-1, L-R]**
b. Write two applications of light emitting diode. **[CO-1, L-R]**
c. Define rectifier. State its types. **[CO-2, L-R]**
d. State types of biasing techniques of BJT. **[CO-3, L-R]**
e. Define (i) Load Regulation (ii) Line Regulation. **[CO-4, L-R]**
f. Draw pin diagram of voltage regulator Ic 78xx. **[CO-4, LR-]**
g. State limitations of zener diode voltage regulator. **[CO-4, L-R]**
h. Draw symbol of (i) N channel JFET (ii) P channel D-MOSFET. **[CO-3, L-R]**
i. State any two applications of FET. **[CO-3, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw half wave rectifier and explain its operation with waveforms. **[CO-2, L-U]**
b. Describe working principle of N-P-N transistor with neat diagram. **[CO-3, L-U]**
c. Compare BJT and JFET on basis of (i) Symbol (ii) Input resistance (iii) Thermal runaway (iv) Applications. **[CO-3, L-A]**
d. Draw block diagram of D.C. regulated power supply. Explain each block. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Draw and explain working principle of LED (Light Emitting Diode). **[CO-1, L-U]**
b. Draw circuit diagram of bridge rectifier with C-L-C (Pi) filter. Explain its operation with waveforms. **[CO-2, L-U]**
c. Compare CB,CE and CC configuration on basis of (i) Input resistance (ii) Output resistance (iii) Current gain (iv) Applications. **[CO-3, L-A]**
d. Draw and explain zener diode as voltage regulator with varying input voltage and fix load resistance. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw and describe reverse characteristics of zener diode. **[CO-1, L-U]**

b. In a full wave rectifier Vm = 10v, $R_L$ = 10KΩ . Calculate $V_{dc}$, $I_{dc}$ and Ripple factor. **[CO-2, L-A]**

c. Draw circuit diagram of transistor as switch and describe it. **[CO-3, L-U]**

d. State concept of thermal runaway. How it can be avoided? **[CO-3, L-U]**

e. Compare D-MOSFET and E-MOSFET (any three points). **[CO-3, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw and explain V-I characteristics of P-N junction diode. List any two applications of PN junction diode. **[CO-1, L-U]**

b. Compare half wave rectifier, center tapped full wave rectifier and bridge rectifier on basis of (i) No. of diodes (ii) Average D.C voltage ($V_{DC}$) (iii) Efficiency (iv) Ripple factor (v) PIV of diode (vi) T.U.F. **[CO-2, L-A]**

c. Draw and explain input and output characteristics of transistors in common emitter configuration. **[CO-3, L-U]**

****End****

EVEN 2025-26 **EC23503**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Entrepreneurship Development Programme**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions***:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Compare Entrepreneur and Manager (any two points). **[CO-1, L-R]**
b. State characteristics of Small enterprises. **[CO-2, L-R]**
c. State any two advantages of KAIZEN. **[CO-6, L-R]**
d. State the causes of accident. **[CO-4, L-R]**
e. State any two advantages of Entrepreneurship. **[CO-1, L-R]**
f. Write objectives of Inventory control. **[CO-5, L-R]**
g. State the types and source of capital generation. **[CO-4, L-R]**
h. Define ABC analysis in material management. **[CO-5, L-R]**
i. State the phases of project management process. **[CO-6, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Explain different barriers to Women entrepreneurs. **[CO-1, L-U]**
b. Explain DPIIT recognition guidelines with its benefits. **[CO-2, L-U]**
c. Explain any eight principles of management. **[CO-3, L-A]**
d. State types of procurrent. Explain any one in detail. **[CO-5, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Explain Khadi Village Industries Commission (KVIC) as support agencies for entrepreneurship. **[CO-2, L-U]**
b. Explain how SWOT analysis will help in complex problem solving to entrepreneurs. **[CO-3, L-U]**
c. Explain safety precautions taken at industry. **[CO-4, L-A]**
d. Write a short note on economic order quantity. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Explain traits of successful entrepreneur (i) Consistency (ii) Learning from failure (iii) Persistence. **[CO-1, L-U]**
b. Write a short note on Maharashtra Industrial Development Corporation (MIDC) . **[CO-2, L-U]**
c. Explain different types of Business. **[CO-3, L-U]**
d. Explain objective and functions of Financial management. **[CO-4, L-U]**
e. Explain Break even analysis. **[CO-6, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Explain Unique selling proposition with suitable example. **[CO-2, L-A]**

b. Explain with suitable example, basic functions of management. **[CO-3, L-A]**

c. Explain Risk management with suitable examples. **[CO-6, L-A]**

****END****

EVEN 2025-26

EC23203

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (Sandwich Pattern)**
**Course Title : Advance Communication Systems**

