

Code: 7G511

I B.Tech. I Semester Regular Examinations December 2017

Engineering Graphics-I

(Common to CE and ME)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. Draw a rectangle having its sides 125 mm and 75 mm long. Inscribe two parabolas in it with their axes bisecting each other. 14M

OR

2. Two straight lines OA and OB make an angle of 90° between them. P is a point 40 mm from OA and 50 mm from OB. Draw a hyperbola through P, with OA and OB as asymptotes, marking at least ten points. 14M

UNIT-II

3. Draw a hypo-cycloid of a circle of 40 mm diameter, which rolls inside another circle of 160 mm diameter, for one revolution counter clockwise. Draw a tangent and normal to it at a point 65 mm from the center of the directing circle. 14M

OR

4. An inelastic string 145 mm long, has its one end attached to the circumference of a circular disc of 40 mm diameter. Draw the curve traced out by the other end of the string, when it is completely wound around the disc, keeping the string always tight. 14M

UNIT-III

5. a) A point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P. and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views. 7M

- b) A point P is 50 mm from both the reference planes. Draw its projections in all possible positions. 7M

OR

6. The front view of a line AB measures 65 mm and makes an angle of 45° with xy. A is in the H.P. and the V.T. of the line is 15 mm below the H.P. The line is inclined at 30° to the V.P. Draw the projections of AB and find its true length and inclination with the H.P. Also locate its H.T. 14M

UNIT-IV

7. Draw a rhombus of diagonals 100 mm and 60 mm long, with the longer diagonal horizontal. The figure is the top view of a square of 100 mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground. 14M

OR

8. A composite plate of negligible thickness is made-up of a rectangle 60 mm \times 40 mm, and a semi-circle on its longer side. Draw its projections when the longer side is parallel to the H.P. and inclined at 45° to the V.P., the surface of the plate making 30° angle with the H.P. 14M

UNIT-V

9. An isosceles triangle PQR having the base PQ 50 mm long and altitude 75 mm has its corners P, Q and R 25 mm, 50 mm and 75 mm respectively above the ground. Draw its projections by auxiliary plane method. 14M

OR

10. An equilateral triangle ABC of sides 75 mm long has its side AB in the V.P. and inclined at 60° to the H.P. its plane makes an angle of 45° with the V.P. Draw its projections by auxiliary plane method. 14M

Code: 7G311

I B.Tech. I Semester Regular Examinations December 2017
Fundamentals of Electrical & Electronics Engineering
 (Common to EEE & ECE)

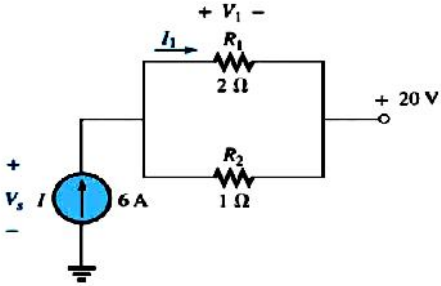
Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) What is the value of the electrical resistance of the resistor with color rings as follows:
- i) yellow, orange, red, and gold
 - ii) orange, white, brown, and gold
 - iii) green, blue, yellow, and silver
 - iv) brown, black, green, and colorless 10M
- b) Determine I_1 and V_S in the circuit shown below.



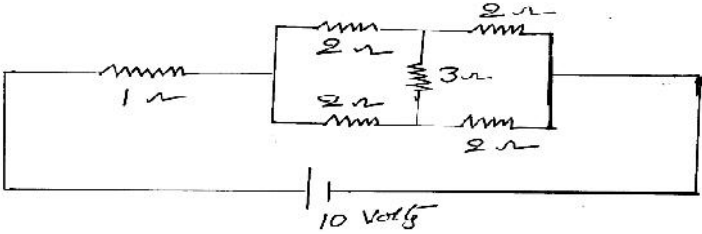
4M

OR

2. a) Explain the dependent and independent sources. 7M
- b) Classify the types of resistors. Explain any two fixed resistors with neat diagram. 7M

