

CBCS SCHEME

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17CHE12/22

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are ion selective electrodes? Discuss the construction and working of a glass electrode. (07 Marks)
- b. Define Battery. Explain construction, working and uses of (Ni – Metal Hydride) battery. (07 Marks)
- c. What are fuel cells? How it is different from a galvanic cell? Mention any two advantages of fuel cell. (06 Marks)

OR

- 2 a. Derive Nernst equation for electrode potential. (06 Marks)
- b. What are concentration cells? The emf of the cell
 $\text{Ag} | \text{AgNO}_3 (0.0083\text{M}) || \text{AgNO}_3 (\text{XM}) | \text{Ag}$
was found to be 0.074 V at 298 K. Calculate the value of X and write the cell reactions. (07 Marks)
- c. Describe the construction, working and applications of methanol –oxygen fuel cell. (07 Marks)

Module-2

- 3 a. Define corrosion. Explain electrochemical theory of corrosion by taking Iron as an example. (07 Marks)
- b. What is Cathodic protection? Explain Sacrificial Anode and Impressed Current method for prevention of corrosion. (07 Marks)
- c. Define electroless plating. What are the differences between electroplating and electroless plating? (06 Marks)

OR

- 4 a. How does the following factors affect the rate of corrosion?
(i) Nature of the corrosion product
(ii) Temperature
(iii) pH. (06 Marks)
- b. Explain the process of electroplating of chromium and its applications. (07 Marks)
- c. Discuss the process of electroless plating of copper and explain its application in the manufacture of Printed Circuit Board (PCB). (07 Marks)

Module-3

- 5 a. Define Gross and Net calorific values of a solid on a liquid fuel. Calculate the gross and net calorific value of a sample of coal 0.5 g of which when burnt in a bomb calorimeter raised the temperature of water from 293 K to 296.4 K. The mass of water is 1000 g and water equivalent of calorimeter is 350 g. The specific heat of H₂O is 4.187 kJ/kg/K, latent heat of steam is 2454 kJ/kg. The coal sample contains 93% carbon, 5% hydrogen and 2% ash. (07 Marks)

- b. What is meant by knocking? What are its ill effects? Discuss the mechanism of knocking by giving relevant equations. (07 Marks)
- c. Explain the construction and working of a PV cell. (06 Marks)

OR

- 6 a. What is cracking of petroleum? Describe the fluidized bed catalytic cracking. (07 Marks)
- b. Explain the production of solar grade silicone by Union Carbide process. (07 Marks)
- c. Write a note on :
(i) Power alcohol (ii) Biodiesel. (06 Marks)

Module-4

- 7 a. What is addition polymerization? Illustrate the mechanism of addition polymerization by taking Vinyl Chloride as an example. (07 Marks)
- b. Describe the manufacture of (i) PMMA (ii) Epoxy resin. Mention the uses. (07 Marks)
- c. A polymer sample containing 100, 250 and 300 molecules having molar mass 10^3 g/mol, 10^4 g/mol and 10^5 g/mol respectively. Calculate the number average and weight average molecular mass of polymer. (06 Marks)

OR

- 8 a. What is glass transition temperature? Explain any three factors affecting T_g . (07 Marks)
- b. What are elastomers? Give the synthesis and applications of
(i) Silicone rubber (ii) Polycarbonate. (07 Marks)
- c. What are conducting polymers? Discuss the conduction mechanism in polyaniline. (06 Marks)

Module-5

- 9 a. Define Priming and Foaming. Mention the reasons for priming and foaming in the boiler with any two prevention steps. (07 Marks)
- b. What is desalination? Explain the desalination of water by reverse osmosis. (06 Marks)
- c. Describe the synthesis of nano-materials by Sol-gel process. (07 Marks)

OR

- 10 a. Define COD. In COD test 25.5 cm^3 and 12.5 cm^3 of 0.05N FAS solution and required for blank and sample titration respectively. The volume of the test sample used is 25 cm^3 . Calculate the COD of the sample solution. (07 Marks)
- b. Explain the precipitation method for preparation of nanomaterials with an example. (07 Marks)
- c. Write a note on Fullerenes and Composites. (06 Marks)

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15CHE12/22

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Derive Nernst equation for single electrode potential. (05 Marks)
b. Define electrolyte concentration cell. The e.m.f of cell $\text{Ag}|\text{AgNO}_3 (0.001\text{M})|| \text{AgNO}_3(\text{X}\text{M})|\text{Ag}$ is 0.0591 V at 25°C. Find the value of X. (05 Marks)
c. Explain the following battery characteristics:
i) Cell potential
ii) Capacity
iii) Cycle life. (06 Marks)

OR

- 2 a. Define reference electrode. Discuss the construction and working of Ag-AgCl electrode. (05 Marks)
b. Describe the construction and working of Lithium – ion battery. Mention its application. (05 Marks)
c. Describe construction, working and application of methanol O_2 fuel cell using H_2SO_4 as electrolyte. (06 Marks)

Module-2

- 3 a. Explain electrochemical theory of corrosion taking Iron as an example. (05 Marks)
b. Explain the following factors affecting corrosion
i) Nature of corrosion product
ii) Ratio of Anodic to cathodic Area
iii) p^{H} of the medium. (05 Marks)
c. Describe electroplating of chromium (decorative and Hard). Mention the reasons for not using chromium Anode in electroplating of chromium. (06 Marks)

OR

- 4 a. Explain waterline and pitting corrosion. (06 Marks)
b. What is metal finishing? Mention technological importance of metal finishing. (05 Marks)
c. Describe electro-less plating of copper with plating reactions. (05 Marks)

Module-3

- 5 a. Define Cracking. Explain fluidized bed catalytic cracking method with a neat diagram. (05 Marks)
b. What is Reforming of petroleum? Give any three reactions involved in reforming. (05 Marks)
c. What is photovoltaic cell? Explain the construction and working of photovoltaic cell. Mention any two advantages. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Calculate the Gross or Net calorific value of a coal sample from the following data obtained from Bomb calorimetric experiment. (05 Marks)
- | | | | |
|------|---------------------------------|---|---------------------------------|
| i) | Weight of coal | = | $0.65 \times 10^{-3} \text{kg}$ |
| ii) | Weight water in calorimeter | = | 1200g |
| iii) | Water equivalent of calorimeter | = | 400g |
| iv) | Latent heat of steam | = | $587 \times 4.2 \text{kJ/kg}$ |
| v) | Rise in temperature | = | 1.8°C |
| vi) | Sp-heat of water | = | 4.187kJ/kg % of H = 5 |
- b. Explain the modules, panels and arrays of the design of PV cell. (06 Marks)
- c. Explain the purification of silicon by zone refining process. (05 Marks)

Module-4

- 7 a. Explain free radical mechanism for addition polymerization taking vinyl chloride as an example. (06 Marks)
- b. Describe the synthesis and applications of the following polymer.
- | | | |
|-----|-------------------|------------|
| i) | Plexiglass (PMMA) | |
| ii) | Polyurethane | (06 Marks) |
- c. What is glass transition temperature? Discuss how flexibility of polymer chain affects glass transition temperature. (04 Marks)

OR

- 8 a. Calculate number average and weight average of a polymer in which 200 molecules of 1000 g/mole, 300 molecules of 2000g/mole and 500 molecules of 3000 g/mole are present respectively. (06 Marks)
- b. Explain the synthesis, properties and application of silicon rubber. (05 Marks)
- c. What is polymer composite? Describe the synthesis and application of Kevlar fibre. (05 Marks)

Module-5

- 9 a. Explain Scale and Sludge formation in the boiler. (05 Marks)
- b. Explain determination of DO (Dissolved O₂) by Winkler's method. (06 Marks)
- c. Write a note on fullerene. (05 Marks)

OR

- 10 a. Explain desalination of sea water by ion selective electro dialysis method. (05 Marks)
- b. Explain the synthesis of nanomaterial by chemical vapour condensation method. Mention advantages of this method. (05 Marks)
- c. Write short notes on Carbon nanotubes and Dendrimers. (06 Marks)

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14CHE12/22

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019
Engineering Chemistry

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
 ONE full question from each module.**

Module - 1

- 1 a. Derive Nernst equation for electrode potential. (05 Marks)
- b. What are reference electrodes? Describe the construction and working of calomel electrode. (05 Marks)
- c. Explain the construction, working and applications of Ni-MH battery. (05 Marks)
- d. What are fuel cells? Explain the construction and working of Methanol-Oxygen fuel cell. (05 Marks)
- 2 a. What are concentration cells? Derive an expression for emf of a concentration cell. (05 Marks)
- b. Explain an experimental method of determination of pH using glass electrode. (05 Marks)
- c. Describe the construction, working and applications of Zn -Air battery. (05 Marks)
- d. What are fuel cells? How they differ from a battery? (05 Marks)

