

1190**Code : 15EC21T**Register
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II Semester Diploma Examination, Nov./Dec. 2017**BASICS OF SEMICONDUCTOR DEVICES****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any **six** (6) questions from **Part-A**. ($6 \times 5 = 30$ marks)
(ii) Answer any **seven** (7) questions from **Part-B**. ($7 \times 10 = 70$ marks)

PART – A**6 × 5 = 30**

1. Compare the features of insulator and semiconductor with energy level diagram. **5**
2. Explain how the transistor can work as a switch. **5**
3. Compare CB and CE transistor configuration. **5**
4. Distinguish between BJT and FETS. **5**
5. Explain the constructional features of JFET. **5**
6. Explain the holding and latching currents of SCR. **5**
7. Define SSI, MSI, LSI and VLSI. **5**
8. Explain the term photo-emissive, photo-conductive and photo-voltaic effect. **5**
9. List the applications and advantages of LED. **5**

- (2) Write a paragraph of not more than 100 words using the following points :

The reason why the widespread use of solar energy must be promoted :

5

Hints :

- * freely available source
- * limitless supply
- * economical
- * non-polluting

- (3) Read the following passage and write a summary in not more than 1/3 of its length :

5

When one hears the term "reality" applied to a television show, one might expect that the events occurred naturally or at the least, were not scripted, but this is not always the case. Many reality shows occur in unreal environments like rented mansions occupied by film crews. These living environments do not reflect what most people understand to be "reality". Worse, there have been accusations that events not captured on film were later restaged by producers. Worse still, some involved in the production of "reality" television claim that the participants were urged to act out story lines premediated by producers. With such accusations floating around, its no wonder many people take reality T.V. to be as real as the sitcom.

- (4) Read the following passage and answer the questions that follow :

You all know that the republic day of India is celebrated on 26th January. When you watch the Republic day parade, do you wonder who built the Rashtrapati Bhavan, the Rajpath and the India Gate which are situated in New Delhi ? They were mainly the work of Sir Edwin Lutyens. He studied at the Royal College of Art. London. Edwin Lutyens' father, Charles Lutyens was in British army. He was also a good painter.

Questions :

- (a) Who built Rashtrapati Bhavan ? 1
 - (b) Where is India Gate situated ? 1
 - (c) Who was Charles Lutyens ? What did he do ? 1
 - (d) The Republic day is celebrated on _____. 1
 - (e) Where did sir Edwin Lutyens studied ? 1
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1130**Code : 15EC21T**Register
Number

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II Semester Diploma Examination, April/May-2017**BASICS OF SEMI CONDUCTOR DEVICES****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any **SIX** questions from **PART-A**.
(ii) Answer any **SEVEN** question from **PART-B**.

PART – A**5 × 6 = 30**

1. Define doping. Explain atomic structure of p-type semiconductor. **5**
2. Explain working of NPN Transistor. **5**
3. Sketch and explain input characteristics of transistor in CE mode. **5**
4. Explain CMOSFET as an inverter. **5**
5. Compare BJT and FET. **5**
6. List the applications of Schotky diode and GUNN diode. **5**
7. Define IC's. Mention advantages. **5**
8. Write a short note on Solar cell. **5**
9. Explain the terms photoemission and photoconduction. **5**

1 of 2**[Turn over**

PART – B

7 × 10 = 70

10. (a) Explain effect of temperature on semiconductor devices. 4
(b) Explain the working principal of Zener diode. 6
11. (a) Describe the formation of PN junction and write the diode current equation. 6
(b) Applications of Diodes. 4
12. (a) In a common base connection of a transistor collector current is 0.95 mA, base current is 0.05mA, Find value of α . 4
(b) Compare common base and common emitter of a transistor. 6
13. Justify how transistor can act as an amplifier with support of circuit and waveform in CE mode. 10
14. Define and correlate JFET parameters γ_d , g_m and μ . 10
15. (a) Explain working of N channel JFET. 5
(b) Compare enhancement and depletion modes of MOSFET. 5
16. (a) Sketch and discuss VI characteristics of UJT. 5
(b) List the applications of DIAC and TRIAC. 5
17. Explain constructional features and operation of SCR. 10
18. Describe the steps in fabricating monolithic IC's with diagrams. 10
19. (a) List the features of LED bulbs. 5
(b) List the applications of photo diode. 5
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1217**Code : 15CP-01E***Register
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I Semester Diploma Examination, April/May-2017**COMMUNICATION SKILLS IN ENGLISH****Time : 3 Hours |****[Max. Marks : 100**

- Note :**
- (i) Answer all the questions as directed.
 - (ii) Spelling and grammatical errors shall be penalized.
 - (iii) Answer to Question No. I and II are based on the prescribed text book.

I. Answer any twelve of the following in one or two sentences each : 2 × 12 = 24

- (1) What should be the major focus of career planning ?
- (2) What are the guidelines for choosing a career ?
- (3) List out the factors influencing career decisions.
- (4) What has started global experts ?
- (5) What are the three traits of the Indian psyche which are not good for the country ?
- (6) How are Indians exposed to corruption from their childhood ?
- (7) What is Global Warming ?
- (8) According to available statistics how much fossil fuel is burnt each year ?
- (9) What are some of the steps that can be taken to save our environment ?
- (10) What ambition did Nooyi's mother have for her daughter ?
- (11) What is Indra Nooyi's passion ?
- (12) Describe the farmer who visited the dentist's clinic.
- (13) Why did the farmer visit the clinic a week later ?
- (14) Who is the narrator in the poem "The Farmer's Wife" ?
- (15) What memories of her husband trouble her now ?

II. Write short notes on any three of the following : 5 × 3 = 15

- (1) How does career planning play a major role in making career choices ?
- (2) How does our education system inculcate the trait of servility in us ?
- (3) How does deforestation affect our environment ? What are the measures that can be taken to protect our environment ?

- (4) How did Indra Nooyi's mother try to teach her the role of a woman in a family ?
Do you agree with her ?
- (5) The poem "The Farmer's Wife" contrasts the characters of the farmer and his wife. What are these contrasts ? How are they different from each other ?