2:30 Hours/ 60 marksEnrolment No. | | | | | | | | | |

*Instructions*:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX 12 Marks**

a. Give the uplink & downlink frequency range for following bands i) X band ii) C band. **[CO-1, L-R]**
b. State the function of base station in mobile communication. **[CO-2, L-R]**
c. Define – i) Cell ii) Frequency reuse. **[CO-2, L-R]**
d. Define Co-channel interference with diagram. **[CO-3, L-R]**
e. Enlist the types Handoff. **[CO-3, L-R]**
f. State concept of scattering. **[CO-4, L-R]**
g. Define – i) Critical angle ii) Numerical aperture. **[CO-4, L-R]**
h. Enlist the features of FTTH. **[CO-5, L-R]**
i. State the necessity of GPON. **[CO-5, L-R]**

**Q.2 Attempt any THREE 12 Marks**

a. Explain Look angles of satellite communication with diagram. **[CO-1, L-U]**
b. Draw and explain block diagram of Logic unit of mobile phone. **[CO-2, L-U]**
c. Explain the mobile terminated call sequence in GSM. **[CO-3, L-U]**
d. Draw and explain block diagram of WDM. **[CO-5, L-U]**

**Q. 3 Attempt any THREE 12 Marks**

a. Explain working of Regenerative transponder with its block diagram. **[CO-1, L-U]**
b. Explain Telemetry, Tracking and command subsystem used in satellite communication. **[CO-1, L-U]**
c. Explain the working of GSM architecture with its block diagram. **[CO-3, L-U]**
d. Explain the construction of optical fiber with diagram. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR 12 Marks**

a. Draw and explain block diagram of mobile phone unit. **[CO-2, L-U]**
b. Explain following terms – i) Cluster ii) Traffic channel. **[CO-2, L-U]**
c. Write short note on total internal reflection. **[CO-4, L-U]**
d. Draw the block diagram of OTDR and state its applications. **[CO-5, L-U]**
e. Explain Power loss model in fiber optic communication. **[CO-5, L-U]**

**Q. 5 Attempt any TWO 12 Marks**

a. Draw block diagram of satellite earth station and explain function of each block in detail. **[CO-1, L-U]**

b. Explain the cell splitting, adjacent channel interference and handoff strategies with diagram. **[CO-3, L-U]**

c. A step index fiber having R.I of core with 1.5 and R.I of cladding 1.3. calculate the following i) Numerical aperture of the fiber ii) Critical angle of fiber iii) Relative refractive index difference. **[CO-4, L-A]**

****End****

EVEN 2025-26

**EC23103**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Electronics Instrument and Sensor**

2:30 Hours / 60 marks  Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define accuracy and precision. **[CO-1, L-R]**
b. Define sensitivity and fidelity. **[CO-1, L-R]**
c. Define resolution and speed of response. **[CO-2, L-R]**
d. Draw construction of LCD . **[CO-2, L-R]**
e. State need of delay line. **[CO-3, L-R]**
f. Define transducer and list its types. **[CO-4, L-R]**
g. State application of sensor. **[CO-4, L-R]**
h. Draw construction of thermocouple **[CO-5, L-R]**
i. State see back and Peltier effect. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Explain static characteristics of Instruments. **[CO-1, L-U]**
b. Explain working of PMMC Instrument with neat diagram. **[CO-2, L-U]**
c. Explain block diagram of CRO. **[CO-3, L-U]**
d. Explain classification of sensors. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Explain various types of errors in measurement. **[CO-1, L-A]**
b. Explain extension of Ammeter range. **[CO-2, L-A]**
c. Explain applications of CRO. **[CO-3, L-A]**
d. Explain working of LVDT with diagram . **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Compare Analog and Digital meters. **[CO-2, L-U]**
b. Draw Lissajous pattern for given signal
i) $f_x = 2f_y$ ii) $f_y = 3f_x$ **[CO-2, L-A]**
c. Explain working of RTD with diagram **[CO-5, L-A]**
d. Explain block diagram of Instrumentation system. **[CO-4, L-U]**
e. State flow measurement methods and explain any one. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw and explain bloc diagram of Ramp type digital volt meter and list type of volt meter **[CO-2, L-A]**
b. Explain frequency measurement using Lissajous pattern. **[CO-5, L-A]**
c. Select suitable sensor for temperature measurement and justify. **[CO-5, L-A]**