Module - 2

- 3 a. Define the term corrosion. Explain electrochemical theory of corrosion with respect to iron. (06 Marks)
- b. Explain the effect of the following factors on the rate of corrosion:
 - i) Relative area of anode and cathode
 - ii) Nature of corrosion product. (04 Marks)
- c. What is electroless plating? Explain electroless plating of copper on PCB. (06 Marks)
- d. Explain the process of galvanizing. (04 Marks)
- 4 a. Explain the following types of corrosion:
 - i) Pitting corrosion ii) Water line corrosion. (04 Marks)
- b. What is cathodic protection? Explain the following methods of control of corrosion:
 - i) Sacrificial anode ii) Impressed current. (06 Marks)
- c. Explain the following terms:
 - i) Polarization and ii) Decomposition voltage. (06 Marks)
- d. Explain the process of electroplating of decorative chromium. (04 Marks)

Module - 3

- 5 a. What are chemical fuels? Give the classification of fuels with an example. (05 Marks)
- b. What is cracking process? Explain fluidized bed catalytic cracking with neat diagram. (05 Marks)
- c. What are photovoltaic cells? Explain construction and working of photovoltaic cell. (05 Marks)
- d. Discuss the production of solar grade silicon by union carbide process. (05 Marks)

- 6 a. What is gasoline knocking? Explain its mechanism with chemical reactions. (05 Marks)
 b. Calculate GCV and NCV using the following data. Mass of coke = 0.8×10^{-3} kg, mass of water = 2.5 kg, water equivalent of calorimeter = 0.5 kg, specific heat of water = 4.187 kJ/kg/K, increase in temperature = 2.8 K, latent heat = 2457 kJ/kg, H = 2.5%. (05 Marks)
 c. Explain doping of silicon by diffusion technique. (04 Marks)
 d. Discuss the physical and chemical properties of silicon relevant to photovoltaics. (06 Marks)

Module – 4

- 7 a. Explain addition and condensation polymerization with example. (04 Marks)
 b. What is glass transition temperature? Explain any two factors effecting it. (06 Marks)
 c. What are polymer composites? Explain the synthesis and applications of Kevlar fibres. (05 Marks)
 d. Explain synthesis and applications of the following polymers: i) PMMA ii) Teflon. (05 Marks)
- 8 a. Explain free radical mechanism of polymerization of vinylchloride as an example. (05 Marks)
 b. What are elastomers? Give the synthesis and applications of silicone rubber. (05 Marks)
 c. What is conducting polymer? Explain the mechanism of conduction in polyaniline. (05 Marks)
 d. A polymer has the following composition:
 100 molecules of molecular mass 1000 g/mol, 200 molecules of molecular mass 2000 g/mol and 500 molecules of molecular mass 5000 g/mol. Calculate the number and weight average molecular weights of a polymer. (05 Marks)

Module – 5

- 9 a. What is boiler feed water? Explain the scale and sludge formation in boiler. (05 Marks)
 b. What is desalination? Explain the process of desalination of water by electro dialysis. (05 Marks)
 c. What are nano materials? Explain the synthesis of nano materials by precipitation and gas condensation processes. (06 Marks)
 d. Write a note on nano composites. (04 Marks)
- 10 a. Define BOD and COD. 25 cm³ of an industrial effluent requires 12.5 cm³ of 0.5N K₂Cr₂O₇ solution for complete oxidation. Calculate the COD of the effluent. (06 Marks)
 b. Explain activated sludge process of sewage treatment with neat diagram. (04 Marks)
 c. Explain synthesis of nano materials by chemical vapour condensation and sol-gel processes. (06 Marks)
 d. Write a note on carbon nano tubes. (04 Marks)

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Question Paper Version : **B**

First Semester B.E Degree Examination, Dec.2018/Jan.2019

Technical English – I**(COMMON TO ALL BRANCHES)**

Time: 3 hrs.]

[Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the hundred questions, each question carries **ONE** mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

1. _____ do you think has stolen the watch?
a) Who b) Whom c) Whose d) All of these
2. _____ do you think I met at the party?
a) Who b) Whom c) Whose d) None of these
3. This dress is _____ to that.
a) Preferable b) More preferable c) Most preferable d) None of these
4. Our teacher has read _____ book of this library.
a) each b) every c) little d) small
5. The plural form of the compound noun 'Son-in-law' is
a) Son-in-laws b) Sons-in-law c) Sons-in-laws d) Son-in-law
6. Which of the following Nouns is generally used as plural form?
a) Economics b) Furniture's c) Public d) News
7. The meaning of the Noun 'Advices' is
a) Counsel b) Opinion c) Information d) Advise
8. You and Ahmed have wasted _____ time
a) they b) your c) yours d) him
9. The Abstract noun of the verb 'Go' is
a) Goit b) Glutton c) Gone d) Go

Select the appropriate Question Tag, to complete the following sentences: (Q.No.10 to Q.No.13)

10. You are not serious; _____
 a) are you? b) had you? c) were you? d) aren't you?
11. We can't buy this costly car, _____
 a) can't we? b) can we? c) could we? d) shouldn't we?
12. Give me a hint, _____
 a) will you? b) won't you? c) can you? d) Do you?
13. There are many beautiful lakes in Udaipur, _____
 a) are there? b) weren't there? c) aren't there? d) isn't there?

Choose the appropriate Homophones of the following words: (Q.No.14 to Q.No.18)

14. Ad : _____
 a) Had b) Add c) Odd d) and
15. Beet : _____
 a) Beat b) Boat c) Bate d) Bird
16. Scene : _____
 a) Seen b) Rain c) See d) Saw
17. Tea : _____
 a) Seen b) Tee c) rite d) sow
18. Right : _____
 a) Bright b) Light c) Rite d) effect

Select the missing silent letter/s from the options given. Check the spelling carefully (Q.No.19 to Q.No.23)

19. _____ onest
 a) h b) b c) k d) c
20. Com _____
 a) d b) f c) e d) b
21. As _____ ma
 a) t b) th c) ss d) kn
22. Fau _____
 a) t b) gh c) x d) z

23. _____ neumonia
a) p b) ch c) gh d) k
24. Which of the following has / a:/ sound
a) art b) eat c) date d) get
25. Which of the following has /i:/ sound
a) Fact b) eat c) wit d) few
26. Which of the following has |P| sound
a) but b) pat c) wit d) get
27. Which of the following is an adjective form of "WORD"
a) vocal b) verbal c) oral d) word
28. The adjective form of the noun "Attendance" is
a) Attend b) Attentive c) Attendant d) Presence
29. The pronunciation of definite article "The", before a vowel is
a) thee b) th-uh c) th-hu d) th-ch
30. The baker prepared some 'eats' for Christmas. Here the word 'eats' is
a) a noun b) a pronoun c) a verb d) an adverb
31. They have reached the place _____ time
a) on b) in c) at d) over
32. The _____ of an earthquake is the movement of tectonic plates
a) Reason b) Cause c) Habit d) Wind
33. One who knows many languages is called
a) Linguist b) Emigrant c) Omnipotent d) Fotalist
34. A person walking and not using a vehicle is called
a) Patriot b) Pessimist c) Pedestrian d) Usurer
35. One who looks at the dark side of things
a) Pessimist b) Optimist c) Omniscient d) Omnipotent

Choose the correct parts of speech of the underlined words: (Q.No.36 to Q.No.41)

36. "Our blessings come from above"
a) Noun b) Pronoun c) Verb d) Adverb
37. "The stars are shining above in the sky"
a) Noun b) Pronoun c) Adverb d) Adjective
38. "None but the brave deserve the best"
a) Preposition b) Noun c) Conjunction d) Verb

39. "She tried hard but did not succeed".
 a) Noun b) Conjunction c) Adverb d) Preposition
40. Ask either of them to leave
 a) Verb b) Adverb c) Pronoun d) Adjective
41. I believe in human 'goodness'.
 a) Abstract Noun b) Proper Noun c) Common Noun d) Collective Noun
42. A spendthrift is devoid _____ foresight and often runs _____ debt
 a) in, in b) of, in c) of, into d) of, to
43. Have you read the last _____ one poem of the book?
 a) before b) but c) either d) because
44. He is wise _____ he is young
 a) though b) where c) before d) because
45. You are _____ my friend _____ philosopher
 a) both, and b) and, both c) and, and d) both, both
46. _____ How unworthy of you!
 a) pooh! b) Hush! c) Fie! d) ouch!
47. Much _____ since they were last seen here
 a) has happened b) had happened
 c) was happening d) would have happening
48. He _____ waiting for her since morning.
 a) has been b) have been c) had d) would
49. I suggest that Prakash _____ walk on and try to get help.
 a) would b) can c) could d) should
50. Some checks _____ to be put on the mushrooming of frivolous unions.
 a) also have b) has c) will also d) shall also
51. He would not have written this letter if he _____ heard the news.
 a) had not b) would have c) will have d) shall had

