

E-1125

B. E. 1st Semester (Main & Re) Examination, December – 2019

BASIC ELECTRONICS ENGG.

Branch : (CSE, EE, ECE)

Code : BEC-101

Time : Three Hours]

[Maximum Marks : 60]

Note : Attempt *all* questions from *Section – A* *four* questions from *Section – B* and *three* questions from *Section – C*.

Section- A : Filling the blanks/MCQ/True, false. $1 \times 10 = 10$

Section- B : Short answer type questions. $5 \times 4 = 20$

Section- C : Long / descriptive answer type questions. $10 \times 3 = 30$

SECTION – A

Note: Attempt all questions.

P.T.O.

4. For a full wave rectifier root mean square value of current is :

(a) I_m

(b) $\frac{I_m}{2}$

(c) $\frac{I_m}{\sqrt{2}}$

(d) $\sqrt{2}I_m$

5. The LED emits light when biased.

(a) Reverse

(b) U_n

(c) Forward

(d) None of the above

6. The transistor act as an amplifier in the region.

(a) Cut off

(b) Saturation

(c) Active

(d) All

7. In common collector configuration, current amplification factor given as :

(a) $\alpha = \frac{I_c}{I_E}$

(b) $\beta = \frac{I_C}{I_B}$

(c) $\gamma = \frac{I_E}{I_B}$

(d) None of these

8. JFET and MOSFETS are controlled device .

(a) Current

(b) Voltage

(c) Field

(d) Power

9. gate is also known as universal gate.

(a) OR

(b) EX - OR

(c) NAND

(d) NOT

10. A Half wave rectifier is

(a) Negative clipper

(b) Positive clamper

(c) Filter

(d) Voltage regulator

SECTION – B

1. Explain the operation of transistor as an amplifier.

2. Give working of bridge rectifier with circuit diagram. Also give its input-output wave forms.

3. Convert :

(i) $(5EA339)_{16} = (?)_{10} = (?)_2$

(ii) $(21.125)_{10} = (?)_2 = (?)_8$

4. Explain working of diode.

(a) Unbias condition

(b) Forward bias

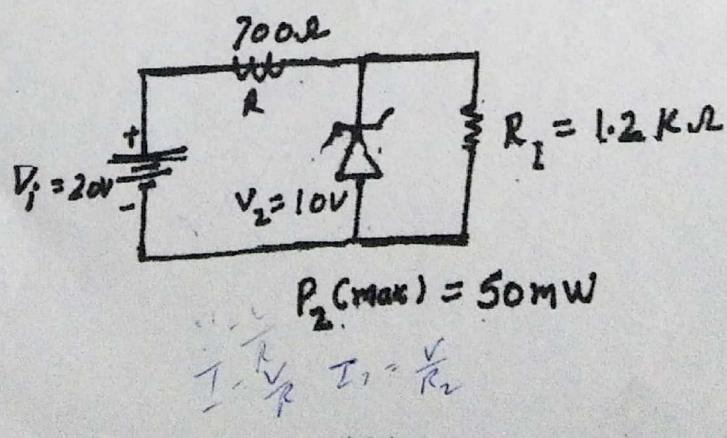
(c) Reverse bias

5. Enlist the difference between BJT and FET.

6. Explain the block diagram of the communication system and describe the function of each element.

SECTION - C

- A BJT common emitter amplifier has a potential divider bias using $V_{cc} = 12V$, $R_c = 4k\Omega$, $R_1 = 20k\Omega$, $R_2 = 5k\Omega$, $V_{BE} = 0.6V$ and $\beta = 100$. Determine the operating point.
- Explain enhancement type MOSFET with diagram and draw the transfer and output characteristics.
- (a) For the network shown determine V_L , V_R , I_Z , and I_R .



(3)

P.T.O.

B. E. Ist Semester (Main & Re) Examination, December – 2019

ENGINEERING GRAPHICS & DESIGN

Code : BME 101/201

Branch : (CSE, ECE, EE)

Time : Three Hours]

[Maximum Marks : 60

Note : Attempt *all* questions from *Section – A* four questions from *Section – B* and *three* questions from *Section – C*.

Section- A - Filling the blanks/MCQ/True, false. $1 \times 10 = 10$

Section- B - Short answer type questions. $5 \times 4 = 20$

Section- C - Long/ descriptive answer type questions. $10 \times 3 = 30$

SECTION – A

1. (i) What are non parallel and non intersecting lines called ?