****End****

EVEN 2025-26

**EC23106**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : EC Engineering**
**Course Title : Applied Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. State need of cascading. **[CO-1, L-U]**
b. List the advantages of Direct coupled amplifier (any two). **[CO-1, L-R]**
c. Draw hybrid equivalent model of CE configuration. **[CO-1, L-R]**
d. Define Resonant frequency and Q factor. **[CO-1, L-R]**
e. List the advantages of push pull amplifiers. (any two points) **[CO-2, L-R]**
f. Compare positive and negative feedback. (any two points) **[CO-3, L-U]**
g. State an effect of negative feedback on amplifier parameters.
i) Bandwidth ii) Stability **[CO-3, L-U]**
h. Draw block diagram of current shunt feedback amplifier. **[CO-3, L-R]**
i. State Barkhausen's criteria. **[CO-3, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Explain two stage transformer coupled amplifier with circuit diagram **[CO-1, L-U]**
b. Draw and explain circuit diagram of double tuned amplifier. **[CO-1, L-R]**
c. Explain class B push pull amplifier with circuit diagram. **[CO-2, L-U]**
d. Draw and explain circuit diagram of exponential sweep generator. **[CO-4, L-R]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Determine h - parameter for equivalent model of CB configuration. **[CO-1, L-U]**
b. A circuit is resonant at 455 KHz and has a 10 KHz bandwidth. The inductive reactance is 1255 Ω and circuit resistance is 27.6 Ω. Calculate the parallel impedance of the circuit at resonance? **[CO-1, L-A]**
c. Explain the concept of cross over distortion with neat waveform **[CO-2, L-U]**
**d.** Explain Hartley oscillator with circuit diagram. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Compare series and parallel tuned circuit. (any 3 points) **[CO-1, L-U]**

b. A parallel resonant circuit consist of a C= 100 pf and L= 100 μH. The inductor has a resistance of 5Ω.in series Find the value of frequency at which the circuit will resonate and the circuit impedance at resonance. **[CO-1, L-A]**

c. Draw circuit diagram of voltage series feedback amplifier. **[CO-3, L-R]**

d. An amplifier has a mid frequency gain of 100 and a bandwidth of 200 KHz. Find the new bandwidth and gain, if 5% negative feedback is introduced. **[CO-3, L-A]**

e. An amplifier with negative feedback gives an output of 12.5 V with an input of 1.5 V. When feedback is removed it requires 0.25 V input for the same output. Find i) Value of voltage gain without feedback & b) Value of β, if input & output are in phase and β is real. **[CO-3, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Compare class A, class B, class C and class AB power amplifier with respect to i) Q- point ii) Conduction angle iii) efficiency. **[CO-2, L-U]**

b. Explain Astable Multivibrator with neat circuit diagram and waveforms. **[CO-4, L-U]**

c. Draw circuit diagram for i) R-C Phase shift Oscillator. ii) Crystal Oscillator **[CO-4, L-R]**

****End****

EVEN 2025-26

EC23113

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **VLSI**

2:30 Hours/ 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. List the second order effects in CMOS. **[CO-1, L-R]**
b. Define fan-in and fan-out. **[CO-2, L-R]**
c. List the two advantages of VHDL. **[CO-3, L-R]**
d. Define transmission gate design style. **[CO-4, L-R]**
e. List the types of PLD's. **[CO-4, L-R]**
f. Differentiate between NMOS & PMOS. **[CO-1, L-U]**
g. Draw inverter using NMOS transistor. **[CO-2, L-R]**
h. Define (i) Entity (ii) Architecture. **[CO-3, L-R]**
i. Compare ASIC & FPGA. **[CO-4, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw and explain the I.V. characteristics of MOS transistor. **[CO-1, L-U]**
b. Draw following equation using CMOS logic $= \overline{A + B.C}$ . **[CO-2, L-A]**
c. Explain the basic structure of CPLD. **[CO-4, L-U]**
d. Explain speed and power dissipation of dynamic logic. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Explain the dynamic behavior of CMOS inverter. **[CO-2, L-U]**
b. Write VHDL code for half and full adder. **[CO-3, L-A]**
c. Explain the basic principle of dynamic CMOS logic. **[CO-4, L-U]**
d. Explain transmission gate using diagram. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw symbol for NMOS and PMOS transistor. **[CO-1, L-R]**
b. Derive equation for dynamic power consumption. **[CO-2, L-A]**
c. List the different concurrent construct used in VHDL. Explain any one in detail. **[CO-3, L-U]**
d. Explain factors affecting while selection of logic style. **[CO-4, L-U]**
e. Implement the following equation $y = A.\bar{B} + \bar{A}.B$ using PLA. **[CO-4, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Explain the fabrication process of CMOS with neat sketch. **[CO-1, L-U]**
b. Write and explain VHDL program for 4-bit counter using flip-flop. **[CO-3, L-A]**
c. Draw and explain functional block diagram of FPGA in detail. **[CO-4, L-U]**