Choose the correct spelling words which are commonly mis-spelt : (Q.No. 52 to Q.No.56)

52. a) Advisable b) Adviesable c) Advisible d) Adviseable
53. a) Admission b) Admision c) Admision d) Admisionne
54. a) Adress b) Address c) Adres d) Addres

55. a) appiarance b) appearence c) apparance d) appearance
56. a) Committment b) Comitment c) Commitment d) Commitment

Choose the correct Antonym for the following words (Q.No.57 to Q.No.61)

57. Interest : _____
a) uninterest b) disinterest c) non-interest d) curious
58. Blunt : _____
a) dull b) sharp c) gloomy d) wax
59. Hostile : _____
a) Innocent b) Friendly c) Lazy d) Crazy
60. Fresh : _____
a) Stale b) Stole c) Steal d) Steel
61. Postpone : _____
a) Prepone b) Before c) Advance d) Soon

Select the name of the collective Noun of the following: (Q.No.62 to Q.No.64)

62. A _____ of ants
a) board b) swarm c) council d) fleet
63. A _____ of ships
a) fleet b) posy c) crew d) bunch
64. A _____ of Elephants
a) Stack b) Herd c) mob d) gang
65. Which of these is a communication skill?
a) Swimming b) Running c) Sleeping d) Asking Questions
66. Which of these is an intrapersonal communication barrier?
a) Lack of knowledge b) Reading c) Listening d) Writing
67. Which of the following is called an Aspiration?
a) elongated pronunciation b) actual sound
c) forceful release of air d) sound
68. In business, oral communication is face-to-face
a) in some situation b) in no situation
c) in all but one situation d) in all situation

69. Which of the following skills has the largest share in communication time in schools/colleges?
 a) Reading b) Listening c) Writing d) Speaking
70. In general, the oral communication is the interchange of _____ between the sender and the receiver.
 a) cues and clues b) written messages c) signs and gestures d) verbal messages
71. Comparatively, oral communication is better than written communication in
 a) Providing opportunity to refer back b) Conveying feelings and emotions
 c) Saving time d) Conveying facts and opinions
72. Which of the following is a Interpersonal Communication barrier?
 a) Language b) Listening c) Reading d) Writing
73. Body language is also known as
 a) Noise b) Overflow c) Leakage d) Verbal
74. Which of these is not a communication skill?
 a) Swimming b) Asking question c) Writing d) Body language
75. The police _____ arrested the thief
 a) has b) have c) has been d) will
76. The horse and carriage _____ ready
 a) is b) are c) were d) have
77. My brother likes comics _____ much
 a) Very b) Too c) most d) so
78. _____ boys passed with distinction
 a) full b) little c) a few d) number
79. It is _____ hot to drink
 a) very b) so much c) Too d) more
80. I complimented him _____ his brilliant success in the examination
 a) over b) for c) to d) on
81. As I approached _____ him, he turned and walked away
 a) to b) by
 c) beside d) no preposition is needed
82. _____ uranium, we can use another metal, thorium to produce nuclear power
 a) Beside b) Besides c) Against d) of
83. _____ all your patent medicines, you haven't cured me _____ this cold
 a) of, of b) of, from c) with, of d) with, from

84. If you live _____ your means, you will, run _____ debt.
a) above, in b) beyond, into c) beyond, in d) in. on

Choose the correct synonym for the following words (Q.No.85 to Q.No.89)

85. Amuse : _____
a) Entertain b) Enroll c) engage d) ended
86. Tranquil : _____
a) calm b) storm c) bold d) loud
87. Darling : _____
a) near b) dear c) close d) full
88. Event : _____
a) Vain b) Void c) incident d) vile
89. Queer : _____
a) curious b) gain c) deep d) weary

Select the correct Prefix or Suffix from the given options to complete the gap: (Q.No.90 to Q.No.95)

90. _____ adjustment.
a) Mal b) All c) non d) un
91. _____ driven.
a) Wise b) Self c) Un d) Re
92. _____ chairman
a) Wise b) Vice c) Nice d) Un
93. Affection _____
a) ate b) eat c) ade d) es
94. Astro _____
a) logo b) logist c) loger d) ist
95. Micro _____
a) alia b) phone c) scene d) ship

Choose the correct pair of words from the given options (Q.No.96 to Q.No.100)

96. Accept: _____
a) Expect b) Except c) Eccept d) Excess
97. Fain: _____
a) Fine b) Fane c) Feign d) Fan

98. Naughty: _____
a) knotty b) notty c) note d) notice
99. Dissent: _____
a) Decent b) Descent c) Dissect d) Decence
100. In: _____
a) Hen b) Inn c) Him d) Hymn

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First Semester B.E. Degree Examination, Dec.2018/Jan.2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the working of PN junction diode under forward and reverse biased conditions. (06 Marks)
- b. Explain how zener diode helps in voltage regulation with neat circuit diagram. (06 Marks)
- c. Explain with neat circuit diagram and waveforms the working of center-tap full wave rectifier. Show that efficiency of full-wave rectifier is 81%. (08 Marks)

OR

- 2 a. Explain the operation of half-wave rectifier with capacitor filter with neat circuit diagram and waveforms. (06 Marks)
- b. Show that the ripple factor of a half-wave rectifier is 1.21 and efficiency is 40.5%. (06 Marks)
- c. Explain VI characteristics of photodiode and its operation. (04 Marks)
- d. For the circuit shown in Fig.Q2(d) find (i) current and voltages in the circuit for $R_L = 450 \Omega$. (04 Marks)



Fig.Q2(d)

Module-2

- 3 a. Explain the drain and transfer characteristics of a JFET with neat circuit diagram. (08 Marks)
- b. Explain the basic structure and operation of JFET with neat diagrams. (08 Marks)
- c. For a JFET $I_{DSS} = 9 \text{ mA}$ and $V_{GS(off)} = -8 \text{ V}_{(max)}$ determine drain current for $V_{GS} = -4 \text{ V}$. (04 Marks)

OR

- 4 a. Explain the operation of an enhancement MOSFET with neat circuit diagram. (06 Marks)
- b. Explain CMOS as an inverter with neat circuit diagram. Give its equivalent circuit and its advantages. (08 Marks)
- c. Explain VI characteristics of SCR. (06 Marks)

Module-3

- 5 a. Explain the block diagram of an operational amplifier. (06 Marks)
- b. Explain the operation of an op-amp as a non-inverting amplifier with neat diagram and waveforms. (06 Marks)
- c. Define the following terms with respect to op-amp. (08 Marks)
 - (i) CMRR (ii) Slewrate (iii) μp offset voltage and current (iv) μp bias current

OR

- 6 a. Explain op-amp as a subtractor with neat circuit diagram. (08 Marks)
- b. Explain the different μp modes of an op-amp. (06 Marks)

- c. For an op-amp circuit shown in Fig.Q6(c), find the output V_{O1} and V_{O2} .

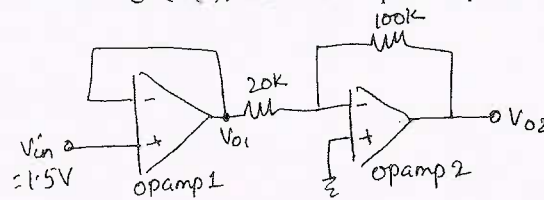


Fig.Q6(c)

Also write the function of each op-amp used.