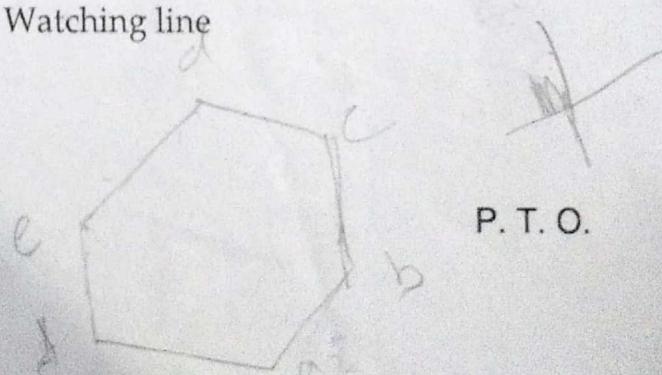
- | | |
|------------------|-------------------------|
| (a) Spiral lines | (b) Parallel lines |
| (c) Skew lines | (d) Perpendicular lines |

(ii) The following is not included in title block of drawing sheet.

- | | |
|--------------------------|-------------------|
| (a) Sheet No. | (b) Scale |
| (c) Method of Projection | (d) Size of Sheet |

(iii) The dotted line represents.

- | | |
|------------------|---------------------|
| (a) Hidden edges | (b) Projection line |
| (c) Centre line | (d) Watchung line |



- (iv) The internal angle of regular hexagon is degree.

(a) 72 (b) 108
(c) 120 (d) 150

(v) Metric thread of 10 mm diameter is represented by :

(a) 10 M (b) M10
(c) M¹⁰ (d) None of the above

(vi) The length : Width in case of an arrow head is.

(a) 1 : 1 (b) 2 : 1
(c) 3 : 1 (d) 4 : 1

(vii) A cube is resting on HP. with a solid diagonal perpendicular to H. The top view will appear as :

(a) Square (b) Rectangle
(c) Irregular hexagon (d) Regular hexagon

(viii) Radial line method of development is used to develop the surface of.

(a) Pyramid (b) Cone
(c) Cylinder (d) All of these

(ix) The offset command cannot be used to create :

(a) Concentric circles (b) Vertical Straight
(c) Three parallel lines (d) Parallel areas.

(x) Which grade of pencil is used for drawing arrowhead ?

(a) 2 H (b) 2 B
(c) 7 H (d) H

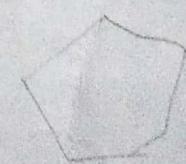
SECTION – B

2. Write different type of equipments used in Drawing. Explain four with neat sketch.
3. Explain UCS with reference to CAD software.
4. Define : (i) A feature, (ii) A functional dimension, (iii) Datum Dimension, (iv) Notation of Dimension.
5. Point A is 20 mm above HP and 30 mm in front of VP and point B is in the HP and 40 mm behind the V. P. The distance between their projectors is 50 mm. Draw the projections of the points. Also draw straight lines joining their top and front view.
6. The end P of a line PQ 120 mm long is 30 mm above HP and 60 mm behind VP. The line is inclined at an angle of 30° with the reference plane of projection. The point Q is below the H.P. Draw the projections of the line PQ and locate the Point Q.
7. A regular hexagonal lamina of side 20mm rests on one of its sides on HP. Such that it is perpendicular to V.P. and inclined to the H. P. at 45° . Its corner nearest to the VP. is 15mm away from the VP. Draw the projection.