III. Grammar :

- (1) Identify the parts of speech of the underlined words : $4 \times 1 = 4$
- (a) She is a brave soldier.
 - (b) Mysore is a beautiful city.
 - (c) We worked hard for the examinations.
 - (d) Ram and Shyam are brothers.
- (2) Fill in the blanks with suitable modal auxiliaries : $3 \times 1 = 3$
- (a) Tomorrow _____ be a holiday.
 - (b) We _____ obey the law.
 - (c) How _____ you argue with me ?
- (3) Fill in the blanks with suitable articles : $3 \times 1 = 3$
- (a) Give me _____ cup of coffee.
 - (b) It was _____ awe-inspiring sight.
 - (c) He is _____ tallest boy in the class.
- (4) Identify the tense of the verbs in the following sentences : $4 \times 1 = 4$
- (a) He works in a bank.
 - (b) It rained yesterday.
 - (c) She is watching T.V.
 - (d) I have been waiting for her for over an hour.
- (5) Change the voice of the verb in the following sentences : $4 \times 1 = 4$
- (a) They are building a new shopping centre.
 - (b) We invited her for lunch.
 - (c) Maya has left all the windows open.
 - (d) Goods news is expected by us.
- (6) Fill in the blanks with appropriate prepositions : $4 \times 1 = 4$
- (a) They go _____ work _____ bus.
 - (b) She was born _____ two o'clock _____ 17th July.

- (7) Add suitable question tags : $3 \times 1 = 3$
- (a) It is cold, _____ ?
 - (b) I did not hurt you, _____ ?
 - (c) Tina runs very fast, _____ ?
- (8) Give short form answers to the following : $2 \times 1 = 2$
- (a) Do you like watching movies ? (Negative)
 - (b) Can you give me an answer by tomorrow ? (Affirmative)
- (9) Add a prefix and a suffix to the following to form a meaningful word : $2 \times 1 = 2$
- (a) _____ manage
 - (b) Cheer _____
- (10) Frame sentences using each of the words in the pairs below to bring out the differences in meaning : $4 \times 1 = 4$
- (a) (i) Sell (ii) Cell (Homophones)
 - (b) (i) Pupil (ii) Pupil (Homonyms)
- (11) Give synonyms of the following words : $2 \times 1 = 2$
- (a) Yearly
 - (b) Broad
- (12) Give antonyms of the following words : $2 \times 1 = 2$
- (a) Joy
 - (b) Legal
- (13) Fill in the blanks with verbs that agree with the subject : $4 \times 1 = 4$
- (a) Mathematics _____ my favourite subject.
 - (b) All the seats in this bus _____ reserved.
 - (c) The President, with his advisers, _____ arrived.
 - (d) Ravi and Leela _____ interviewed yesterday.

IV. Composition : Answer any two :

$5 \times 2 = 10$

- (a) Describe the first few days of your college life.
- (b) Describe your grandparent.
- (c) Describe the process of opening a bank account.

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1210**Code : 15SC-02M**Register
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II Semester Diploma Examination, April/May-2017**ENGINEERING MATHEMATICS – II****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any 10 question in Section-A. Each question carries 3 marks.
(ii) Answer any 8 questions in Section –B. Each question carries 5 marks.
(iii) Answer any 5 questions in Section-C. Each question carries 6 marks.

SECTION – A**(Answer any 10)**

1. Find the equation of straight line passing through the point $(-3, 9)$ and having the slope -1 3
2. Find the equation of parabola with focus at $(3, 0)$ and x -axis is the axis of the parabola. 3
3. Differentiate $10x^4 + 3e^{2x} - \cos^{-1}(x)$ w.r.t. x . 3
4. If $y = \frac{\log x}{(1 + \sin x)}$ find $\frac{dy}{dx}$. 3
5. If $y = e^{\tan^{-1} x}$, Show that $\frac{dy}{dx} = \frac{my}{\sqrt{1-x^2}}$. 3
6. If $x = 2\sin^3\theta$ and $y = 2\cos^3\theta$. Find $\frac{dy}{dx}$. 3
7. If the slope of the tangent to the curve $\frac{1+x^3}{3}$ is 4. Then find the value of x . 3

8. The equation of motion of the particle is $S = t^3 - 2t^2 + 4$ in meter. Find the velocity when $t = 2$ seconds. 3
9. Integrate w.r.t. x $\frac{1}{x} + \frac{1}{1+x^2} + \cos 2x$. 3
10. Evaluate $\int \sqrt{1 + \sin 2x} \, dx$. 3
11. Integrate $\tan^2 x$ w.r.t. ' x '. 3
12. Evaluate $\int_0^1 \left(\frac{1}{1+x^2} + \frac{1}{\sqrt{1-x^2}} \right) dx$. 3
13. Evaluate $\int_0^{\pi/2} \sin x \, dx$. 3
14. Form the differential equation by eliminating ' a ' from $y^2 = 4ax$. 3

SECTION -B

(Answer any 8)

15. Find the equation of straight line, which is perpendicular to the line $3x + 4y - 8 = 0$ and passing through the point $(3, 4)$. 5
16. Differentiate $\cos x$ from first principle. 5
17. If $x^y = y^x$ find $\frac{dy}{dx}$. 5
18. If $y = e^{ax} + e^{-ax}$. Show that $\frac{d^2y}{dx^2} = a^2y$. 5

19. If area of circular plate is increasing at the rate of $2\text{cm}^2/\text{sec}$. Find the rate of increase of radius when radius is 14 cm. 5
20. Evaluate $\int \frac{\cos x}{1 + \sin x} dx$. 5
21. Integrate $\cos^3 x$ w.r.t. x . 5
22. Evaluate $\int \frac{e^{m \tan^{-1} x}}{1 + x^2} dx$. 5
23. Simplify $\int_0^{\pi/2} \sin 3x \cdot \cos x dx$. 5
24. Find the area bounded by the curve $y = x^2 + 1$, x -axis, and the ordinates $x = 1$, $x = 3$. 5
25. Eliminate the arbitrary constants a and b from the equation $y = a \cos mx + b \sin mx$. 5