(06 Marks)

Module-4

- 7 a. With neat circuit diagram explain how transistor is used as an voltage amplifier. Derive an equation for A_v . (08 Marks)
- b. Explain the voltage series feedback circuit and derive an equation for voltage gain A_v with feedback. (04 Marks)
- c. Explain RC phase-shift oscillator with circuit diagram and necessary equations. (08 Marks)

OR

- 8 a. With neat circuit diagram explain how transistor can be used to switch an LED ON/OFF and give the necessary equation. (08 Marks)
- b. The transistor in common emitter configuration is shown in Fig.Q8(b) with $R_c = 10 k\Omega$ and $\beta_{DC} = 200$ determine
 (i) V_{CE} at $V_{in} = 0$ (ii) $I_{B(min)}$ to saturate the collector current (iii) $R_{B(max)}$ when $V_{in} = 5V$.
 $V_{CE(sat)}$ can be neglected. (04 Marks)

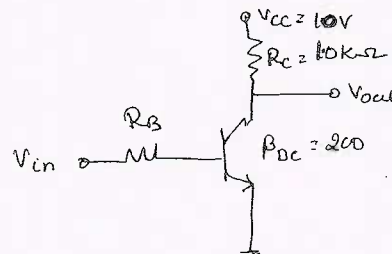


Fig.Q8(b)

- c. Explain the operation of IC-555 as an Astable oscillator with neat circuit diagram and necessary equation. (08 Marks)

Module-5

- 9 a. Design Full adder circuit and implement it using basic gates. (10 Marks)
- b. Explain the basic elements of communication system with block diagram. (06 Marks)
- c. Find
 (i) $(1010111011110101)_2 = (?)_{16}$ (ii) $(FA876)_{16} = (?)_2$ (04 Marks)

OR

- 10 a. State and prove De Morgan's theorems. (04 Marks)
- b. Explain the working of a 3-bit ripple counter with neat circuit diagram and timing diagrams. (08 Marks)
- c. Explain the working of RS flip flop with truth table and diagram. (06 Marks)
- d. Subtract the following using 2's complement:
 (i) $11100 - 10011$ (02 Marks)

CBCS SCHEME

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18CPS13

First Semester B.E. Degree Examination, Dec.2018/Jan.2019

C Programming for Problem Solving

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the basic structure of a C program with example. (10 Marks)
- b. Define a variable. Explain the rules for constructing variables in C language. (04 Marks)
- c. Write a C program to compute simple interest. Draw the flowchart for the same. (06 Marks)

OR

- 2 a. Define data type. Explain primitive data types supported by C language with example. (10 Marks)
- b. List all the operators used in C language and evaluate following expression.
 - i) $x = a - b/3 + c * 2 - 1$ when $a = 9, b = 12, c = 3$
 - ii) $10! = 10 \parallel 5 < 4 \& \& 8.$ (04 Marks)
- c. Describe the various type computers. (06 Marks)

Module-2

- 3 a. Explain the formatted I/O functions of C language with syntax and example. (04 Marks)
- b. Write a C program to implement commercial calculator using switch statement. (06 Marks)
- c. Write the syntax of different branching statements and explain their working. (10 Marks)

OR

- 4 a. Differentiate between while loop and do-while loop. Explain with syntax and example. (08 Marks)
- b. Write a program to find the sum of N natural numbers using for loop. (04 Marks)
- c. Write a C program to plot Pascal's triangle. (08 Marks)

Module-3

- 5 a. Define array. Write the syntax for and with declaring and initializing 1D and 2D array with suitable example. (10 Marks)
- b. Write a C program to find the transpose of a give matrix. (10 Marks)

OR

- 6 a. Define string. List out all string manipulation function. Explain any two with examples. (10 Marks)
- b. Write a C program for [consider integer data] :
 - i) Bubble sort
 - ii) Linear search. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. What is a function? Explain the different type of functions based on parameter. (10 Marks)
b. Write a program to find the factorial of a given number using functions. (14 Marks)
c. Write a program to find GCD and LCM of two numbers using concept of functions. (06 Marks)

OR

- 8 a. Explain recursion and write a program to find n^{th} term of Fibonacci series. (10 Marks)
b. Give the scope and lifetime of following :
i) External variable ii) Static variable iii) Automatic variable
iv) Static variable iv) Register variable. (10 Marks)

Module-5

- 9 a. What is a structure? Explain the syntax of structure declaration in C with example. (04 Marks)
b. Write note on : i) Arrays within structures ii) arrays of structures. (04 Marks)
c. Implement structures to read, write and compute average marks and the students scoring above and below average marks for class of N students. (12 Marks)

OR

- 10 a. What is a pointer? Show how pointer variable is declared and initialized. (05 Marks)
b. Explain any two preprocessor directives in C. (05 Marks)
c. Write a C program to find sum and mean of all elements in an array using pointer. (10 Marks)

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17PCD13/23

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.**

Module-1

- 1 a. What is an algorithm? Write an algorithm to find largest of 3 numbers. (08 Marks)
b. Explain any five operators used in C language. (10 Marks)
c. Explain two types of type conversions. (02 Marks)

OR

- 2 a. Explain the structure of 'C' program with an example program. (10 Marks)
b. Explain scanf() & printf() function in C language with syntax and example program. (10 Marks)

Module-2

- 3 a. Explain if, if-else, nested if-else and cascaded if-else with examples and syntax. (10 Marks)
b. Write a C program to simulate simple calculator that performs arithmetic operations using switch statement. An error message should be displayed, if any attempt is made to divide by zero. (10 Marks)

OR

- 4 a. List the differences between while loop and do-while loop. Write a C program to find the sum of natural numbers from 1 to N using for loop. (10 Marks)
b. Write a C program to read a year as an input and find whether it is a LEAP YEAR or not. (04 Marks)
c. Write a C program to find reverse of a number and check whether it is a PALINDROME or not. (06 Marks)

Module-3

- 5 a. What is an array? Explain the declaration and initialization of one dimensional and two dimensional array with an example. (10 Marks)
b. Explain any three string manipulation library function with example. (06 Marks)
c. Write a C program to implement string copy operation STRCOPY(Str1, Str2) that copies a string Str1 to another string Str2 without using library function. (04 Marks)

OR

- 6 a. What is function? Explain the two categories of argument passing techniques, with example. (10 Marks)
b. Write a C function isprime(num) that accepts an integer argument and return 1 if the argument is a prime or a 0 otherwise. Write a program that invokes this function to generate prime number between the given range. (10 Marks)

Module-4

- 7 a. What is structure data type? Explain. (04 Marks)
 b. Show how a structure variable is passed as a parameter to a function, with an example. (06 Marks)
 c. Explain the concept of array of structures, with a suitable C program. (10 Marks)

OR

- 8 a. What is FILE? Explain fopen(), fclose() functions. (05 Marks)
 b. Explain various modes of FILE. (05 Marks)
 c. Given two files "Studentname.txt" and "USN.txt" that contains students name and USN respectively. Write a C-program to create a new file called "output.txt" and copy the contents of files "Studentname.txt" and "USN.txt" into output file in the sequence shown below :

Student name	USN
Name – 1	USN – 1
Name – 2	USN – 2
–	–
–	–
–	–
–	–

(10 Marks)

Module-5

- 9 a. Define a pointer. Explain how pointer variable is declared and initialized. (05 Marks)
 b. What are primitive and non – primitive data types? Give examples. (05 Marks)
 c. Write a program using pointers to compute sum, mean and standard deviation of all elements stored in an array of "n" real numbers. (10 Marks)

OR

- 10 a. Explain any 2 pre- processor directives in 'C' language. (05 Marks)
 b. What is a STACK? Explain its applications. (05 Marks)
 c. What is a QUEUE? Explain with example. (05 Marks)
 d. Write a program to swap 2 numbers using call-by-reference method. (05 Marks)

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CBCS SCHEME

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15PCD13/23

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.**

Module-1

- 1 a. What is an operator? Explain the arithmetic, logical, and bitwise operators in C language. (08 Marks)
- b. Write a C program which takes as input p,t,r. Compute the simple interest and display the result. (08 Marks)

OR

- 2 a. What is the purpose of printf() statement? Explain the formatted printf() along with examples. (08 Marks)
- b. What is type conversion? Illustrate different ways of type conversion with an example. (08 Marks)

Module-2

- 3 a. Write a C program to calculate area of circle, rectangle and triangle using SWITCH case. (08 Marks)
- b. What is two way selection statements? Explain nested if statement and cascaded IF-ELSE with examples. (08 Marks)

OR

- 4 a. Write a C program to find GCD of two non-zero integer numbers. If the first number is less than the second number, then the program must exchange the two numbers before computing GCD. (08 Marks)
- b. Illustrate with an example break and continue statements. (03 Marks)
- c. Compare while loop and do-while loop with syntax, flowchart and examples. (05 Marks)

Module-3

- 5 a. Define an array. Explain declaration and initialization of one dimensional array with an example. (08 Marks)
- b. Write a C program to accept an alphanumeric (Eg : "ABC123DEFGR") string, to count the number of characters and digits. Also display the result. (08 Marks)

OR

- 6 a. Explain any four string manipulation functions with examples. (08 Marks)
- b. Write a C program to check a number is a prime number or not. (04 Marks)
- c. What is function? Write a C program to find square of a number using function. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Write a C program to create a structure using typedef and input the following details of "N" students (USN : String Name : String Average : float grade : char). Print the names of students with their average is $\geq 60\%$. (10 Marks)
- b. Differentiate between structure and union with examples. (06 Marks)

OR

- 8 a. Explain how the structure variable passed as a parameter to a function with example. (06 Marks)
- b. Explain the following file operations along with syntax and examples :
i) fopen() ii) fclose() iii) fscan() iv) fprintf() v) fgets(). (10 Marks)

Module-5

- 9 a. List out various memory allocation and de-allocation mechanisms available in C? Write a C program to demonstrate them. (08 Marks)
- b. Discuss any two preprocessor directives in 'C'. (03 Marks)
- c. Define pointer. What are the operators used by pointer with an example. List the advantages and disadvantages of pointer. (05 Marks)

OR

- 10 a. Describe the two ways of passing parameters to function with examples. (08 Marks)
- b. Define stack. Explain the primitive operations on the stack. Write a C program to demonstrate it. (08 Marks)

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First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019

Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting ONE full question from each module.