SECTION – C

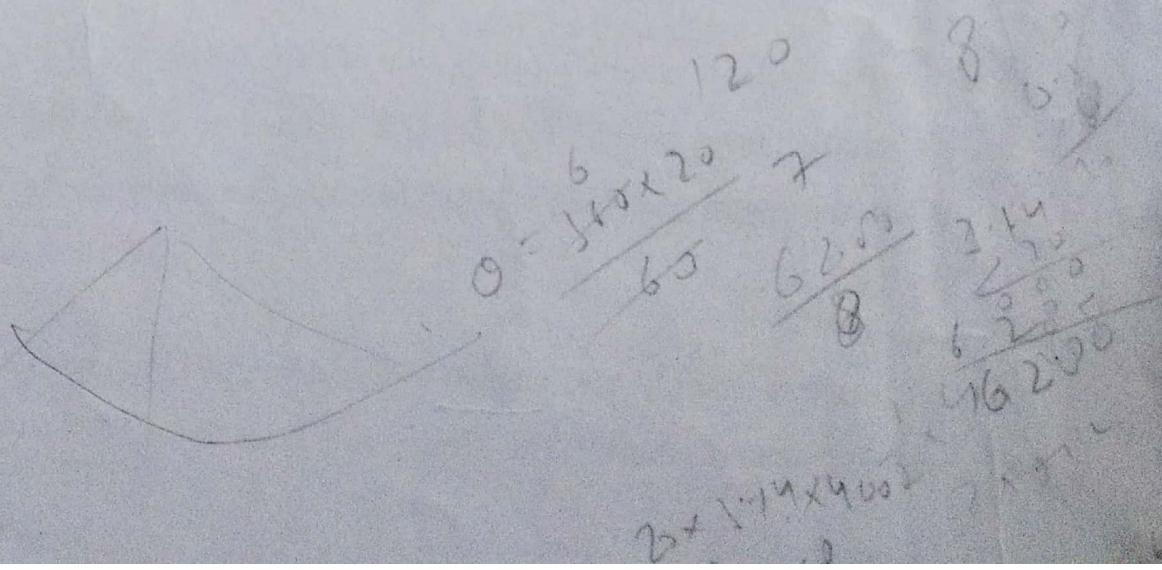
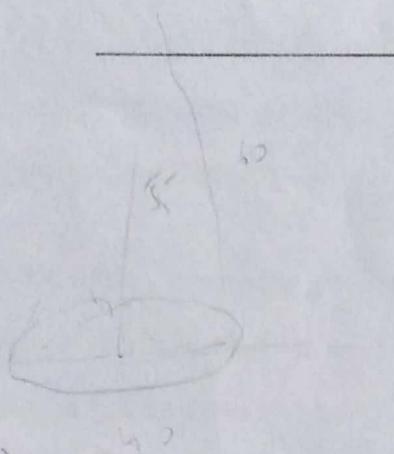
8. Draw free hand sketch (Elevation full in Section) of, spigot and socket joint.
9. A right regular hexagonal prism, side of base 20mm and 53mm long, lies, on one of its rectangular faces on HP. and its axis inclined at 45° to the VP. Draw its projection. When the centre of area of its each face which is towards the VP is 20 mm away from the VP.
10. An isosceles triangle ABC base 75 mm and height 45mm has its base AC in the H.P. and inclined at 30° to the VP. The corners A & B are in the VP. Draw its projections.

(3)



P. T. O.

11. A right circular cone, base diameter 40mm and. (i) height 55mm, (ii) Slant height 60 mm, rests on its base on HP. Develop its lateral surface.
12. A right circular cone of ϕ 30 mm base and height. 36mm rests centrally on top a square block of 48 mm side and 22 mm thick. Draw the isometric projection of two solids.



B. E. Ist Semester (Main & Re) Examination, December - 2019

PROBLEM SOLVING & COMPUTER PROGRAMMING USING C

Branch: (CSE, ECE, EE)

Time : Three Hours]

[Maximum Marks : 60]

Note : Attempt all questions of Section - A, four questions from Section - B and three questions from Section - C.

SECTION - A

[1 × 10 = 10]

(State True or False)

Note : Attempt all questions.

1. Void is not a data type.
2. Getch() is a standard input function.
3. Break statement cannot be used in switch statement.
4. Array is a collection of similar elements.
5. Pointer is not a variable.
6. Structure uses the memory equal to the sum of the memory required by all its elements.
7. Open is used to create a file.
8. Sizeof() operator can be used to calculate the size of an array.
9. && is a relation operator.
10. Nesting of the loops is not possible in C language.

P. T. O.

SECTION - B
(Short Answer Type Questions)

Note : Attempt any *four* questions.

1. Describe various data types with syntax and examples available in C language.
2. What is flow Chart ? Draw a flow chart for calculating the area of any type of triangle.
3. Why loops are needed ? Explain with example all the available loops in C language.
4. Differentiate between Structure and Union with proper example.
5. Describe dynamic memory allocation and all the available functions used for this purpose.
6. How to handle files in C language ? Explain with proper functions.

SECTION - C

(Long/Descriptive Answer Type Questions)

Note : Attempt any *three* questions.

1. What is an array ? Write a program in C language to display the tables of 1 to 10 numbers.
2. What is recursion ? Write a program in C language to calculate the factorial of a number using recursion.
3. What are the pointer operators ? Write a program in C language to swap two numbers using pointer.
4. How to handle a file ? Write the syntax with examples of all the primary file handling functions.

B. E. I Semester (Main & Re) Examination, December - 2019

PHYSICS

(New Course)

Branch: (CSE, ECE, EE)

Time : Three Hours 1

[Maximum Marks : 60]

Note : Attempt all questions of Section - A, four questions from Section - B and three questions from Section - C.

SECTION – A

$$[1 \times 10 = 10]$$

Note : Attempt *all* questions of this Section.

P.T.O.

- 5.** Which of the following identities is always zero for static fields ?