SECTION - C

(Answer any 5)

26. Find the equation of median through 'A' of the triangle ABC where $A = (-1, 3)$, $B(-3, 5)$ & $C = (7, -9)$. 6
27. Find the co-ordinate of foci, the vertices, the length of Latus rectum, eccentricity of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$. 6
28. If $y = e^{\tan^{-1} x}$, then prove that $(1 + x^2) y_2 + (2x - 1) y_1 = 0$ where y_1 and y_2 are first and second derivatives. 6
29. If $y = (\sin x)^{\cos x}$ find $\frac{dy}{dx}$. 6

30. Find the maximum and minimum values of the function

$$f(x) = x^3 + 6x^2 - 15x + 5$$

6

31. Evaluate $\int \tan^{-1}x \, dx$.

6

32. Evaluate $\int_0^1 x^2 e^x \, dx$.

6

33. Solve the differential equation $x(y^2 + 1) \, dx + y(x^2 + 1) \, dy = 0$.
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6

PART – B

7 × 10 = 70

10. Sketch V-I characteristics of PN junction diode with circuit in both FB and RB mode. 10
11. (a) Explain how zener diode can act as a voltage regulator. 5
(b) Explain Avalanche Breakdown. 5
12. (a) Explain the working principle of NPN transistor. 5
(b) Define Alpha and Beta deduce the relation between them. 5
13. (a) Explain the working principle of PNP transistor with neat diagram. 5
(b) Explain the application of transistor as a switch. 5
14. (a) Explain the operation of N-channel JFET with diagram. 5
(b) Define : 5
(i) Drain resistance
(ii) Trans conductance
15. (a) List the features of CMOS. 5
(b) Explain the working of CMOS inverter. 5
16. (a) Describe the construction of UJT. 5
(b) List the features of GUNN diode. 5
17. (a) Explain the working principle of SCR with neat diagram. 5
(b) Sketch and discuss the V-I characteristics of DIAC. 5
18. Describe the steps in fabricating monolithic IC's with diagram. 10
19. (a) Write a note on solar cell. 5
(b) Write the advantages of Opto-couplers. 5

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II Semester Diploma Examination, April/May-2016**BASICS OF SEMICONDUCTOR DEVICES****Time : 3 Hours |****| Max. Marks : 100**

- Note :** (i) Answer any **six** questions from Part – A ($5 \times 6 = 30$ marks).
(ii) Answer any **seven** questions from Part – B ($10 \times 7 = 70$ marks)

PART – A

1. Define conductor, insulator and semiconductor with energy level diagrams. **5**
2. Explain in brief the different modes of operation of transistor with diagrams. **5**
3. Compare CB & CE transistor configurations. **5**
4. List the applications of JFET. **5**
5. Explain the basic steps involved in the preparation of monolithic IC. **5**
6. Explain the physical structure of FET with a diagram. **5**
7. List the features of LED. **5**
8. Write a short note on solar cells. **5**
9. Explain the working principle of TRIAC. **5**

PART – B

10. Explain the method of finding V-I characteristics of a P-N junction diode. **10**
11. (a) Explain Zener breakdown. **4**
(b) Explain the application of diode as **6**
 - (i) Switch
 - (ii) Voltage regulator

12. (a) Define input characteristics of NPN transistor. Explain the method of finding input characteristics in CB mode. 5
(b) Explain the working principle of PNP transistor with a neat diagram. 5
13. (a) Explain the method of finding output characteristics of common emitter NPN transistor. 5
(b) Explain the application of transistor as a switch. 5
14. Explain the physical structure of N channel JFET with a neat diagram. 10
15. (a) Define pinch off voltage and compare MOSFET and JFET. 6
(b) Explain with a diagram the operation of N channel enhancement MOSFET. 4
16. (a) Explain the working principle of UJT with a neat diagram. 6
(b) List the features of varactor diode. 4
17. (a) Explain the working principle of SCR with a neat diagram. 5
(b) Explain the working principle DIAC with a neat diagram. 5
18. Explain the fabrication of Monolithic IC's with diagrams. 10
19. (a) List the features of LASER and MASER. 6
(b) Define : 4
(i) Photo Emission
(ii) Photoconduction
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1502**Code : 15SC02M**

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II Semester Diploma Examination, April/May-2016
ENGINEERING MATHEMATICS - II

Time : 3 Hours]**[Max. Marks : 100**

- Note :** (i) Answer any 10 questions in Section – A, 8 questions from Section – B and 5 questions from Section – C.
(ii) Each question carries 3 marks in Section – A, 5 marks in Section – B and 6 marks in Section – C.

SECTION - A

1. Find the value of k, if the lines $(14 + 1)x + 4y - 3 = 0$ and $8x - 3y + 1 = 0$ are perpendicular. 3
2. Find the focus and equation to directrix of the parabola $y^2 = 16x$. 3
3. If $y = \sin^{-1}x + 2e^{3x} - 4\sqrt{x}$, find $\frac{dy}{dx}$. 3
4. If $y = (4x^2 - 3 \cos x)^{10}$, find $\frac{dy}{dx}$. 3
5. If $y = (3 + 2 \sin hx)\cos x$, find $\frac{dy}{dx}$. 3
6. If $y = x^x$, find $\frac{dy}{dx}$. 3
7. Find the equation to the tangent to the curve $y = 2x^2 - 3$ at $(1, 3)$. 3
8. The displacement of a particle moving along a straight line is $S = t^3 - 2t^2 - 4t + 20$ mts. Find the velocity when $t = 2$ secs. 3
9. Evaluate $\int (x^4 + 5/x + 3 \operatorname{cosec}^2 x) dx$. 3