Module – 1

- 1 a. Explain the structure of typical C program. (06 Marks)
- b. What are the Data types available with C? Explain briefly with valid examples. (10 Marks)
- c. Write a program in C to find the area of a circle. (04 Marks)

- 2 a. Write a program in C to find the greatest of 3 numbers using conditional operator. (08 Marks)
- b. Write a guidelines to use scanf() function in C language. (08 Marks)
- c. What is an operator? Explain Relational operators in C. (04 Marks)

Module – 2

- 3 a. Explain the following with their syntax :
 - i) if – else (08 Marks)
 - ii) cascaded if – else. (04 Marks)
- b. Explain the switch statement with a simple C program (08 Marks)
- c. Write a program in C to check the given alphabet is a VOWEL or not. (04 Marks)

- 4 a. Differentiate between while and do – while statement. (04 Marks)
- b. Explain the uses of jump statements in loop with example. (06 Marks)
- c. Write an Algorithm, flowchart and C program to find reverse of an integer number NUM and check whether it is PALINDROME or not. (10 Marks)

Module – 3

- 5 a. What is an Array? Wire the syntax of declaring a one – Dimensional and Two – Dimensional array. (06 Marks)
- b. Write a C program to input N integer into a single dimensional array and sort them in Ascending order using Bubble sort method. (10 Marks)
- c. How are strings are declared and initialized? Explain with example. (04 Marks)

- 6 a. What are string manipulation library functions? explain any two string manipulation with C program. (10 Marks)
- b. Explain the difference between “call by value” and “call by reference” with suitable example. (04 Marks)
- c. Design and develop a function isprime (x) that accepts an integer argument and returns 1 if the argument is prime and 0 otherwise. (06 Marks)

Module – 4

- 7 a. What is structure? Explain the syntax of structure declaration with example. (05 Marks)
- b. Explain Nested structure with example. (05 Marks)
- c. Write a C program to maintain a record of “n” student details using an array of structure with four fields (RollNumber, Name, Marks and Grade). Each field is of an appropriate data type. Print the marks of the student given name as input. (10 Marks)

- 8 a. Explain Basic Input and output operations on files management. (06 Marks)
b. Write a simple C program to pass a structure as a parameter to a function. (10 Marks)
c. Explain with syntax typedef statement. (04 Marks)

Module – 5

- 9 a. Explain the four Library routines called memory management function in C. (06 Marks)
b. Explain commonly used preprocessor directives and their functions. (10 Marks)
c. Explain the code Demonstrating the use of pointers to pointer. (04 Marks)
- 10 a. What are stack and Queues? Explain them with a neat diagram. (06 Marks)
b. Write a C program using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n natural/real numbers. (10 Marks)
c. Explain prefix and postfix expression using example. (04 Marks)

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18ME15

First Semester B.E. Degree Examination, Dec.2018/Jan.2019 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of Thermodynamic data hand book is permitted.*

Module-1

- 1 a. Explain briefly the principle of conversion of solar energy directly into electrical energy in a solar cell. (10 Marks)
 b. Write a note on wind energy and its conversion. (10 Marks)

OR

- 2 a. Explain I - law of thermodynamics. List the similarities and dissimilarities between work and heat. (10 Marks)
 b. Define the following term in relation to steam:
 (i) Dryness fraction
 (ii) Latent heat
 (iii) Degree of super heat
 (iv) Saturation temperature (10 Marks)

Module-2

- 3 a. Differentiate between water tube boiler and fire tube boiler. (04 Marks)
 b. List the boiler mountings and accessories and also mention their uses. (06 Marks)
 c. With neat sketch explain the working of Babcock and Wilcox boiler. (10 Marks)

OR

- 4 a. With a neat sketch explain the working of Pelton Wheel. (10 Marks)
 b. With a neat sketch explain the working of a Reciprocating pump, state the advantages and uses. (10 Marks)

Module-3

- 5 a. Differentiate between Two-stroke and Four stroke engine. (04 Marks)
 b. Explain with neat sketch construction and working of 4-stroke diesel engine with the help of theoretical P-V diagram. (10 Marks)
 c. A four stroke single cylinder Diesel engine piston diameter 250 mm and stroke 400 mm. The mean effective pressure is 4-bar and speed is 500 rpm. Diameter of the brake drum is 1000mm. The effective brake load is 400 N. Find IP, BP and FP. (06 Marks)

OR

- 6 a. What are the properties of good refrigerant? (04 Marks)
 b. Explain with neat sketch working principle of vapour compression refrigeration. (10 Marks)
 c. Explain the following :
 (i) Refrigeration effect
 (ii) Ton of refrigeration
 (iii) COP. (06 Marks)

Module-4

- 7 a. Write a note on application of ferrous and non-ferrous alloys. (06 Marks)
b. Define composite material. State the advantages and applications of composite material. (05 Marks)
c. Differentiate between Soldering, Brazing and Welding. (09 Marks)

OR

- 8 a. Differentiate between Open and Crossed belt drive. (06 Marks)
b. Enumerate the advantages and disadvantages of gear drive over belt drive. (06 Marks)
c. Derive an equation for length of belt in open belt drive. (08 Marks)

Module-5

- 9 a. Explain the following operation on lathe with suitable sketches:
(i) Turning (ii) Knurling (iii) Facing (iv) Thread cutting (10 Marks)
b. Explain the following operation on milling machine with suitable sketches:
(i) Form milling (ii) Angular milling (iii) Gang milling (10 Marks)

OR

- 10 a. Differentiate between open loop and closed loop systems. (06 Marks)
b. Define robot. Write down industrial applications of robot. (04 Marks)
c. Explain the components of CNC with a block diagram. (10 Marks)

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CBGS SCHEME

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Question Paper Version : A

First/Second Semester B.E Degree Examination, Dec.2018/Jan.2019

Environmental Studies

(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 40

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the fourty questions, each question carries **ONE** mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

-
1. The word ecology is proposed by
a) Ernst Heckel b) Helena curtis c) Charles Southwick d) Charles Alton
 2. A food web consists of
a) a portion of food chain b) An organism position in food chain
c) Interlocking of food chain d) A set of similar consumers
 3. Population explosion will cause
a) Bio diversity b) Stress on ecosystem
c) More Employment d) None of these
 4. Which of the following statement is not true about animal husbandary?
a) it is a part of agricultural activity
b) It is breeding, feeding and management of animals
c) It is live stock production
d) It is protective of wild life.
 5. Fossils fuels largely consists of
a) Hydrocarbons
b) Hydrogen sulphide
c) Hydrochloric acid
d) Carbon dioxide.

6. The major contributors to the acid rain are known as
a) Precursors b) Processors c) Protons d) Pollutants
7. Percentage methane content of biogas is
a) 5.5 b) 85 c) 55 d) 0.55
8. Water used for irrigation of food crops fodder crops and medical herbs is known as
a) Consumptive use b) Commercial use
c) Productive use d) Auxiliary use
9. Environment (protection) Act was enacted in the year
a) 1986 b) 1992 c) 1984 d) 1974
10. Pesticide causes
a) eye irritation b) skin irritation
c) Respiratory ailments d) all of the above
11. Which of the following is not a renewable source of energy
a) Fossil fuel b) Solar energy c) Tidal wave energy d) Wind energy
12. Percentage of fresh water available below the earth is
a) 2.8% b) 2.2% c) 0.6% d) 2.15%
13. The quantity of solar energy received by the earth is
a) 5% b) 15% c) 99% d) 45%
14. Smog is combination of,
a) Smoking and Fog b) Snow and Fog c) Smoke and Snow d) All the above
15. Agricultural revolution began
a) 1000-2000 years ago b) 1 million years ago
c) 30,000 – 50,000 years ago d) 10,000 – 20,000 years ago
16. Environmental pollution is due to
a) Rapid urbanization b) Deforestation
c) Afforestation d) a and b, as above
17. What is maximum allowable concentration of fluorides in drinking water?
a) 1.0 mg/litre b) 1.25 mg/litre c) 1.50 mg/litre d) 1.75 mg/litre
18. Which pyramid is always upright?
a) Energy b) Biomass c) Numbers d) Food chain
19. The leader of chipko movement is
a) Sunderlal Bahuguna b) Medha Patkar
c) Vandana Shiva d) Suresh Heblkar

