

Hall Ticket Number :

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R-14

Code: 4G513

B.Tech. I Year Supplementary Examinations May 2018

Engineering Drawing

(Common to EEE, ECE, CSE and IT)

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. Two straight lines OA and OB make an angle of 75° 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

OR

2. A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and a normal to the curve at a point 125 mm from the center of the directing circle. 14M

UNIT-II

3. 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) The front view of a line, inclined at 30° to the V.P. is 65 mm long. Draw the projections of the line, when it is parallel to and 40 mm above the H.P., its one end being 30 mm in front of the V.P. 7M

OR

4. 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 H.P. Also locate its H.T. 14M

UNIT-III

5. Draw a regular hexagon of 40 mm side, with it two sides vertical. Draw a circle of 40 mm diameter in its center. The figure represents a hexagonal plate with a hole in it and having its surface parallel to the V.P. Draw its projections when the surface is vertical and inclined at 30° to the V.P. Assume the thickness of the plate to be equal to that of a line. 14M

OR

6. A plate having shape of an isosceles triangle has base 50 mm long and altitude 70 mm. It is so placed that in the front view it is seen as an equilateral triangle of 50 mm sides and one side inclined at 45° to xy. Draw its top view. 14M

Code: 4GC14

B.Tech. I Year Supplementary Examinations May 2018

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) Solve $\frac{dy}{dx} + \frac{y}{x \log x} = \frac{\sin 2x}{\log x}$ 7M
- b) Prove that the system of confocal and coaxial parabolas $y^2 = 4a(x+a)$ is self Orthogonal 7M

OR

2. a) Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$ 7M
- b) Solve $(D^2 + 1)y = \operatorname{cosec} x \cot x$ by the method of variation of Parameter 7M

UNIT-II

3. a) Expand $\log(1+e^x)$ in ascending powers of x 7M
- b) If $u = \frac{x+y}{1-xy}$, $V = \tan^{-1} x + \tan^{-1} y$ then find $\frac{\partial(u,v)}{\partial(x,y)}$ 7M

OR

4. a) Examine the function for extreme values $f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$ 7M
- b) Find the volume of the largest rectangular parallelepiped that can be inscribed in ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ 7M

UNIT-III

5. Trace the curve $9ay^2 = (x-2a)(x-5a)^2$ 14M

OR

6. a) Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} \sqrt{a^2-x^2-y^2} dx dy$ 7M
- b) Evaluate $\int_0^1 \int_y^1 \int_0^{1-x} x dz dx dy$ 7M

UNIT-IV

7. a) Find the Laplace Transforms of i) $\sin 2t \sin 3t$ ii) $L \left\{ e^t \left(\cos 2t + \frac{\sinh 2t}{2} \right) \right\}$ 7M
- b) Using convolution theorem find $L^{-1} \left\{ \frac{s}{(s^2+1)(s^2+4)} \right\}$ 7M

OR

8. Using Laplace transform solve $(D^2 + 2D - 3)y = \sin x$ if $y(0) = y'(0) = 0$. 14M

UNIT-V

9. a) Find the directional derivative of $2xy + z^2$ at $(1, -1, 3)$ in the direction of $\vec{i} + 2\vec{j} + 3\vec{k}$. 7M

b) Show that $\text{Curl grad } f = 0$ where f is a scalar point function

7M

OR

10. Verify Green's theorem for $\int_C [(xy + y^2)dx + x^2 dy]$ where C is bounded by $y = x$ and $y = x^2$

14M

Hall Ticket Number :

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R-14

Code: 4GC13

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Chemistry

(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) Comment on hardness of water and mention any one of the method for estimation of hardness of water. 7M
- b) What are boiler troubles? Write a note on disadvantages of boiler troubles. 7M

OR

2. a) Explain the treatment of saline water by reverse osmosis in detail. 7M
- b) Write any one of the methods for purification of lake water for domestic purpose and comment on break point chlorine. 7M

UNIT-II

3. a) What are fuel cells? Write the working procedure for H₂-O₂ fuel cell 7M
- b) Write a note on lead-acid batteries with chemical reactions involving. 7M

OR

4. a) Explain any two methods for prevention of corrosions. 7M
- b) Explain the factors which effect the corrosion. 7M

UNIT-III

5. a) Differentiate between thermoplastics and thermosetting plastics 7M
- b) Write a brief notes on Vulcanization and compounding of rubber 7M

OR

6. a) What are conducting polymers? Explain the synthesis, mechanism and applications of polyacetylene. 7M
- b) Describe the preparation, properties and engineering applications of Buna-S and Buna-N rubbers 7M