10. Evaluate

$$\int \cos^2 x \, dx. \quad 3$$

11. Evaluate $\int (3 + 4 \tan x)^6 \sec^2 x \, dx. \quad 3$

12. Evaluate $\int_0^1 (2x + 1)(x - 3) \, dx. \quad 3$

13. Find the area bounded by the curve $y = x - 5$, the x -axis, the ordinates between $x = 0$ and $x = 5$. 3

14. Form the differential equation from $y^2 = 4ax$ by eliminating a . 3

SECTION - B

1. Find the equation to the straight line passing through the point $(5, 2)$ and parallel to $4x - 3y + 1 = 0$. 5

2. If $y = \frac{1+x^2}{1-x^2}$, find $\frac{dy}{dx}$. 5

3. If $y = \sin(\log x)$, show that $x^2 y_2 + x y_1 + y = 0$ 5

4. If $x = a \cos^3 \theta$, $y = a \sin^3 \theta$, Find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$. 5

5. The radius of a sphere is increasing at the rate of 4 cm/sec. Find the rate of increase of the volume when the radius is 10 cm. 5

6. Evaluate $\int \cos(e^x) e^x \, dx. \quad 5$

7. Evaluate $\int \frac{\cos x}{1 + \sin^2 x} \, dx. \quad 5$

8. Evaluate $\int x \log x \, dx. \quad 5$

9. $\int_0^{\pi/2} \cos 4x \sin 2x \, dx.$ 5
10. Find the volume generated by rotating the curve $y = \sqrt{x^2 + 5x}$ between $x = 1$ and $x = 2$ about x -axis. 5
11. Solve the differential equation $\frac{dy}{dx} = \frac{1 + y^2}{1 + x^2}.$ 5

SECTION – C

1. Find the equation to the straight line passing through the points (5, 2) and (–3, 3) and also find the slope and y -intercept of the line. 6
2. Find the eccentricity, distance between the foci, and equation to directrix for the hyperbola $\frac{x^2}{25} - \frac{y^2}{16} = 1.$ 6
3. Differentiate $\sin x$ w.r.t. x from first principles. 6
4. Find $\frac{dy}{dx}$ if $x^3 + y^3 + 3x^2y - 3x = 25$ 6
5. Find the maximum and minimum value of the function $2x^3 - 3x^2 - 36x + 10.$ 6
6. Evaluate $\int \tan^{-1}x \, dx.$ 6
7. Evaluate $\int_0^{\pi/2} \sin^3x \, dx.$ 6
8. Solve the differential equation $\sec^2x \tan y \, dx + \sec^2y \tan x \, dx = 0.$ 6
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I/II Semester Diploma Examination, April/May-2016

COMMUNICATION SKILLS IN ENGLISH

Time : 3 Hours]

[Max. Marks : 100

- Note :** (i) Answer all the questions as directed.
(ii) Spelling and grammatical errors shall be penalized.
(iii) Answer to Question No. I and II are based on the prescribed text book.

SECTION - II. Answer any **twelve** of the following in **one** or **two** sentences each. **2 × 12 = 24**

1. What does the term 'Career Mean' ?
2. List out a few benefits of Career Planning.
3. What should be the major focus of Career Planning ?
4. What are the three traits of the Indian Psyche which are not good for the country ?
5. What are the questions that youngsters often ask about India's future ?
6. How can one contribute to India's Progress ?
7. What is Global Warming ?
8. What are some of the causes of Global Warming ?
9. According to available Statistics, how much fossil fuel is burnt each year ?
10. According to Nooyi in the 50s and 60s, what did Parents habitually talk about ?
11. What was the 'good news' that Nooyi wanted to share with her mother ?
12. Describe the farmer who visited the dentist's clinic.
13. What request did the farmer make to the dentist ?
14. Who is the 'Sinner', according to the poem 'The Farmer's Wife' ?
15. Why did the farmer, in the Poem 'The Farmer's wife', commit suicide ?

II. Write short notes on any **three** of the following : **5 × 3 = 15**

1. Write a short note on 'guidelines' for choosing a career'.
2. Describe how divisiveness enters our Psyche.
3. How does deforestation affect our environment ? What are the measures that can be taken to protect our environment ?

4. Write a paragraph putting together all the information you have gathered about Indra Nooyi from the interview.
5. What are the responsibilities of farmer's wife after her husband's death ? What is the wife's attitude towards these responsibilities ?

III. Grammar.

1. Identify the parts of speech of the underlined words : $4 \times 1 = 4$
 - (a) The lazy boy was punished.
 - (b) Vivek opened the door.
 - (c) He comes here daily.
 - (d) Monica is my sister.
2. Fill in the blanks with suitable modal auxiliaries. $3 \times 1 = 3$
 - (a) You _____ pay the college fee in time.
 - (b) _____ God bless you !
 - (c) He _____ work this sum.
3. Fill in the blanks with suitable articles. $3 \times 1 = 3$
 - (a) My cousin is _____ university student.
 - (b) I read _____ Times of India every morning.
 - (c) He came after _____ hour.
4. Identify the tense of the verbs in the following sentences. $4 \times 1 = 4$
 - (a) I was reading a novel.
 - (b) Amith drinks Coffee in the morning.
 - (c) I have seen the 'Taj Mahal'.
 - (d) She has been working since morning.
5. Change the voice of the following sentences. $4 \times 1 = 4$
 - (a) Some one has picked my pocket.
 - (b) He is loved by everyone.
 - (c) Suma is practicing yoga.
 - (d) Twenty runs were scored by him.
6. Fill in the blanks with appropriate prepositions. $4 \times 1 = 4$
 - (a) I am fond _____ music.
 - (b) He lives _____ London.
 - (c) It is ten O' clock _____ my watch.
 - (d) The car fell _____ the river.

7. Add suitable question tags. $3 \times 1 = 3$
(a) They were cleaning the floor, _____ ?
(b) Robin did not agree, _____ ?
(c) She works in a Multinational Company, _____ ?
8. Give short form answers to the following : $2 \times 1 = 2$
(a) Do you like sweets ? (Negative)
(b) Can you drive a car ? (Affirmative)
9. Add a Prefix and a Suffix to the following to form a meaningful word. $2 \times 1 = 2$
(a) _____ usual
(b) friend _____
10. Frame sentences using each of the words in the Pairs below to bring out the differences in meaning. $4 \times 1 = 4$
(a) (i) Sea (ii) See
(b) (i) bank (ii) bank
11. Give synonyms of the following words : $2 \times 1 = 2$
(a) trap
(b) finish
12. Give antonyms of the following words : $2 \times 1 = 2$
(a) barren
(b) strict
13. Fill in the blanks with verbs that agree with the subject. $4 \times 1 = 4$
(a) Ten kilometres _____ a long walk.
(b) Sanskrit, as well as Arabic, _____ taught there.
(c) Ram and Sham _____ friends.
(d) Either he or I _____ to do it.