20. Bhopal Gas Tragedy was caused due to leakage of
 a) Methyl iso cyanate (MIC) b) Sulphur dioxide
 c) Mustard gas d) Methane
21. Each chlorine free radical can destroy the following number of ozone molecules
 a) 1000 b) 10,000 c) 1,00,000 d) 100
22. In aquatic ecosystem phytoplankton can be considered as a
 a) Consumer b) Producer
 c) Saprotrophic organisms d) Macro consumer
23. The first international earth summit was held in
 a) Johannesburg b) Kyoto c) Stockholm d) Riodejanerio
24. Ozone layer thickness is measured in
 a) PPM b) PPb c) Decibels d) Dobson unit
25. The water (Prevention and control of pollution) Act was enacted in the year
 a) 1986 b) 1974 c) 1994 d) 2004
26. Karnataka State Pollution Control Board (KSPCB) was established in the year.
 a) 1947 b) 1982 c) 1986 d) 1976
27. Which state is having highest woman literacy rate in India?
 a) Karnataka b) Punjab c) Rajasthan d) Kerala
28. Noise is measured in
 a) Decibles b) Jouls c) PPM d) NTU
29. Excess nitrates in drinking water is likely to cause
 a) Fluorosis b) Minamata
 c) Blue baby syndrome d) None of these
30. The word 'Environment is derived from,
 a) Greek b) French c) Spanish d) English
31. Forests prevent soil erosion by binding soil particles in their
 a) Stems b) Roots c) Leaves d) Buds
32. Study trends in human population growth and prediction of future growth is called
 a) Demography b) Biography c) Kalography d) Psychology
33. Large regional unit characterized by Flora and Fauna is
 a) Biosphere b) Biome c) Ecosystem d) All of these
34. Environment means
 a) Sum total of all condition b) A beautiful land scape
 c) Industrial Production d) Air and water

35. Remote sensing is a
a) Satellite system b) Ground segments c) Sensor system d) All of these
36. Terrace forming is practiced in
a) Coastal areas b) Hills c) Deserts d) Plains
37. Who is the author of the book "Silent Spring"?
a) Robin cook b) Arthur Hailey c) Rachel carson d) Darwin
38. Geothermal energy is a
a) Heat energy b) Current energy c) Wind energy d) Solar energy
39. Which of the following is not a "green house gas"?
a) Oxygen b) Carbon dioxide c) Chlorofluro carbon d) Methane.
40. GIS can be expanded as
a) Geological information system b) Geographic information system
c) Geodynamic intimation system d) Geographic internet system

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CBCS SCHEME

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17ELN15/25

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing
ONE full question from each module.

Module-1

- 1 a. Explain the operation of PN junction diode under forward and reverse bias condition. (07 Marks)
- b. Discuss the load and line regulations using zener diode with neat circuit diagrams and appropriate expressions. (08 Marks)
- c. Design a 9V DC reference source consisting of a zener diode and series connected resistor to operate from a 24V supply. [$I_{ZT} = I_Z = 20 \text{ mA}$]. (05 Marks)

OR

- 2 a. With a neat circuit diagram, explain the operation of centre tapped full wave rectifier. Draw input and output waveforms. (07 Marks)
- b. Draw common emitter circuit, sketch input and output characteristics and explain three regions of operation. (08 Marks)
- c. Derive the relationship between α and β . Find I_C and I_E for the transistor with $\alpha = 0.99$ and $I_B = 20 \mu\text{A}$. (05 Marks)

Module-2

- 3 a. Precisely analyse the circuit of voltage divider bias. (08 Marks)
- b. What is Op-Amp? List out the ideal and particle characteristics of Op-Amp. (07 Marks)
- c. Calculate the output voltage of a summer. Given : $R_1 = 200\text{k}\Omega$, $R_2 = 250\text{k}\Omega$, $R_3 = 500\text{k}\Omega$. $R_f = 1\text{M}\Omega$, $V_1 = -2\text{V}$, $V_2 = -1\text{V}$ and $V_3 = +3\text{V}$. (05 Marks)

OR

- 4 a. Design a base bias circuit to have $V_{CE} = 5\text{V}$ $I_C = 5\text{mA}$. The supply voltage is 15V and transistor has $h_{FE} = 100$. (07 Marks)
- b. Derive an expression for the voltage gain of inverting and Non-inverting amplifier. (08 Marks)
- c. Analyse the circuit of an op-amp as an integrator. (05 Marks)

Module-3

- 5 a. Interpret the following :
 - i) $(48350)_{10} = ()_{16} = ()_8$
 - ii) $(FACE)_{16} = ()_2 = ()_8$
 - iii) $(847.951)_{10} = ()_8$. (06 Marks)
- b. Write the logical symbol, truth table and Boolean expressions of all the logic gates : (AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR). (09 Marks)
- c. Realize EX -OR gate using NAND gates only. (05 Marks)

OR

- 6 a. Which are the universal gates? Realize basic gates using universal gates? (07 Marks)
 b. Design a full adder using two half adder. Derive the necessary expressions. (08 Marks)
 c. Perform the subtraction using 2's complement method :
 i) $(11010)_2 - (10000)_2$
 ii) $(11)_{10} - (15)_{10}$. (05 Marks)

Module-4

- 7 a. With diagram and truth table explain NAND gate latch. (06 Marks)
 b. Explain the operation of 8051 microcontroller with neat block diagram. Mention the salient features. (10 Marks)
 c. Distinguish between flip-flop and latch. List out the applications of flip-flop. (04 Marks)

OR

- 8 a. Explain the operation of clocked RS flip-flop. (07 Marks)
 b. With a neat block diagram, explain microcontroller based stepper motor control system. (07 Marks)
 c. With a diagram and truth table, explain NOR Gate Latch. (06 Marks)

Module-5

- 9 a. What is modulation? Explain the need for modulation. (04 Marks)
 b. Derive the expression for frequency modulation with a neat waveforms. (10 Marks)
 c. Explain the piezoelectric and photo electric transducers. (06 Marks)

OR

- 10 a. Discuss the comparison between AM and FM modulation. (06 Marks)
 b. Explain the construction and principle of operation of LVDT. (07 Marks)
 c. A carrier of 1MHz , with 400 Watt of its power is amplitude modulated with a sinusoidal signal of 2500Hz . The depth of modulation 75% Calculate the side band frequencies, the band width, the power in the side bands and the total power in the modulated wave. (07 Marks)

CBCS SCHEME

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15ELN15/25

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1
- Draw and explain the V-I characteristics of a Silicon diode. (05 Marks)
 - Find the value of the series resistance 'R_S' required to drive a forward current of 1.25mA through a germanium diode from a 4.5V battery. Write the circuit diagram showing all the values. (04 Marks)
 - With circuit diagram, explain the operation of center-tapped full wave rectifier. Draw input and output waveforms. (07 Marks)

OR

- 2
- Design the Zener regulator for the following specifications. Output voltage = 5V, load current = 20mA, Zener voltage $P_{Z(\min)} = 500$ mW and input voltage = $12V \pm 3V$. (05 Marks)
 - Draw CE circuit and sketch the input and output characteristics also explain the operating regions by indicating them on the characteristics curve. (08 Marks)
 - Calculate the values of I_C and I_E for a BJT with $\alpha = 0.97$ and $I_B = 50 \mu A$. Also determine the value of β_{dc} . (03 Marks)

Module-2

- 3
- Determine the operating point for a Silicon transistor biased by base bias method, for $\beta = 100$, $R_C = 2.5k\Omega$, $R_B = 500k\Omega$ and $V_{CC} = 20V$. Also draw the DC load line. (06 Marks)
 - With a net circuit diagram. Explain the voltage divider bias circuit. (07 Marks)
 - Compare base bias and voltage divider bias circuits. (03 Marks)

OR

- 4
- List the characteristics of an ideal op-amp. (05 Marks)
 - A non-inverting amplifier has input resistance of $10k\Omega$ and feedback resistance of $60k\Omega$. With a load resistance of $47k\Omega$. Draw the circuit and calculate the output voltage, voltage gain, load current, when the input voltage is 1.5V. (06 Marks)
 - Derive the expression for 3-input summing amplifier. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Compare analog and digital signal. (04 Marks)
 b. Convert :
 i) $(1AD.E0)_{16} = (?)_{10} = (?)_8$
 ii) $(1101101)_2 = (?)_{10}$
 iii) $(69)_{10} = (?)_2$ (05 Marks)
 c. Perform the subtraction :
 i) $(10010)_2$ and (1101) using 1's complement method
 ii) $(10010)_2$ and $(01101)_2$ using 2's complement method. (07 Marks)