(a) $\text{Grad}(\text{Curl } \mathbf{V})$ (b) $\text{Curl}(\text{Div } \mathbf{V})$
(c) $\text{Div}(\text{Grad } \mathbf{V})$ (d) $\text{Curl}(\text{Grad } \mathbf{V})$

6. The total probability of finding the particle in space must be

(a) zero (b) unity
(c) infinity (d) double

7. What is path difference for destructive interference ?

(a) $n\lambda$ (b) $n(\lambda+1)$
(c) $(2n+1)\lambda/2$ (d) $(n+1)\lambda/2$

8. The phenomenon of interference is based on :

(a) Conservation of momentum.
(b) Conservation of energy.
(c) Conservation of momentum and energy.
(d) Quantum nature of light.

9. Which of the following is known as fibre optic back bone ?

(a) Telecommunication (b) Cable television
(c) Delay lines (d) Bus topology

10. Which of the following is a unique property of laser ?

(a) Directional (b) Speed
(c) Coherence (d) Wavelength

SECTION - B

$$5 \times 4 = 20$$

1. What are postulates of Einstein's special theory of relativity ? Using these, derive Lorentz transformation equations.
 2. What do you mean by displacement current ? State the important consequence of displacement current.

(2)

3. State Maxwell's equations in integral form & explain physical significance of the equations.
4. Derive expression for time independent Schrodinger wave equation.
5. Distinguish between interference of light and diffraction of light.
6. Describe the function of core and cladding in optical fiber.

SECTION - C

[$10 \times 3 = 30$]

Note : Attempt any *three* of this Section

1. (a) Obtain Maxwell equations and deduce an expression for the velocity of propagation of a plain electromagnetic wave in a medium of dielectric constant ϵ and permeability μ .
 (b) Define pointing vector. Deduce theoretically pointing theorem for the flow of energy in electromagnetic field.
2. (a) Write the Schrodinger equation for particle in a box and solve it to obtain energy Eigen values and Eigen functions.
 (b) What is the de Broglie wavelength of an electron, which has been accelerated from rest through a potential difference of 150 V ?
3. (a) What do you meant by interference of light ? What are the necessary conditions for obtained interference ? Also explain constructive and destructive interference.
 (b) What is diffraction of light ? Distinguish between Fresnel's diffraction and the Fraunhoffer diffraction.

(3)

P. T. O.

E-1122

4. Explain with neat diagram absorption, spontaneous emission and stimulated emission of radiation. Also explain the population Inversion.
5. Explain any four :
 - (i) Time dilation
 - (ii) Laser
 - (iii) Holography
 - (iv) Diffraction grating
 - (v) Polaroid

Code - 861103

E-1121

B. E. 1st Semester (Main & Re) Examination, Dec. – 2019

MATHEMATICS - I

Branch : (CE, CSE, ECE, EE, ME)

Time : Three Hours I

[Maximum Marks : 60]

Note : Attempt *all* questions from Section – A, *four* questions from Section – B and *three* questions from Section – C.

SECTION - A

Note : Fill the blanks/choose the most appropriate alternative.

$$1 \times 10 = 10$$

P.T.O.

SECTION – B

$$5 \times 4 = 20$$

1. Reduce the matrix A to its normal form and hence find its rank, where,
$$A = \begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 \\ -1 & -2 & 6 & -7 \end{bmatrix}$$
 2. Expand $f(x) = 4x^2 + 7x + 5$ in powers of $(x - 3)$ by Taylor's theorem.
 3. Prove that $\beta(m, n) = \frac{\lceil m \rceil \lceil n \rceil}{\lceil (m+n) \rceil}$
 4. Find the directional derivative of $\phi = (x^2 + y^2 + z^2)^{-\frac{1}{2}}$ at the point P (3, 1, 2) in the direction of the vector $y\hat{i} + z\hat{j} + x\hat{k}$.

(2)

5. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z} \right)^2 u = \frac{-9}{(x+y+z)^2}$.
6. Test the series $1 + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \dots \infty$ for convergent or divergent.

SECTION - C

12 × 3 = 36

1. Find the characteristics equation of the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find A^{-1} . Also

find the matrix represented by : $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.

2. If $y = [x + \sqrt{1+x^2}]^m$, find y_n at $x = 0$.
3. A rectangular box, which is open at the top, has a capacity of 32 m^3 . Determine, using the Lagrange's method of multipliers, the dimension of the box such that the least material is required for the construction of the box.
4. Verify the Stoke's theorem for $\vec{F} = (x^2 + y^2)\hat{i} - 2xy\hat{j}$ taken round the rectangle bounded by the lines $x = \pm a, y = 0, y = b$.
5. Test the series :

$$1 + \frac{x}{2} + \frac{x^2}{5} + \frac{x^3}{10} + \dots + \frac{x^n}{n^2 + 1} + \dots$$