EVEN 2025-26

**EC23110**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electrical Engineering (Sandwich Pattern)**
**Course Title** : **Elements of Electronics Engineering**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. List two types of semiconductors with example. **[CO-1, L-R]**
b. Define ripple factor and PIV of diode for rectifier. **[CO-2, L-R]**
c. Draw the symbols of NPN & PNP transistor. **[CO-3, L-R]**
d. List two applications of FET. **[CO-3, L-R]**
e. State two application of IC7805 **[CO-4, L-R]**
f. Draw truth table and symbol of NAND gate **[CO-5, L-R]**
g. State two applications of Zener diode. **[CO-1, L-R]**
h. Define i) Efficiency of rectifier
ii) TUF **[CO-2, L-R]**
i. Define operating point of transistor. **[CO-3, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. With Suitable diagram explain the working of P-N Junction diode **[CO-1, L-U]**

b. Identify the circuit shown in fig 1 . Explain working with input – output waveform for a sinusoidal input.

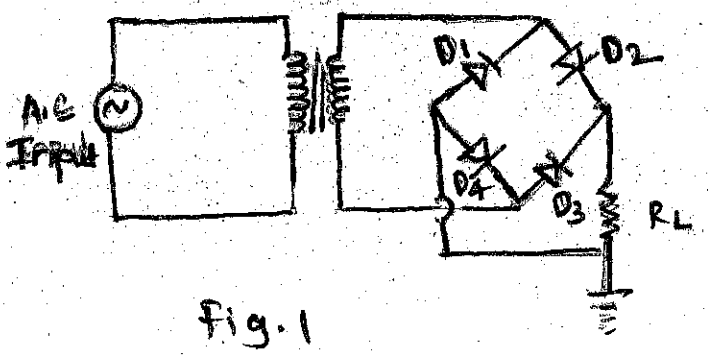



Fig. 1

**[CO-2, L-U]**

c. Describe the working of transistor as a switch with circuit diagram. **[CO-3, L-U]**

d. Draw a block diagram of DC regulated power supply Explain the function of each block. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Compare FET and BJT with any four points. **[CO-3, L-U]**

b. Convert following numbers in to binary & octal numbers

i) $(55)_{10}$ ii) $(92)_{10}$ **[CO-5, L-A]**

c. List the biasing techniques used in FET. Explain any one in detail. **[CO-3, L-D]**

d. Describe the Zener diode as Voltage regulator with neat sketch. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw construction of LED and explain working principle. **[CO-1, L-U]**

b. Draw and explain working of half wave rectifier. **[CO-2, L-U]**

c. In N-channelJFET describe the effect of input voltage VGS on output current ID. **[CO-3, L-U]**

d. Explain the concept of thermal runaway in BJT. **[CO-3, L-U]**

e. Draw basic gates using NAND gate. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw and explain working of Zener diode in reverse biased condition. Draw its V-I characteristics. **[CO-1, L-A]**

b. I) Compare Half wave, Bridge full wave and center tapped full wave rectifier based on given parameter -

i) PIV ii) Rectification efficiency

iii) Ripple factor iv) DC voltage. **[CO-2, L-A]**

II) Describe working of shunt capacitor filter with half wave rectifier **[CO-2, L-U]**

c. Draw circuit diagram of single stage RC coupled CE amplifier and Describe it's working with the help of input and output waveform. **[CO-3, L-U]**

****End****

EVEN 2025-26 **EC23108**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Microcontroller**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. Define : (i) Assembler (ii) Debugger. **[CO-1, L-R]**
b. State function of TXD & RXD pin of 8051. **[CO-1, L-R]**
c. List various modes used in timer programming in 8051 microcontroller. **[CO-2, L-R]**
d. State default priority of interrupts in 8051 microcontroller. **[CO-3, L-R]**
e. Name and describe any two machine control instructions. **[CO-2, L-U]**
f. Draw format of PCON register in 8051. **[CO-4, L-R]**
g. Draw interfacing diagram of RS232 with 8051 microcontroller. **[CO-4, L-R]**
h. Distinguish between hardware and software interrupts of 8051. (any two points) **[CO-3, L-A]**
i. Write assembly language program (ALP) to generate square wave at port pin P2.7 of 8051. **[CO-5, L-A]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw format of program status word (PSW) of 8051 and state use of what information each flag (bit) gives? **[CO-1, L-U]**
b. Describe directives used in 8051 (in detail) with example. (any four) **[CO-2, L-U]**
c. State significance of SBUF register in serial transmission of data in 8051 and state function of each bit in SCON register. **[CO-5, L-A]**
**d.** Interface common cathode type 7 segment display with 8051 and write ALP to display '7' on 7 segment display. **[CO-5, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. State function of each pin of port 3. Describe alternate function of each port 3 pin in detail. **[CO-1, L-A]**
b. Draw memory map of internal memory of 8051, describe each section in detail. **[CO-1, L-U]**
c. Draw format and describe each bit in special function registers IE (Interrupt Enable) & IP (interrupt Priority). **[CO-3, L-U]**
d. Interface 8 KB of RAM with 8051 microcontroller. Draw interfacing diagram and generate address for the interfaced RAM locations. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Write assembly language program to transfer five numbers stored at 30H to 34H to the 50H to 54H location in internal RAM. **[CO-2, L-A]**