OR

- 6 a. State and prove DC – Morgan's theorems for 4 variables. (08 Marks)
 b. Simplify the following expression and realize using basic gates :
 $Y = A(\overline{ABC} + A\overline{BC})$. (04 Marks)
 c. Realize half adder using only NAND gate. (04 Marks)

Module-4

- 7 a. Define flip-flop. Give the difference between a later and flip-flop. (04 Marks)
 b. Explain the working of a NOR gate later. (06 Marks)
 c. With diagram and truth table explain clocked RS –flip-flop. (06 Marks)

OR

- 8 a. List the important features of 8051 microcontroller. (03 Marks)
 b. Explain the architecture of 8051 microcontroller. (07 Marks)
 c. With block diagram, explain the micro-controller based stepper motor control system. (06 Marks)

Module-5

- 9 a. With a neat block diagram, explain the elements of communication system. (06 Marks)
 b. A carrier of 1MHz, with 400W of its power is amplitude modulated with a sinusoidal signal of 2500Hz. The depth of modulation is 75%. Calculate the sideband frequencies, the band width, the power in the side bands and the total power in the modulated wave. (05 Marks)
 c. Give the comparison between AM and FM. (05 Marks)

OR

- 10 a. What is a Transducer? Distinguish between active and passive transducer. (05 Marks)
 b. A termistor has a material constant ' β ' of 2000° K. If its resistance is 100 k Ω at 300°k temperature, what will be the resistance at 500°k? (04 Marks)
 c. Explain the construction and the principle of operation of LVDT. Also list the advantages of LVDT. (07 Marks)

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14ELN15/25

First/Second Semester B.E. Degree Examination, Dec.2018/Jan.2019
Basic Electronics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting ONE full question from each module.

Module – 1

- 1
 - a. Define PN Junction. Draw and explain the VI characteristics of Si and Ge diodes. (05 Marks)
 - b. Derive an expression for ripple factor and dc o/p voltage of a half wave rectifier with C filter. (07 Marks)
 - c. Calculate the values of I_C , I_E and β_{dc} for a transistor with $\alpha_{dc} = 0.99$ and $I_B = 110\mu A$. (03 Marks)
 - d. With a neat circuit. Explain the working of clipping circuit. (05 Marks)
- 2
 - a. Explain the working of center tapped Full Wave Rectifier (FWR) and derive the expression for I_{dc} , I_{rms} , r (06 Marks)
 - b. Draw and explain the clamper circuit with suitable waveforms. (05 Marks)
 - c. Derive the relationship between α and β and draw the input and output characteristics of common collector configuration. (04 Marks)
 - d. Design a zener diode voltage regulator to meet the following requirements unregulated dc I/P voltage, $V_i = 13$ to $17V$, $I_L = 10mA$, $V_0 = 10V$, $I_{zmin} = 5mA$, $P_{zmax} = 500mW$. (05 Marks)

Module – 2

- 3
 - a. What are the ideal characteristics of opamp? (05 Marks)
 - b. Explain dc load line and Bias point with respect to common emitter configuration. (05 Marks)
 - c. Compute the output expression for V_o shown in Fig Q3(c)

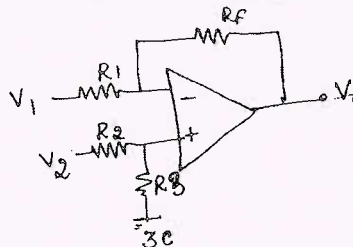


Fig Q3(c)

- d. Explain how opamp can be used as an inverting amplifier. (05 Marks)
- 4
 - a. With waveform, explain how opamp can be used as differentiator and integrator. (06 Marks)
 - b. Explain the working of voltage divider bias circuit. (07 Marks)
 - c. Mention different region of operation of transistor. (03 Marks)
 - d. Explain the term with respect to opamp a) CMRR ii) Slew rate. (04 Marks)

Module – 3

- 5
 - a. Implement EXOR gate using basic gates. (05 Marks)
 - b. Explain basic boolean laws. (05 Marks)
 - c. Determine the value of base x if
 - i) $(225)_x = (341)_8$ ii) $(211)_x = (152)_8$ (04 Marks)
 - d. Subtract $(28)_{10} - (19)_{10}$ using both 1's and 2's complement methods. (06 Marks)

- 6 a. State Demorgan's theorem for 3 variables and prove. (05 Marks)
 b. Design half adder circuit and realize using NAND gates. (05 Marks)
 c. Simplify and realize the following Boolean equation using basic gates

$$Y = ABC + \overline{A}BC + A\overline{B}C + \overline{A}\overline{B}C$$
 (05 Marks)
 d. $(110011)_2 - (11001)_2 = (?)_2$ using 2's complement method. (05 Marks)

Module – 4

- 7 a. Define Flip-flop. Explain the working of clocked RS FF with a suitable logic diagram and a truth table. (06 Marks)
 b. Explain the functional diagram of 8085 microprocessor. (09 Marks)
 c. Distinguish between active and passive transducers. (05 Marks)
- 8 a. With circuit. Explain the working of NAND gate Latch. (05 Marks)
 b. List the differences between microprocessor and microcontroller. (05 Marks)
 c. Explain the construction and working of Linear variable differential transducer. (05 Marks)
 d. Write a note on Piezo electric transducer. (05 Marks)

Module – 5

- 9 a. What is modulation? Explain the need for modulation. (05 Marks)
 b. With block diagram, explain the basic elements of communication system. (05 Marks)
 c. Mention the applications of OFC. (04 Marks)
 d. List the differences between AM and FM. (06 Marks)
- 10 a. Define amplitude modulation and prove that $P_t = P_c \left(1 + \frac{m^2}{2} \right)$ and write AM wave. (09 Marks)
 b. Explain the block diagram of ISDN. (06 Marks)
 c. The total power content of an AM signal is 2000W. Determine the power being transmitted at carrier frequency and at each of the side bands when percentage modulation is 100% (05 Marks)

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First/Second Semester B.E. Degree Examination, June/July 2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is single electrode potential? Derive Nernst's equation for single electrode potential. (06 Marks)
- b. What are batteries? Demonstrate the construction and working of Ni-MH battery. mention its applications. (07 Marks)
- c. What voltage will be generated by a cell that consists of an iron electrode immersed in 0.5M FeSO₄ solution and a copper electrode immersed in 1M CuSO₄ solution at 298 K. Given $E_{Fe}^{\circ} = -44 \text{ V}$ and $E_{Cu}^{\circ} = 0.34 \text{ V}$. Write the cell representation and cell reactions. (07 Marks)

OR

- 2 a. What is Battery? Explain primary and secondary with examples. (06 Marks)
- b. Describe the construction and working of Li-ion battery. Mention its applications. (07 Marks)
- c. What are concentration cells? Emf of the cell $Cd | CdSO_4 (XM) || CdSO_4 (0.025M) | Cd$ at 28°C is 0.035 V. Find the concentration of CdSO₄ at anode. Given $R = 8.314 \text{ J/K/mol}$. $F = 96500 \text{ C}$. (07 Marks)

Module-2

- 3 a. Discuss the following types of corrosion:
i) Differential metallic corrosion ii) Water line corrosion (06 Marks)
- b. What is corrosion? Illustrate electrochemical theory of corrosion taking iron as an example. (07 Marks)
- c. What is electroless plating? Outline the electroless plating of copper. (07 Marks)

OR

- 4 a. Explain the factors affecting the rate of corrosion:
i) Nature of corrosion product ii) Ratio of anodic to cathodic areas (06 Marks)
- b. What is meant by metal finishing? Highlight any five technological importance of metal finishing. (07 Marks)
- c. What is electroplating? Discuss the electroplating of chromium. (07 Marks)

Module-3

- 5 a. What are fuel cells? Describe the construction and working of Methanol-Oxygen fuel cell. (06 Marks)
- b. Describe the experimental determination of calorific value of solid fuel using Bomb Calorimeter. (07 Marks)
- c. 0.95 g of coal sample (C = 93%; H₂ = 6% and ash 1%) was subjected to combustion in Bomb calorimeter. Mass of water taken in the calorimeter was 2.6 kg and the water equivalent of calorimeter was 0.75 kg. The rise in temperature was found to be 3.2°C. Calculate the gross and net calorific values of the sample. Latent heat of steam = 2457 kJ/kg/°C and S = 4.187kJ/kg/°C. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the preparation of solar grade silicon by union-carbide process. (06 Marks)
b. What are pv-cells? Illustrate the construction and working of a typical pv-cell. (07 Marks)
c. What is knocking? Explain the mechanisms of knocking. Mention its ill effects. (07 Marks)