UNIT-IV

7. a) Explain the classification of fuels and write the characteristics for good fuel 7M
- b) Explain Otto Hoffmann's by product oven process 7M

OR

8. a) Explain the following 7M
 - i) Knocking
 - ii) Octane number
 - iii) Cetane number
- b) Compare the liquid fuels with gaseous fuels. 7M

UNIT-V

9. a) What is Portland cement? Describe the manufacture of Portland cement by wet method. 7M
- b) What is setting and hardening of cement? Explain various reactions involved in setting and hardening of cement 7M

OR

10. a) What are lubricants? Discuss any three properties of lubricants. 7M
- b) What are refractories? Discuss any three properties of refractories. 7M

Code: 4G311

B.Tech. I Year Supplementary Examinations May 2018

Electronic Devices & Circuits

(Common to EEE & ECE)

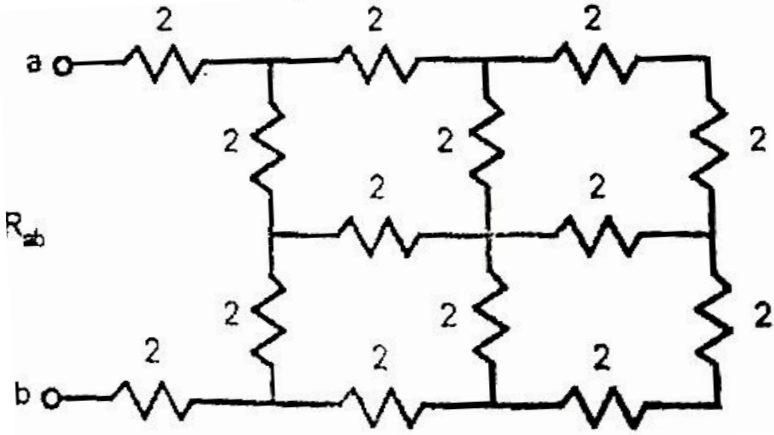
Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. a) Find the equivalent resistance R_{ab} for the circuit shown in the figure. All the resistor values shown are in ohms.



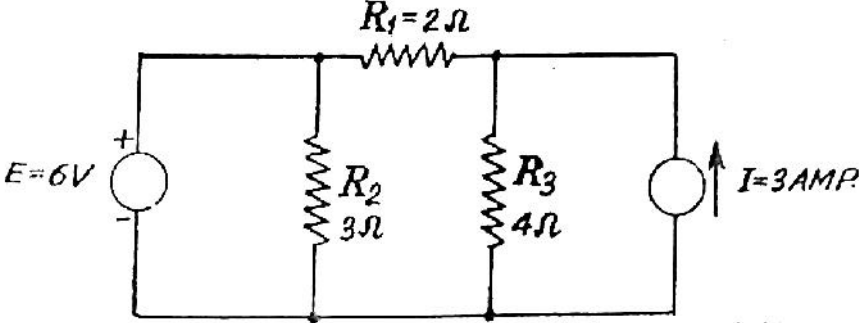
8M

- b) State maximum power transfer theorem. Derive the condition for transfer of maximum power to the load.

6M

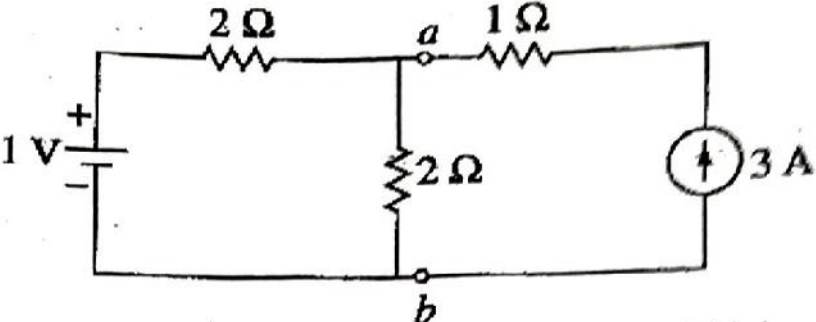
OR

2. a) Find the current flowing through the resistor R_1 using Thevenin's theorem.



8M

- b) For the circuit shown in the figure, find the voltage across the terminals a and b using the source transformation.