b. Draw format of timer control (TCON) register. Describe function of each bit in detail. **[CO-3, L-U]**

c. Write assembly language program (ALP) to generate delay of 10ms. Using timer 1 in mode 1. **[CO-3, L-A]**

d. Write ALP to transmit message "YES" serially using mode 1 at 9600 baud rate. **[CO-4, L-A]**

e. Draw interfacing diagram of stepper motor with 8051 microcontroller. **[CO-5, L-A]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Define addressing modes. List its types. Describe (any 4) addressing modes with example. **[CO-2, L-U]**

b. Draw architecture of 8051 microcontroller & define (i) Program counter (ii) Stack pointer (iii) Stack. **[CO-1, L-R]**

c. Write assembly language program (ALP) to display 'GPM' continuously on LCD interfaced to 8051. Also draw interfacing diagram. **[CO-5, L-A]**

****END****

EVEN 2025-26 **EC23202**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (Sandwich Pattern)**
**Course Title : Consumer Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Draw the block diagram of PA system (Public Address) **[CO-1, L-R]**
b. List various controls of Hi- Fi amplifier. **[CO-1, L-R]**
c. Define following term of TV
i) Aspect ratio ii) Vertical resolution **[CO-2, L-R]**
d. Draw block diagram of Direct to Home Receiver (DTH) **[CO-3, L-R]**
e. State the function of Magnetron in microwave oven. **[CO-4, L-R]**
f. State important specification of washing machine. (Any four) **[CO-4, L-R]**
g. Draw the block diagram of Air conditioner. **[CO-4, L-R]**
h. List any four components of Drones (Hardware and software) **[CO-5, L-R]**
i. List the types of drones. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw the block diagram of Hi Fi amplifier and explain its working principle. **[CO-1, L-U]**
b. Compare between color TV Transmitter and color TV Receiver. (Any four points) **[CO-2, L-R]**
c. State Installation steps and Applications of CCTV **[CO-3, L-R]**
d. Explain recent trends in Drone technology. **[CO-5, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Explain troubleshooting and specifications for colour television. **[CO-2, L-A]**
b. State difference between LED and LCD television. (any four points.) **[CO-3, L-A]**
c. List safety instructions and electrical specifications of Microwave oven. **[CO-4, L-U]**
d. Explain working principle of digital cam coder. **[CO-4, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Explain troubleshooting procedure of audio system. **[CO-1, L-A]**
b. Explain vestigial side band transmission, bandwidth for color signal of television. **[CO-2, L-U]**
c. Explain the function of all the blocks of cable television. **[CO-3, L-U]**

d. Draw block diagram of Refrigerators and write any two troubleshooting method of it. **[CO-4, L-A]**

e. State different parts of drones and explain any one. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw the block diagram of color TV picture tube and explain its working principle. **[CO-2, L-A]**

b. Explain working principle of smart TV with block diagram. State any two advantages. **[CO-3, L-U]**

c. List the use cases of Drones. Explain drone applications in
i) Agriculture ii) Defense **[CO-5, L-U]**

****End****

EVEN 2025-26 **EC23501**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Internet of Things**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