UNIT-II

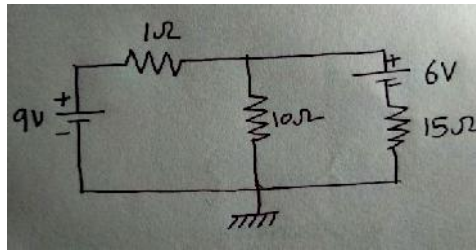
3. a) Explain the following 8M
- i). Ohm's law
 - ii) Source transformation technique
 - iii) Star-Delta transformation
 - iv) Current division and Voltage division rules
- b) Find the power loss in 1 resistor in the figure shown below.



6M

OR

4. a) State and explain the Superposition theorem. 6M
 b) For the circuit shown below determine the current through $10\ \Omega$ resistor using Thevenin's theorem.



8M

UNIT-III

5. a) Explain the process of breakdown of a P-N junction diode due to Avalanche effect and Zener effect. 6M
 b) Write a short note on
 i) Junction capacitance.
 ii) Temperature dependence of V-I characteristics. 8M

OR

6. a) Calculate the factor by which the current will increase in a silicon diode operating at a forward voltage of 0.4 Volts, when the temperature is raised from 25°C to 125°C . 7M
 b) Explain how P-N Junction diode acts as a switch. 7M

UNIT-IV

7. a) Define the terms as referred to FWR circuit:
 i). PIV ii). Average DC voltage iii). RMS Current iv). Ripple factor 7M
 b) A FWR supplies a load requiring 300V at 200mA. Calculate the transformer secondary voltage for;
 i). A capacitor input filter using a capacitor of 10mF .
 ii). A choke input filter using a choke of 10H and a capacitance of 10mF .
 Neglect the choke resistance. 7M

OR

8. a) Explain the circuit diagram of a Bridge rectifier and sketch the input and output waveforms. 7M
 b) Derive the expressions for the ripple factor and efficiency for a Bridge rectifier 7M

UNIT-V

9. a) With neat diagram explain the various current components in a p-n-p transistor. 7M
 b) Explain the input and output characteristics in CB configuration. 7M

OR

10. a) Draw the block diagram of a Function generator and explain its Operation. 7M
 b) With a block diagram explain the operation of a digital storage oscilloscope. 7M

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R-17

Code: 7GC14

I B.Tech. I Semester Regular Examinations December 2017

Engineering Mathematics-I

(Common to all Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Define rank of a matrix. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$

b) Investigate for what values of } and ~ the simultaneous equations $2x + 3y + 5z = 9; 7x + 3y - 2z = 8; 2x + 3y + }z = \sim,$ have (i) no solution (ii) a unique solution (iii) infinite number of solutions.

OR

2. a) Find the eigenvalues and eigenvectors of the matrix $A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$

b) Use Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and express

$A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$ as a quadratic polynomial in A .

UNIT-II

3. a) If $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ then find the matrix P which transforms the matrix A to a diagonal matrix.

b) If $A = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$ then show that $(I - A)(I + A)^{-1}$ is a unitary matrix.

OR

4. Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 2yz + 4zx - 4xy$ in to a sum of squares. Also find the rank, index, signature and nature of the quadratic form.

UNIT-III

5. a) Solve: $(x+2y^3)\frac{dy}{dx} = y$.
- b) Find the orthogonal trajectory of the family of curves $r^n = a \sin n\theta$.

OR

6. a) Solve: $(y \log y) dx + (x - \log y) dy = 0$.
- b) Uranium disintegrates at a rate proportional to the amount then present at any instant. If M_1 and M_2 grams of uranium are present at times T_1 and T_2 respectively, find the half-life of uranium.

UNIT-IV

7. a) Solve: $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 8x^2 e^{2x} \sin 2x$.
- b) Using the method of variation of parameters, solve: $\frac{d^2y}{dx^2} - y = \frac{2}{1+e^x}$.