IV. COMPOSITION

Describe the following in a Paragraph of not more than 100 words.

- (a) Describe your favourite tourist destination. 5
(b) Describe how you started preparing for the final examination. 5

[Turn over

V. COMPREHENSION

Read the following passage and answer the questions that follow :

It was a cold winter's afternoon. Robert paused for a moment as he crossed the bridge and looked down at the river below. There were hardly any boats on the river. Near the bridge, however, almost directly below, there was one small one, a canoe, with a boy in it. He was not even wearing many clothes, Robert noticed. He shivered and walked on.

Just then he heard a cry. Help ! Help ! The cry definitely came from the river. Robert looked down. The boy was in the water and his canoe was floating away. "Help ! Help !" he called again.

Robert was a good swimmer and he hesitated for only a moment. Taking off his coat, he dived into the river. The icy water almost took his breath away, but in a matter of seconds he reached the boy. "Don't Panic !" he said as he caught hold of him. "Just relax – and I'll soon get you out of the water." But the boy began to struggle and shout something at him. Robert could not make out his words. "Don't Panic," He said again and started to swim towards the bank, dragging the boy with him. But at that moment he noticed a large motor boat under the bridge. There were several people on board, all looking in his direction. Robert decided to swim towards the boat.

"Give me a hand," he shouted as he got near the boat. He looked up into a row of faces. "It's funny." He thought. "They look angry." Silently the people on the boat helped the boy aboard and wrapped him in a blanket. But they made no move to help Robert.

"Aren't you going to pull me out too ?" Robert asked.

"You !" said one of the men. Robert noticed that he was standing next to a large Camera.

"You ! why, we were making a film and you spoilt a whole afternoon's work ! You can say in the water !"

Unfamiliar words :

Paused – Stop temporarily

Canoe – Shallow narrow boat, with pointed ends.

Hesitate – be reluctant to do something.

Panic – Sudden uncontrollable fear or anxiety.

Spoilt – Make something less good or enjoyable.

Questions :

- | | |
|---|---|
| 1. How was the weather in the afternoon ? | 1 |
| 2. Who was found in the Canoe ? | 1 |
| 3. What did Robert do when he heard a cry for help ? | 2 |
| 4. How did Robert calm down the boy and what was boy's reaction to it ? | 2 |
| 5. What did the people do when the boy came near the boat ? | 2 |
| 6. Why did the people make Robert to stay in water ? | 2 |

1002**Code : 15EC-21T**Register
Number

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II Semester Diploma Examination, Nov./Dec. 2016**BASICS OF SEMICONDUCTOR DEVICES****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any **six** questions from Part – A. ($6 \times 5 = 30$ Marks)
(ii) Answer any **seven** full questions from Part – B. ($7 \times 10 = 70$ Marks)

PART – A

1. Define Doping. Explain energy band diagram of p-type semiconductor. 5
2. Explain the formation of PNP transistor. 5
3. Outline different regions in output characteristics of BJT in CE mode. 5
4. Explain the principle of operation of JFET briefly. 5
5. Write applications of CMOS. 5
6. List the features of GUNN diode. 5
7. Define SSI, MSI, LSI, VLSI and ULSI. 5
8. List the applications and advantages of LED. 5
9. Write a short note on opto-coupler. 5

PART – B

10. (a) Distinguish between n-type and p-type semiconductors. 5
(b) Explain the behaviour of zener diode under reverse biasing with the help of characteristic plot. 5
11. (a) Define : 5
(i) Valence electron
(ii) Intrinsic semiconductor
(iii) Cut-in voltage
(iv) Dopant
(v) Reverse saturation current
(b) Describe the effect of temperature on Diode Current. 5

1313**Code : 15SC02M**Register
Number

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II Semester Diploma Examination, Nov./Dec. 2017**ENGINEERING MATHEMATICS – II****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any 10 questions from Section A, 8 questions from Section B and 5 questions from Section C.
- (ii) Each question carries 3 marks in section – A, 5 marks in section – B & 6 marks in section – C.

SECTION – A

1. Find the equation to the straight line cutting off y – intercept 5 units and making inclination 135° . 3
2. Find the focus and equation to directrix of the parabola $y^2 = 40x$. 3
3. If $y = (x^2 + 5x) \cdot \log x$. Find $\frac{dy}{dx}$. 3
4. If $y = (3x^3 - 4x + 5)^6$. Find $\frac{dy}{dx}$. 3
5. Find $\frac{dy}{dx}$, if $x^2 + y^2 = a^2$. 3
6. If $x = a \tan \theta$, $y = a \sec \theta$. Find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$. 3
7. Find the equation to the tangent to the curve $y = x^2 + 1$ at $(1, 2)$. 3

15EC-21T	[2 of 2]	1002
12.	(a) Calculate emitter current if the base current is $10\ \mu\text{A}$ and current gain is 100 for CE mode transistor.	5
	(b) Justify the need of heat sink.	5
13.	(a) Write a note on CE mode of operation of BJT.	5
	(b) Define α and β and deduce the relation between them.	5
14.	(a) Define g_m , μ and r_d of JFET. Justify $\mu = g_m \times r_d$.	5
	(b) Explain the working principle of CMOS inverter.	5
15.	(a) Justify why JFET is called as voltage controlled device. Also, list disadvantages of JFET over MOSFET.	5
	(b) Compare the enhancement and depletion modes of MOSFET.	5
16.	(a) Outline symbols of UJT, SCR, diac, diode and Schottky diode.	5
	(b) Identify at least one application for each of SCR, tunnel diode, diac, triac and UJT.	5
17.	(a) Write a short note on varactor diode.	5
	(b) List the features of tunnel diode.	5
18.	(a) Explain the fabrication process of monolithic ICs.	5
	(b) List the advantages and disadvantages of ICs.	5
19.	(a) List the applications of photodiode and phototransistor.	5
	(b) List the features of MASER.	5

1231**Code : 15CP-01E**

Register
Number

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I/II Semester Diploma Examination, Nov./Dec. 2016**COMMUNICATION SKILLS IN ENGLISH****Time : 3 Hours |****| Max. Marks : 100**

- Note :**
- (i) Answer all the questions as directed.
 - (ii) Spelling and grammatical errors shall be penalized.
 - (iii) Answer to question No. I and II are based on the prescribed text book.