*Instructions*:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

**Q.1 Attempt any SIX** **12 Marks**

a. List any two characteristics of IoT. **[CO-1, L-R]**
b. Differentiate between physical design and logical design in IoT. **[CO-1, L-A]**
c. State concept of MQTT protocol. **[CO-2, L-R]**
d. Define block programming. Name two block programming platforms. **[CO-4, L-R]**
e. State any four advantages of learning python for IoT. **[CO-4, L-R]**
f. Draw SaaS architecture using block programming. **[CO-5, L-R]**
g. List benefits of AWS for IoT. **[CO-5, L-R]**
h. List two common platform adhesion types. **[CO-6, L-R]**
i. List two IoT supported platforms. **[CO-2, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. Describe the conceptual framework of IoT architecture briefly. **[CO-1, L-U]**
b. Explain the working principle of any one sensor. **[CO-3, L-U]**
c. Explain the steps involved in block programming. **[CO-4, L-U]**
d. Compare skirt, brim and raft adhesion settings. **[CO-6, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Explain the block diagram of an embedded system. **[CO-2, L-U]**
b. Differentiate between UART and SPI communication.(any four points) **[CO-3, L-A]**
c. Explain python direct IDEs in IoT software development. **[CO-4, L-U]**
d. Explain the circuit designer tools used for IoT. **[CO-4, L-U]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. State design principles for connected IoT devices. **[CO-1, L-U]**
b. Differentiate between SaaS and PaaS.(any four points) **[CO-5, L-A]**
c. Explain the basic principles of 3D printing. **[CO-6, L-U]**
d. State the need for post processing in 3D printed models. **[CO-6, L-U]**
e. Discuss the steps to open an AWS account for IoT applications. **[CO-5, L-R]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Compare Arduino and Raspberry Pi based on IoT applications with examples. **[CO-2, L-A]**

b. Explain Bluetooth, Wi-Fi and ZigBee technologies in the context of IoT. **[CO-3, L-U]**

c. Explain the detail the cloud connectivity architecture for IoT applications. **[CO-5, L-U]**

****END****

EVEN 2025-26 **AI23111**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **AIML**
**Course Title** : **Theory of Computation**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions***:
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

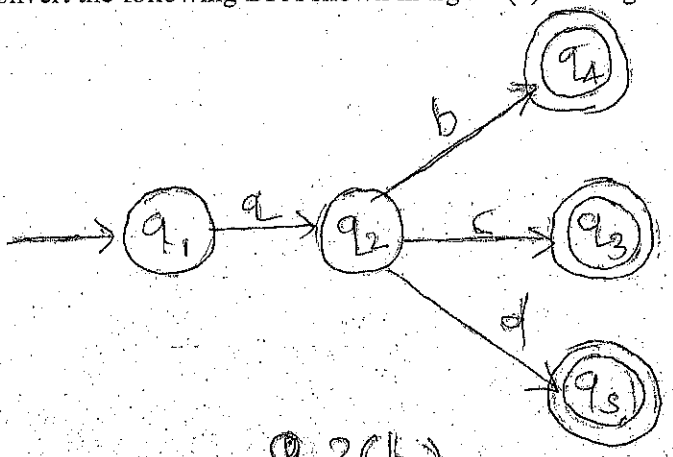
a. Define the terms with the truth tables i) Conjunction ii) Disjunction. **[CO-1, L-U]**
b. Define cardinality of a set. **[CO-1, L-U]**
c. Define NFA (Non deterministic Finite Automata). **[CO-2, L-R]**
d. Define CNF. **[CO-4, L-R]**
e. Write any four tuples of context free grammar. **[CO-4, L-R]**
f. Define regular expression with example. **[CO-3, L-R]**
g. Define Non-deterministic Turing machine. **[CO-5, L-R]**
h. Define loader with example. **[CO-6, L-U]**
i. Define compiler with example. **[CO-6, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw the graphs representing the following chemical compounds : i) $CH_4$ ii) NaOH iii) $CaCo_3$ iv) KCL. **[CO-1, L-U]**
b. Design NFA that accepts strings containing 1100 or 1010 as a substring. The input symbols are $\Sigma=\{0,1\}$. **[CO-2, L-A]**
c. Explain the closure properties of regular expression. **[CO-3, L-A]**
d. For the grammar G={V,T,P,S} where S→OB, A→1AA | ∈, B→OAA. Draw the derivation tree for the above grammar. **[CO-4, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Differentiate between DFA and NFA. **[CO-2, L-U]**
b. Convert the following DFA shown in figure (b) to a regular expression.




9.3(b)

[CO-3, L-A]

c. Convert the given CFG to CNF. Consider the given grammar G: S→9 | A | B, A→aBB | ∈, B→Aa | b. [CO-4, L-A]

d. Explain assembler with example. [CO-6, L-U]

**Q. 4 Attempt any FOUR** **12 Marks**

a. Define the following terms with respect to trees : i) Leaf node ii) Root node iii) Depth of a tree. [CO-1, L-U]

b. Define grammar, explain classification of grammar. [CO-4, L-U]

c. Explain with example left and right derivation tree. [CO-4, L-U]

d. Differentiate between compiler and interpreter. [CO-6, L-U]

e. Explain macro and macro processor with example. [CO-6, L-U]