OR

8. a) Solve: $\frac{d^2y}{dx^2} + a^2y = \sec ax$.
- b) A condenser of capacity C is discharged through the inductance L and a resistance R in series and the charge q at any time satisfies equation $L\frac{d^2q}{dt^2} + R\frac{dq}{dt} + \frac{q}{C} = 0$. Given that $L=0.25$ henry, $R=250$ ohms, $C = 2 \times 10^{-6}$ farad and that when $t = 0$, the charge q is 0.002 coulomb, and the current $\frac{dq}{dt} = 0$. Obtain the value of q in terms of t .

UNIT-V

9. a) If $u = x^2 + y^2 + z^2$, $v = xy + yz + zx$, $w = x + y + z$, find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.
- b) If $u = u\left(\frac{y-x}{xy}, \frac{z-x}{xz}\right)$, show that $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} + z^2 \frac{\partial u}{\partial z} = 0$.
- OR
10. a) Find the extreme values of $2(x^2 - y^2) - x^4 + y^4$.
- b) Show that the rectangular solid of maximum volume that can be inscribed in a sphere is a cube.

Code: 7GC13

I B.Tech. I Semester Regular Examinations December 2017

Engineering Physics
(Common to EEE and ECE)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) What is interference? With a neat diagram, explain that the diameter of bright Newton's Ring is directly proportional to the square root of the odd number. 10M
- b) In Newton's ring experiment in air the diameter of 10th and 15th bright fringes are 0.272cm and 0.555cm respectively if the radius of curvature of the plano-convex lens is 200cm, calculate the wavelength of the monochromatic light. 4M

OR

2. a) What is optical fiber? Discuss briefly principle, construction and working of an optical fiber. 10M
- b) Calculate the numerical aperture and acceptance angle of optical fiber of refractive indices for core and cladding as 1.62 and 1.52 respectively. 4M

UNIT-II

3. a) Show that the FCC is the most closely packed of the three cubic structures by working out the packing factors. 10M
- b) Calculate the glancing angle at (110) plane of a cubic crystal having axial length 0.26nm corresponding to the second order diffraction maximum for the X rays of wavelength 0.065nm. 4M

OR

4. a) Describe how ultrasounds can be produced using the piezoelectric principle. 10M
- b) The speed of ultrasonic wave in a certain medium is 5050m/s. If the wavelength of the ultrasonic wave is 2.5×10^{-3} m, find the frequency of ultrasonic wave. 4M

UNIT-III

5. a) Show that energies of a particle in a potential box are quantized. 10M
- b) What is the lowest energy that a neutron mass = 1.67×10^{-27} kg which is confined to move along the one dimensional box of length 10^{-14} m. $h = 6.63 \times 10^{-34}$ J-s 4M

OR

6. a) Discuss the Kronig Penny model for the motion of an electron in a periodic potential. 7M
- b) Explain the salient features of quantum free electron theory. 7M

UNIT-IV

7. a) Distinguish between intrinsic and extrinsic semiconductor. 6M
- b) What are Cooper pairs? Describe BCS theory of superconductivity. 8M

OR

8. a) What is a photodiode? Differentiate between photodiode and LED 7M
- b) Describe the difference between Type-I and Type-II superconductors. 7M

UNIT-V

9. a) Derive an equation for magnetic moment of atom. 7M
- b) How optical and mechanical properties of nanomaterials varies with their size. 7M

OR

10. a) Differentiate between Dia, para and ferro magnetic materials. 7M
- b) What are nanomaterials? Discuss the phenomena responsible for change in properties of nanomaterials. 7M

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R-17

Code: 7G111

I B.Tech. I Semester Regular Examinations December 2017

Problem Solving Techniques and C Programming

(Common to all Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

- 1. a) Define and explain the various steps involved in program development with example. 7M
- b) Describe the difference between Pseudo code and algorithm. Write Pseudo Code for finding factorial of a given number 7M