SECTION – I

- I. Answer any **twelve** of the following in **one** or **two** sentences each. **2 × 12 = 24**
- 1. What does the term 'Career' mean ?
 - 2. Define 'Career Planning'.
 - 3. What should be the major focus of career planning ?
 - 4. What has started global experts ?
 - 5. What are the three traits of the Indian psyche which are not good for the country ?
 - 6. How does the concentration of Carbon dioxide in the air increase ?
 - 7. What are some of the steps that can be taken to save our environment ?
 - 8. What is global warming ?
 - 9. According to Nooyi, in the 50s and 60s, what did parents habitually talk about ?
 - 10. What lesson did Nooyi learn from her mother ?
 - 11. How does Nooyi manage time ?
 - 12. Describe the farmer who visited the dentists' clinic.
 - 13. Why did the doctor almost 'faint in shock' ?
 - 14. Why did the farmer commit suicide ?
 - 15. What is needed to avoid death ?

[1 of 4]**[Turn over**

SECTION – II

II. Write short notes on any **three** of the following : **5 × 3 = 15**

1. How does our education system inculcate the trait of servility in us ? Explain in your own words.
2. Write a short note on 'guidelines for choosing a career'.
3. Discuss the causes and effects of global warming.
4. How did Nooyi's husband contribute to her success ?
5. Discuss how the doctor fixed the bull's tooth.

III. Grammar :

1. Identify the parts of speech of the underlined words : **4 × 1 = 4**
 - (a) India is a peace loving country.
 - (b) Hurray ! we have won the match.
 - (c) Ram and Rahim are best friends.
 - (d) The sun shines bright.
2. Fill in blanks with suitable modal auxiliaries : **3 × 1 = 3**
 - (a) The cat _____ climb a tree.
 - (b) You _____ improve your spelling.
 - (c) _____ all your dreams come true !
3. Fill in the blanks with suitable articles : **3 × 1 = 3**
 - (a) Yesterday _____ European called at my office.
 - (b) _____ sun rises in the East.
 - (c) He returned after _____ hour.
4. Identify the tense of the verbs in the following sentences : **4 × 1 = 4**
 - (a) Disha speaks English fluently.
 - (b) They have been playing since four O'clock.
 - (c) She left the school last year.
 - (d) We shall know our exam results in January.
5. Change the voice of the following sentences : **4 × 1 = 4**
 - (a) The cat killed the rat.
 - (b) Shakuntalam was written by Kalidasa.
 - (c) Vidya gave Maria a present.
 - (d) They sell books here.

IV. Composition :

5 × 2 = 10

Describe any **two** of the following in a Paragraph of not more than 100 words :

- (a) Describe your favourite teacher.
- (b) Describe your favourite tourist destination.
- (c) Describe the process of making a bus pass.

V. Comprehension :

Read the following passage and answer the questions that follow :

I had never seen a house on fire before. So, one evening when I heard fire engines with loud alarm bells rushing past my house, I quickly ran out and, a few streets away, joined a large crowd of people; but we could see the fire only from a distance because the police would not allow any one near the building on fire.

What a terrible scene I saw that day ! Huge flames of fire were coming out of each floor, and black and thick smoke spread all around. Every now and then tongues of fire would shoot up almost sky-high, sending huge sparks of fire round-about.

Three fire engines were busily engaged and the firemen in their dark uniform were playing the hose on various parts of the building. The rushing water from several hoses soaked the building but it did not seem to have any effect on the flames. Finally the tall red ladders of the fire engine were stretched upwards and I could see some firemen climbing up with hoses in their hands. On reaching almost the top of the ladder, they began to pour floods of water on the topmost part of the building. This continuous flooding brought the fire under control but the building was completely destroyed.

While fire is a blessing in many ways, it can also be a great danger to human life and property.

Questions :

- 1. On an evening, what did the narrator hear and do ? 2
 - 2. Why could the fire be seen only from a distance ? 2
 - 3. Describe the terrible scene. 2
 - 4. How did the three fire engines try to bring the fire under control ? What was its effect ? 2
 - 5. How was the fire finally brought to control ? 2
-

1348**Code : 15SC-02M**Register
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II Semester Diploma Examination, Nov./Dec. 2016**ENGINEERING MATHEMATICS – II****Time : 3 Hours }****[Max. Marks : 100**

- Note :** (i) Answer any 10 questions in Section – A, 8 questions from Section – B and 5 questions from Section – C.
- (ii) Each question carries 3 marks in Section – A, 5 Marks in Section – B and 6 Marks in Section – C.

SECTION – A**(Answer any 10)**

1. Find the slope, x-intercept and y-intercept of the line $2x + 3y - 11 = 0$.
2. Find the focus, vertex and length of Latus rectum of $y^2 = 28x$.
3. If $y = \tan^{-1} x + 5 \log x - 2e^{3x}$, then find $\frac{dy}{dx}$.
4. If $y = \log \sqrt{\sin x}$, find $\frac{dy}{dx}$.
5. If $y = x^{1/x}$, find $\frac{dy}{dx}$.
6. If $x = \sin^{-1} t$, $y = \cos^{-1} t$, find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $y = 3x^2 + 4x$ at (1, 2).
8. The equation of motion is given by $S = 3t^2 + 4t + 6$, find the velocity after 2 seconds.
9. Evaluate $\int \left(x^5 + \frac{5}{x} + 4 \operatorname{cosec}^2 x \right) dx$.
10. Evaluate $\int \frac{1}{\sin^2 x \cos^2 x} dx$.