**Q. 5 Attempt any TWO** **12 Marks**

a. For given NFA for a language L={set of all strings over (0,1) that ends with '01)}. Construct its equivalent DFA. [CO-2, L-A]

b. Convert the following regular expression to its equivalent finite automata (a/b)*(abb/$a^+$b). [CO-3, L-A]

c. Determine the language accepted by CFG having following production rules hence represent in 4 tuple form of its definition S→ASB/∈ A→0 B→1. [CO-4, L-A]

****End****

EVEN 2025-26 **EC23107**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme** : **Electronics Engineering (Sandwich Pattern)**
**Course Title** : **Analog & Digital Communication**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Define Sampling theorem and Nyquist criteria. **[CO-2, L-R]**
b. List applications of PCM. **[CO-2, L-R]**
c. Draw electromagnetic spectrum. **[CO-1, L-U]**
d. Compare Analog & Digital communication (any two points). **[CO-1, L-U]**
e. Define Bit rate and Baud rate. **[CO-3, L-R]**
f. State the need of Multiplexing. **[CO-3, L-R]**
g. Compare Coherent & Non-coherent detection. (any two points) **[CO-4, L-U]**
h. List advantages and dis-advantages of ASK. **[CO-4, L-R]**
i. Enlist various applications of Ground wave propagation. **[CO-5, L-R]**

**Q.2 Attempt any THREE** **12 Marks**

a. State the need of modulation and list various modulation techniques. **[CO-1, L-R/U]**
b. Describe quantization process and quantization noise with diagram. **[CO-2, L-U]**
c. Draw and explain block diagram of digital communication system. **[CO-3, L-R]**
d. Draw block diagram of DPSK and explain function of each block with waveform. **[CO-4, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Define FM. A 107.6 MHz carrier signal is frequency modulated by 7 KHz sine wave. The FM signal has frequency deviation 50KHz. Determine modulation index of FM wave. **[CO-2, L-A]**
b. Explain vertical redundancy check (VRC) technique in detail. **[CO-3, L-U]**
c. State need of QAM, draw its waveforms. **[CO-4, L-U]**
d. Define following antenna parameters : (i) Directivity (ii) Antenna gain (iii) Radiation pattern (iv) Beam width. **[CO-5, L-R]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw block diagram of communication system also list the types of communication system. **[CO-1, L-U]**
b. Draw block diagram of AM super heterodyne receiver. Draw AM wave in time domain. **[CO-1, L-U]**

c. Compare between PAM and PWM. (any three points) **[CO-2, L-A]**
d. Draw radiation pattern and list applications of yogi-uda antenna. **[CO-5, L-U]**
e. Draw and explain the construction of horn antenna. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Describe PCM transmitter and receiver block diagram in detail. **[CO-2, L-U]**
b. Compare TDM, FDM and CDM. (any four points) **[CO-3, L-A]**
c. Compare : ASK, FSK, BPSK on the basis of : **[CO-4, L-A]**
   (i) Constant parameter
   (ii) BW
   (iii) S/N ratio
   (iv) Data rate

****END****

EVEN 2025-26 **EC23104**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (Sandwich Pattern)**
**Course Title : Digital Electronics**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Write the radix of binary, octal, decimal and hexadecimal number system. **[CO-1, L-R]**
b. Write the gray code of given number $(0011)_2 = (?)_{Gray}$ **[CO-1, L-R]**
c. Draw the circuit diagram for AND and OR gates using diodes. **[CO-2, L-A]**
d. Define Fan-in and Fan-out of gate. **[CO-2, L-R]**
e. Write any four Boolean laws. **[CO-2, L-R]**
f. Define priority encoder and state the IC number which is used as decimal to BCD encoder. **[CO-3, L-R]**
g. List triggering methods used for triggering flip flops. **[CO-4, L-R]**
h. List the types of DAC. **[CO-5, L-R]**
i. Compare RAM and ROM. **[CO-5, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Perform the subtraction using 2's complement method $(35)_{10} - (52)_{10}$ **[CO-1, L-A]**
b. State and prove De-Morgan's theorem. **[CO-2, L-A]**
c. Compare TTL and CMOS logic families on the basis of following :
(i) Propagation delay (ii) Power dissipation (iii) Fan-out (iv) Basic gate. **[CO-2, L-U]**
d. Design half adder circuit using K-map method. **[CO-3, L-U]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Draw the block diagram of BCD to 7 segment decoder using IC 7447 write truth table of it. **[CO-3, L-R]**
b. Explain the working of master-slave JK flip-flop with truth table and logic diagram. **[CO-4, L-R]**
c. Differentiate between combinational and sequential circuits. (any four points) **[CO-4, L-U]**
d. Calculate the analog output of 8 bit DAC for digital I/P 10011100. Assume V (full scale) = 5V. **[CO-5, L-R]**