OR

- 2. a) Draw the Flow Chart for finding a number is prime or not. 7M
- b) Explain the Types and Categories of Programming Languages with example 7M

UNIT-II

- 3. a) State and explain Compiling and Execution process of a program 8M
- b) Differentiate between Keywords and Identifiers. 6M

OR

- 4. Illustrate the difference between Primary and Derived data types used in C with example. What is the importance of symbolic constant explain with example. 14M

UNIT-III

- 5.
 - i. Explain the conditional control statements with example.
 - ii. Explain the code and what is the output of the following piece of code?

```
main( )  
{  
int i=3;  
switch(i)  
{  
default : printf("0");  
case 1 : printf("1");  
break;  
case 2 : printf("2");  
break;  
case 3 : printf("3");  
break;  
}  
}
```

14M

OR

6. a) i. Differentiate between break and continue with an example.
 ii. Write the output of the following code with explanation

```
while(1)
{
  if (printf ("%d", printf ("%d")))
  break;
  else
  continue;
}
```

10M

- b) Write a Program to find the topper of your class using "for" and "if".

4M

UNIT-IV

7. a) Write a C Program to find Transpose of a Matrix. 10M
 b) Write the functions to find Length of a String and Concatenate Two Strings 4M

OR

8. a) Write a C Program to Remove all Characters in a String Except Alphabets 10M
 b) Explain the applications of array. 4M

UNIT-V

9. a) Write a C Program to Find G.C.D Using Recursion 8M
 b) Explain the following key words with example. 6M
 i) Auto, ii) Register, iii) Static, iv) Extern.

OR

10. a) Write a program to swap two numbers using call by reference and call by value. 7M
 b) Why function is required to write a program, justify your answer with a suitable example. 7M

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R-17

Code: 7GC11

I B.Tech. I Semester Regular Examinations December 2017

Technical English & Professional Communication

(Common to all Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Explain the concept of 'Technology with a Human Face' and state why modern technology does not enrich man but empties him.
- b) Fill in the blanks in the following sentences using the hints given in brackets.
 - i. The only way to ___ women is to give them education.(a word with the prefix em-)
 - ii. Once the process of contamination of water begins, it is ___. (a word with the prefix ir-)
 - iii. My friend speaks English _____ and correctly. (freely, fluently)
 - iv. You have to _____ to many challenges in your life. (Phrasal verb with face)
 - v. The man is moving _____ the building. (at/ towards)

OR

2. What makes technical communication different from general communication?

UNIT-II

3. a) Explain with examples the two kinds of factors that cause the climate to change over long periods of time.
- b) Write a letter of application in response to an advertisement for the post of Assistant Civil Engineer in R & D Department.

OR

4. Describe in brief the five levels of communication.

UNIT-III

5. a) Discuss the two kinds of technologies currently used to generate solar power on a large scale.
- b) Complete the following sentences with appropriate words chosen from those in brackets:
 - i. To prove his points, he _____ an example. (cited /sited)
 - ii. The workers raised a voice of ___ against the management. (dissent / descent)
 - iii. He is very _____ at dodging awkward questions. (adept / adopt)
 - iv. Fruits makes a healthy ___ after lunch or dinner. (desert / dessert)
 - v. The ___ at my work were fired. (personnel / personal)

OR

6. Explain the various functions of Non- verbal Communication.

UNIT-IV

7. a) Discuss some of the measures that are used to prevent soil erosion.
- b) Discuss in detail the Discriminative and Comprehensive listening.

OR

8. The management of your company proposes to establish a school near the factory site for the benefit of its staff. As Public Relations Officer you have been asked to study its feasibility and submit a report to the Personnel Manager, specially referring to the following: finance, teaching staff, library, games and sports, construction cost, etc.

UNIT-V

9. According to Swami Viveananda, what is the spirit in which the nature of work be done.

OR

10. List out the four communication styles and explain them briefly.