[1 of 4]**[Turn over**

11. Evaluate $\int \frac{\tan \sqrt{x}}{\sqrt{x}} dx$.
12. Evaluate $\int_0^4 \frac{1}{16+x^2} dx$.
13. Find the volume generated by rotating the curve $y = x + 1$ above x -axis between ordinates $x = 0$ and $x = 2$.
14. Form the differential equation from $x^2 + y^2 = a^2$, where 'a' is parameter.

Section – B
(Answer any 8)

15. Find the equation of the line passing through the midpoint of line joining the points (2, 4) & (6, 8) and having slope 2.
16. If $y = \frac{\sin hx}{1 + \sin^2 hx}$, find $\frac{dy}{dx}$.
17. If $x = a \cos^4 \theta$, $y = b \sin^4 \theta$, find $\frac{dy}{dx}$ at $\theta = \pi/4$.
18. If $y = e^{\tan^{-1} x}$, prove that $(1+x^2) y_2 + (2x-1) y_1 = 0$.
19. The volume of a spherical ball is increasing at the rate of 36π cc/s. Find the rate at which the radius is increasing when the radius of the ball is 2 cm.
20. Evaluate $\int \sqrt{\frac{1+\cos x}{1-\cos x}} dx$.
21. Evaluate $\int \frac{(1+\log x)^2}{x} dx$.

22. Evaluate $\int \tan^{-1}x \, dx$.

23. Evaluate $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$.

24. Find the area bounded by the curve $y = 4x - x^2 - 3$, x -axis and ordinate $x = 1$, $x = 4$.

25. Solve $\frac{dy}{dx} + y \tan x = \cos x$.

SECTION – C

(Answer any 5)

26. Find the equation to the line passing through the point $(-2, 1)$ and perpendicular to the line joining the points $(-7, 3)$ & $(2, 7)$.

27. Find the length of axis, eccentricity and foci of hyperbola $\frac{x^2}{36} - \frac{y^2}{25} = 1$.

28. Differentiate $\cos x$ w.r.t x from first principles.

29. Find $\frac{dy}{dx}$ if $x^3 + y^3 - 3xy^2 - 3y = 15$.

30. Find the maximum and minimum value of the function $2x^3 + 3x^2 - 36x + 1$.

31. Evaluate $\int \tan^4 x \, dx$.

32. Evaluate $\int_0^{\pi/2} \cos^3 x \, dx$.

33. Solve the differential equation $\frac{dy}{dx} = e^{3x+4y}$, given that $y = 0$ where $x = 0$.

1292**Code : 15EC21T**Register
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II Semester Diploma Examination, April/May-2018**BASICS OF SEMICONDUCTOR DEVICES****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any **six** questions from Part – A.
(ii) Answer any **seven** questions from Part – B.

PART – A**6 × 5 = 30**

1. State the properties of semiconductors. **5**
2. Define α and β , deduce the relation between them. **5**
3. Define Transistor. Explain transistor circuit configurations. **5**
4. Define JFET parameters. **5**
5. Explain working of N-channel JFET with a neat diagram. **5**
6. Write a short note on construction of TRIAC. **5**
7. List the classification of IC's by structure. **5**
8. Explain the terms photoemissive, photoconductive and photovoltaic effect. **5**
9. List the applications and advantages of LED. **5**

PART – B

 $7 \times 10 = 70$

- | | | | |
|-----|-----|---|----|
| 10. | (a) | Define Doping. Compare intrinsic and extrinsic semiconductor. | 5 |
| | (b) | Explain N-type semiconductor. | 5 |
| 11. | (a) | Explain the reverse characteristics of zener diode. | 5 |
| | (b) | Explain the application of diode as a switch. | 5 |
| 12. | (a) | Explain the working of PNP transistor. | 5 |
| | (b) | Explain the input characteristics of CB configuration. | 5 |
| 13. | (a) | Justify the need for heat sink. | 5 |
| | (b) | Write a note on transistor as Emitter follower. | 5 |
| 14. | (a) | Compare BJT and JFET. | 5 |
| | (b) | Explain the structure of P-channel MOSFET. | 5 |
| 15. | (a) | Explain the drain characteristics of P-channel JFET. | 5 |
| | (b) | Compare JFET and MOSFET. | 5 |
| 16. | | Explain the steps involved in the fabrication of monolithic IC. | 10 |
| 17. | | Briefly explain working principle and characteristics of UJT. | 10 |
| 18. | (a) | Write a short note on Opto-coupler. | 5 |
| | (b) | Explain working of LED. | 5 |
| 19. | | Explain the V-I characteristics of SCR. | 10 |
-

8. The displacement of a particle S meters, moving along a straight line is $S = 4t^3 - 2t^2 + t$. Find velocity when $t = 2$ secs. 3
9. Evaluate $\int (x^5 + 3e^{2x} + 4 \sin 3x) dx$. 3
10. Evaluate $\int \frac{1}{1 + \sin x} dx$. 3
11. Evaluate $\int (x^2 + 5x + 7)^5 (2x + 5) dx$. 3
12. Evaluate $\int_0^1 (x + 2)(x - 5) dx$. 3
13. Find the area bounded by the curve $y = 3x$, the x -axis and the ordinates between $x = 1$ & $x = 2$. 3
14. Form the differential equation from $y = ae^x + be^{-x}$ by eliminating a & b . 3



SECTION - B

15. Find the equation to the straight line passing through the point $(4, 3)$ and parallel to the line $3x + 5y - 3 = 0$. 5
16. If $y = \frac{1-x^2}{1+x^2}$ find $\frac{dy}{dx}$. 5
17. If $y = \tan^{-1}x$, show that $(1 + x^2) y_2 + 2xy_1 = 0$. 5
18. If $y = (\sec x)^x$ find $\frac{dy}{dx}$. 5

19. The radius of a sphere is increasing at the rate of 2 cm/sec. Find the rate of increase of the volume when the radius is 6 cm. 5
20. Evaluate $\int \sin^3 x \, dx$. 5
21. Evaluate $\int \frac{(\tan^{-1} x)^{10}}{1+x^2} \, dx$. 5
22. Evaluate $\int x \cos 2x \, dx$. 5
23. Evaluate $\int_{-\pi/4}^{\pi/4} \cot^2 x \, dx$. 5
24. Find the volume generated by rotating the curve $y = x + 2$ about x -axis between $x = 0$ & $x = 2$. 5
25. Solve the differential equation $\frac{dy}{dx} = 3x^2 - 2x + 5$.
when $x = 1, y = 2$. 5