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**Q. 4 Attempt any FOUR** **12 Marks**

a. Convert $(FA35.DCA)_{16} = (?)_{10} = (?)_8$ **[CO-1, L-A]**

b. Draw basic gates using NAND gate. **[CO-2, L-U]**

c. Implement full adder using two half adder. **[CO-3, L-U]**

d. Draw clocked S-R flip-flop with truth table. **[CO-4, L-U]**

e. Draw pin diagram of DAC IC 0808 with specification. **[CO-5, L-U]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Simplify the following Boolean expression using K-map. **[CO-3, L-A]**
$f(A, B, C, D) = \Sigma m(2,3,6,7,8,10,13,15)$ Realize the final equation using gates.

b. Design mod-12 ripple counter. Write its truth table with waveforms. **[CO-4, L-A]**

c. Draw block diagram of dual slope ADC and explain its working. **[CO-5, L-U]**

****End****

EVEN 2025-26 **EC23109**

# GOVERNMENT POLYTECHNIC MUMBAI
## TERM END EXAMINATION

**Programme : Electronics Engineering (SP)**
**Course Title : Linear Integrated Circuits**

2:30 Hours / 60 marks Enrolment No. | | | | | | | | | | |

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***Instructions*:**
1. Attempt all the questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Use of Mathematical Tables, Steam Table and Pocket Calculator (non-programmable) is permissible.
4. Marks on Right Hand Side indicate full marks for the question.
5. Assume suitable additional data, if necessary
6. CO=COURSE OUTCOMES, L=LEVELS

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**Q.1 Attempt any SIX** **12 Marks**

a. Draw equivalent circuit of op-amp and label it. **[CO-1, L-R]**
b. List any four ideal characteristics of op-amp. **[CO-1, L-R]**
c. Differentiate between open-loop and closed loop configurations of op-amp. (any four points) **[CO-2, L-U]**
d. Draw circuit diagram of inverting zero crossing detector and also draw o/p waveform for sine wave input. **[CO-2, L-R]**
e. Draw and state op-amp as a sign changer or inverter. **[CO-3, L-R]**
f. State Barkhusen's criterion for oscillations. **[CO-4, L-R]**
g. Draw pin diagram of IC555 and label the pins. **[CO-4, L-R]**
h. Define the following terms in case of active filter :
(i) Roll of rate (ii) Bandwidth **[CO-5, L-R]**
i. List merits and demerits of active filter over passive filter. **[CO-5, L-U]**

**Q.2 Attempt any THREE** **12 Marks**

a. Draw block diagram of operational amplifier. State function of each block. **[CO-1, L-U]**
b. Draw and explain positive peak detector. **[CO-2, L-U]**
c. Draw and explain difference amplifier using op-amp in closed loop configuration. **[CO-3, L-U]**
d. Draw circuit diagram & o/p waveform of monostable multivibrator using IC555. Also write expression for ON time. **[CO-4, L-A]**

**Q. 3 Attempt any THREE** **12 Marks**

a. Draw and explain sample and hold circuit using op-amp. **[CO-3, L-U]**
b. Draw and explain Colpitt's Oscillator using op-amp. **[CO-4, L-R]**
c. Draw the neat circuit diagram of first order high pass filter and describe its working principle. **[CO-5, L-U]**
d. Draw circuit diagram of notch filter. Also draw frequency response of it. **[CO-5, L-A]**

**Q. 4 Attempt any FOUR** **12 Marks**

a. Draw ideal and practical voltage transfer curve for an op-amp. **[CO-1, L-A]**
b. Draw non-inverting comparator circuit its i/p and o/p waveforms for positive reference voltage. (consider $V_{in} = 4V_{PP}$, $V_{ref} = 2V$) **[CO-2, L-A]**

c. Draw practical circuit of active integrator. State equation for its output voltage. **[CO-3, L-A]**

d. If $R_1$ = 2KΩ, Rf = 100KΩ, $V_{CC}$ = +/- 15V. Calculate output voltage of inverting amplifier for input voltage 20mV. **[CO-3, L-A]**

e. Draw block diagram of PLL and explain it. **[CO-4, L-R]**

**Q. 5 Attempt any TWO** **12 Marks**

a. Draw and explain working of inverting Schmitt trigger circuit. Also state expression for upper threshold voltage & lower threshold voltages with neat output waveform. **[CO-2, L-U]**

b. Draw instrumentation amplifier using 3-op-amp. Derive expression for its output voltage. **[CO-3, L-A]**

c. Design & draw a first order low pass butterworth filter with cut-off frequency 2KHz & closed loop gain 3.2. Also draw its frequency. **[CO-5, L-A]**

****End****