6M

UNIT-II

3. a) Explain the temperature dependency of PN junction diode in detail with all necessary equations and graphs. 7M
- b) What are the advantages of LC filter compared to other filters? Derive the expression for ripple factor r in a LC filters 7M

OR

4. a) Define transition capacitance and derive the relation for the same. 7M
- b) Derive the expression for ripple factor r of a choke filter. What are the limitations of choke filter? 7M

UNIT-III

5. a) What is Thermal runaway? Derive the condition to prevent thermal runaways 7M
- b) What is the need for heat sinks? Draw the thermal resistance circuit for a transistor and derive the relation for power flow in a series thermal resistance circuit. 7M

OR

6. a) Explain the operation of the emitter bias circuit and derive the relation for stability factor S . 7M
- b) Explain any three techniques to construct a transistor. 7M

UNIT-IV

7. a) Explain in detail the characteristics of JFET indicating all the important points and regions on it. 7M
- b) What is the need for biasing in JFET? Explain and analyze the operating of a voltage divider bias. 7M

OR

8. a) Draw & explain the operation of voltage divider bias current using an n-channel MOSFET. 7M
- b) What is Q point? How to set a Q point for a gate biased FET circuit. 7M

UNIT-V

- 9 a) Describe how the construction of Schottky diode is significantly different from the conventional semiconductor diode. Describe its mode of operation. 7M
- b) Write short notes on the operation of LED and explain BJT controlled circuits for LED. 7M

OR

10. a) Define and indicate the typical values of UJT parameters: (i) Inter-base resistance (ii) Intrinsic stand-off ratio (iii) Emitter saturation voltage (iv) Peak point emitter current (v) Valley point current. 7M
- b) What are the essential differences between a semiconductor diode and a Tunnel diode? Explain the characteristics of a tunnel diode and draw the equivalent circuit diagram. 7M

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R-14

Code: 4GC12

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Physics

(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) Derive the expression of wave length of monochromatic light using Newton's rings setup? 11M
- b) A parallel beams of light with wavelength 5893\AA is incident on a glass plate ($\mu=1.5$) such that an angle of refraction into plate is 60° . Calculate the smallest thickness of the plate which will make it appear dark by reflection. 3M

OR

2. a) With the help of suitable diagram, explain the construction and working of Ruby laser. 10M
- b) Mention the applications of lasers in different fields 4M

UNIT-II

3. Derive the packing fractions for SC, BCC and FCC. Show that FCC is the most closely packed of three cubic structures.. 14M

OR

4. a) Explain the working and construction of piezoelectric method of ultrasonic wave production. 10M
- b) Explain the different detection methods of Ultrasonic waves. 4M

UNIT-III

5. a) Show that the energies of a particle in a potential box are quantized. 10M
- b) Explain the Physical significance of wave function. 4M

OR

6. a) What are the salient features of classical free electron theory? Mention its merits and demerits. 7M
- b) On the basis of band theory, explain how the solids are classified into metals, semiconductors and insulators. 7M

UNIT-IV

7. a) Distinguish between intrinsic and extrinsic semiconductors. 4M
- b) Explain the I-V characteristics of p-n Junction diode. 6M
- c) Explain the direct and indirect band gap semiconductor 4M

OR

8. a) Explain Hysteresis Curve. 7M
- b) Distinguish between soft and hard magnetic materials 7M

UNIT-V

9. a) What is a superconductor? Write the general properties of superconductors 6M
- b) Explain the BCS theory of Superconductivity in detail. 8M

OR

10. a) Describe the method of chemical vapour deposition in nano materials preparation 6M
- b) Write the optical, thermal, mechanical and magnetic properties of Nanomaterials. 8M

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R-14

Code: 4G113

B.Tech. I Year Supplementary Examinations May 2018
Programming in C & Introduction to Datastructures
(Common to CE, EEE, ME & 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) Explain the importance of computer system? 8M
- b) Write an algorithm and flowchart on simple interest 6M

OR

2. a) Explain the structure of C programming with simple example 4M
- b) Write a program on calculating area and perimeter of square and rectangle. 10M

UNIT-II

3. a) Define an Array? Write a c program on display 10 numbers using an array 7M
- b) Write a C program to check whether the given number is Divisible by 3 or not 7M

OR

4. a) Write a C program to find whether the given Character is alphabet, Digit or any other 7M
- b) Write a C program to perform multiplication of two matrices 7M

UNIT-III

5. Define a recursive function? Write a C program to find the factorial of a given integer using recursive function 14M

OR

6. How to create dynamic memory allocation with suitable example 14M

UNIT-IV

7. a) Write a C program to write data to text file and read it 7M
- b) Write a c program on Quick sort? 7M

OR

8. a) What are the string manipulation functions? Write a c program to find length of the given string 7M
- b) Write a c program on Binary Search 7M

UNIT-V

9. Write a C Program to implement Queue using arrays 14M

OR

10. Write a C program to convert infix expression to postfix expression 14M