SECTION - C

26. Find the equation to the straight line passing through the point (4, -3) & (2, 1). Also find the slope and the y -intercept of the line. 6
27. Find the eccentricity foci and equation to directrix for the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$. 6
28. Differentiate $\sin x$ w.r.t. x from first principles. 6

[Turn over

29. If $y = e^{m \sin^{-1} x}$ prove that $(1 - x^2) y_2 - xy_1 - m^2 y = 0$. 6

30. Find the maximum and minimum value of the function

$$x^3 - 6x^2 - 15x + 5.$$

6

31. Evaluate

$$\int \left(\frac{4}{x} - \frac{3}{\sqrt{1-x^2}} + 3 \tan x - 3 \operatorname{cosec}^2 x + \frac{1}{\sqrt{x}} - 5 \right) dx.$$

6

32. Evaluate :

$$\int_0^{\pi/2} \sin 4x \cos 2x \, dx.$$

6

33. Solve the differential equation

$$\frac{dy}{dx} + y \tan x = \sec x.$$

6



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Number

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I/II Semester Diploma Examination, Nov./Dec. 2017

ENGLISH COMMUNICATION**Time : 3 Hours |****[Max. Marks : 100**

- Note :** (i) Answer all questions as directed.
(ii) Spelling and grammatical errors shall be penalized.

I. Fill in the blanks :**5**

- (i) Teach him to have _____ in his own ideas.
- (ii) Della sold her hair for _____ dollars.
- (iii) Soil erosion is dangerous to _____.
- (iv) 'The Death of a Hero' is written by _____.
- (v) _____ is an intimate experience.

II. Answer any twelve of the following questions in two or three sentences each: $12 \times 2 = 24$

- (1) What does the boy have to learn about men?
- (2) What is 'Quiet Laughter'?
- (3) How did Della save the money?
- (4) Describe the two possessions of James and Della.
- (5) How are great tracts of land formed?
- (6) What is the role played by flowing water?
- (7) Why did Mr. Thakar approach Mr. Tagde?
- (8) What damage had more caused to one of his classmates?
- (9) Name the six pillars of self-esteem.
- (10) What did Todd owe the speaker and for how long?
- (11) Why should doubts and fears be excluded?
- (12) What is the outcome of allying thought with purpose?
- (13) What does 'Right to Information' mean?
- (14) Define 'competent authority' according to the Rights to Information Act.

III. Write short notes on any two of the following :

2 × 5 = 10

- (1) Conservation of water.
- (2) How is 'thought' linked with 'purpose' ? Explain.
- (3) Procedure for supply of information as stated in the Karnataka Right to Information Act.

IV. Grammar :

- (1) Identify the parts of speech of the underlined words :

1 × 2 = 2

Mr. Sharma is a brave soldier.

- (2) Pickout the countable nouns in the following :

2 × 1 = 2

- (a) These apples are very delicious.
- (b) She is playing with a ball.

- (3) Fill in the blanks with :

6 × 1 = 6

some, any, few, much, a little, many.

- (a) There are _____ trees around our house.
- (b) There is _____ juice in the glass.
- (c) _____ knowledge is a dangerous thing.
- (d) I am not going to buy _____ vegetables.
- (e) _____ people attended the meeting.
- (f) He doesn't eat _____ spicy food.

- (4) Fill in the blanks using suitable auxiliaries :

3 × 1 = 3

- (a) _____ god bless you.
- (b) She _____ speak French fluently.
- (c) You _____ pay the taxes regularly.

- (5) Fill in the blanks with the correct form of the verb given in the brackets : 8 × 1 = 8

- (a) Radha _____ to be a doctor. (want)
- (b) He _____ his car last month. (sell)
- (c) I am sure, she _____ the exam. (pass)
- (d) She _____ since this afternoon. (sing)
- (e) The train _____ when I reached the railway station. (leave)
- (f) I _____ my work by 12 O'clock. (finish)
- (g) We _____ for Bombay tomorrow. (leave)
- (h) They _____ an English language newspaper since March 2013. (buy)

- (6) Fill in the blanks using the passive form of the verbs in brackets : $4 \times 1 = 4$

Rohan _____ (be born) in Mangalore in 1995. In 2011, he _____ (admit) to a college in the city. His teachers _____ (please) with his performance in the exams. He _____ (give) a scholarship of ₹ 10,000.

- (7) Fill in the blanks with appropriate negative verbs : $2 \times 1 = 2$

(a) It is dark outside. I _____ see anything.

(b) I _____ the pilot of this plane. I am a passenger.

- (8) Fill in the blanks with suitable interrogatives : $2 \times 1 = 2$

(a) _____ do you come from ?

(b) _____ girl won the trekking competition ?

- (9) Fill in the blanks with suitable prepositions : $4 \times 1 = 4$

(a) She was standing _____ the door.

(b) Our cat sleeps _____ my bed.

(c) Many people were homeless _____ the war.

(d) She opened the door _____ a key.

- (10) Supply suitable question tags : $2 \times 1 = 2$

(a) He has gone on a picnic, _____ ?

(b) They don't swim everyday, _____ ?

- (11) Fill in the blanks with 'very / too' : $2 \times 1 = 2$

(a) Children like sweets _____ much.

(b) I am just _____ tired to work any more.

- (12) Use the following Idioms and Phrases in sentences of your own : $4 \times 1 = 4$

(a) On account of

(b) To look after

(c) Again and again

(d) In terms of

V. Composition :

- (1) Construct a readable story from the outlines given below : 5

A slave runs away from his cruel master – a lion in the forest – crying in pain – the slave takes out a thorn from his feet – a few months later – the slave caught by his master's men – ordered to be thrown before a hungry lion – the lion rushes at him – remembers his owing kindness – the slave and the lion set at liberty.