Module-4

- 7 a. Outline the softening of water by ion-exchange method. (06 Marks)
b. What are the sources, effects and control of lead pollution? (07 Marks)
c. Define COD. In a COD test, 30.6 cm³ and 15.5 cm³ of 0.05N FAS solution are required for blank and sample titration respectively. The volume of the test sample used was 25 cm³. Solve the COD of the water sample solution. (07 Marks)

OR

- 8 a. What is Desalination? Describe the process of reverse osmosis of water. (06 Marks)
b. What is boiler corrosion? Explain the boiler corrosion with CO₂, O₂ and MgCl₂. (07 Marks)
c. Define COD. Illustrate the determination of COD of waste water sample. (07 Marks)

Module-5

- 9 a. Describe the synthesis of nano-material by sol-gel technique. (06 Marks)
b. Discuss the theory and instrumentation of conductometry. (07 Marks)
c. Outline the theory, instrumentation and applications of colorimetry. (07 Marks)

OR

- 10 a. Explain size dependent properties of nano material:
i) Surface area
ii) Electrical
iii) Optical properties (06 Marks)
b. Write a note on fullerenes. Mention its properties and applications. (07 Marks)
c. What are nanomaterials? Explain the synthesis of nanomaterial by chemical vapour deposition method. (07 Marks)

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First/Second Semester B.E. Degree Examination, June/July 2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is single electrode potential? Obtain an expression for the same. (07 Marks)
- b. What are reference electrodes? Explain the construction and working of Calomel electrode. (07 Marks)
- c. Write a note on following battery characteristics:
(i) Capacity (ii) Current (iii) Shelf life (06 Marks)

OR

- 2 a. What are batteries? Explain the construction and working of Li-MnO₂ battery. Mention its applications. (07 Marks)
- b. Explain the construction and application of CH₃OH-O₂ fuel cell. Mention its applications. (07 Marks)
- c. The cell potential of Cu concentration cell Cu | Cu²⁺ (0.0093 M) || CuSO₄(X) | Cu is 0.086 V at 25°C. Write cell reaction and calculate the value of 'X'. (06 Marks)

Module-2

- 3 a. What is corrosion? Explain the resting of Iron by using electrochemical theory. (07 Marks)
- b. What is cathodic protection? Explain sacrificial anodic method and impressed current method. (07 Marks)
- c. What is metal finishing? Explain the following :
(i) Polarization (ii) Over voltage. (06 Marks)

OR

- 4 a. Discuss the effect of following on nature of electrodeposit:
(i) Current density (ii) pH (iii) Temperature. (07 Marks)
- b. Explain the electroplating of Nickel. (07 Marks)
- c. Write a note on the following :
(i) Galvanic corrosion (ii) Concentration cell corrosion (water line and pitting). (06 Marks)

Module-3

- 5 a. What is calorific value? Explain the experimental determination of calorific value of fuel by using Bomb calorimeter. (07 Marks)
- b. Calculate the gross and net calorific value of a coal sample from the following data obtained from Bomb-calorimeter experiment:
(i) Weight of coal = 0.73 g, (ii) Weight of water taken in calorimeter = 1500 g.
(iii) Water equivalent of calorimeter = 470 g (iv) Initial temperature = 25.0°C (v) Final temperature = 27.3°C (vi) % of H₂ in coal = 2.5% (vii) Latent heat of steam = 587 cal g⁻¹. (07 Marks)
- c. Explain the production of solar grade Si by union carbide process. (06 Marks)

OR

- 6 a. Explain the construction and working of typical P.V. cell. (07 Marks)
 b. What are solar cells? Explain the modules panels and arrays. (07 Marks)
 c. Explain the fluidized bed catalytic cracking process. (06 Marks)

Module-4

- 7 a. What are polymers? Explain the addition polymerization mechanism by taking Vinyl Chloride as example (07 Marks)
 b. What is glass transition temperature? Explain the factors affecting T_g value. (07 Marks)
 c. Explain the synthesis of
 (i) Plexi glass (ii) Epoxy resin. (06 Marks)

OR

- 8 a. What are elastomers? Explain the synthesis and applications of Silicone rubbers. (07 Marks)
 b. What are conductivity polymers? Write the mechanism of polyaniline. (07 Marks)
 c. Calculate the $\bar{\mu}_n$ and $\bar{\mu}_w$ for a polymer sample consisting of 10% by weight of macromolecules of molecular weight 10,000 and 90% by weight of molecules with molecular weight 100000. $M_1 = 10$, $M_2 = 90$. (06 Marks)

Module-5

- 9 a. What is boiler feed water? Explain the scale and sludge formation in boiler. (07 Marks)
 b. 25 ml of waste water was mixed with 10 ml of $K_2Cr_2O_7$, acidified and refluxed. The unreacted $K_2Cr_2O_7$ acidified required 15.2 ml of 0.3N FAS. In blank titration 10ml of $K_2Cr_2O_7$ acidified required 19.4 ml of same 0.3N FAS. Calculate COD of waste water. (07 Marks)
 c. Write a note on Fullerenes. Mention its applications. (06 Marks)

OR

- 10 a. What are nano materials? Explain the synthesis of nanomaterials by Sol-gel method. (07 Marks)
 b. Write note on the following :
 (i) Carbon nanotubes (ii) Dendrimers (06 Marks)
 c. What is desalination? Explain desalination of water by electro dialysis. (07 Marks)

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15CHE12/22

First/Second Semester B.E. Degree Examination, June/July 2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is single electrode potential? Derive the Nernst equation for single electrode potential. (06 Marks)
- b. Define Electrolyte Concentration Cell. Two copper electrodes placed in CuSO_4 solutions of equal concentration are connected to form a concentration cell :
- i) What is the Cell Voltage?
- ii) If one of the solutions is diluted until the concentration of Cu^{2+} ions is $1/5^{\text{th}}$ of its original value, what will be the cell voltage after dilution? (05 Marks)
- c. Describe the construction, reactions and applications of Nickel metalhydride battery. (05 Marks)

OR

- 2 a. Describe the following battery characteristics :
- i) Voltage ii) Capacity iii) Cycle life. (06 Marks)
- b. Explain the construction and working of Calomel electrode. (05 Marks)
- c. Describe the construction, electrode reactions and applications of Methanol – oxygen fuel cell. (05 Marks)

Module-2

- 3 a. Explain the effects of following variables on the nature of electro deposit :
- i) Current density ii) Metal ion concentration iii) Complexing agents. (06 Marks)
- b. Explain the Electrochemical theory of corrosion with iron as an example. (05 Marks)
- c. Describe the Cathodic protection by Sacrificial Anode Method. (05 Marks)

OR

- 4 a. Describe the effects of following factors on the rate of corrosion :
- i) Nature of metal ii) Nature of corrosion products iii) Difference in potential between anodic and cathodic regions. (06 Marks)
- b. Define Electroless plating. Explain the Electroless plating of copper. (05 Marks)
- c. Describe Electro deposition of Hard Chromium. (05 Marks)

Module-3

- 5 a. Explain how calorific value of a solid fuel is determined using Bomb Calorimeter. (06 Marks)
- b. Explain the purification of silicon by zone refining process. (05 Marks)
- c. A 0.85g of coal sample (carbon 90%, H_2 5% and ash 5%) was subjected to combustion in a bomb calorimeter. Mass of water taken in the calorimeter was 2000g and the water equivalent of calorimeter was 600g. The rise in temperature was 3.5°C . Calculate the gross and net calorific value of the sample. Given, specific heat of water = $4.187 \text{ kJ/kg}^{\circ}\text{C}$ and latent heat of steam 2454 kJ/kg . (05 Marks)

OR

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- a. What is Photovoltaic cell? Explain the construction and working of PV cell. (06 Marks)
- 6 b. Describe Fluidized bed catalytic cracking. (05 Marks)
- c. Explain the process of doping of silicon by diffusion technique. (05 Marks)

Module-4

- 7 a. Mention the preparation and applications of Poly methyl Methacrylate (PMMA) and poly carbonate. (06 Marks)
- b. Define Glass transition temperature. Explain the following factors influencing the T_g value.
i) Flexibility ii) Intermolecular forces. (05 Marks)
- c. Explain the free radical mechanism of addition polymerization by taking vinyl chloride as an example. (05 Marks)

OR

- 8 a. What is Conducting polymer? Explain the synthesis of conducting polyaniline. (06 Marks)
- b. Define Adhesive. Explain the preparation and applications of Epoxy resin. (05 Marks)
- c. A polymer has following composition, 100 molecules of molecular mass 1000g/mol, 200 molecules of molecular mass 2000g/mol and 500 molecules of molecular mass 5000g/mol. Calculate the number and weight average molecular weight. (05 Marks)

Module-5

- 9 a. Explain Winkler's method of determining dissolved oxygen. Give the reactions involved. (06 Marks)
- b. Define COD. 25cm³ of an industrial effluent requires 12.5cm³ 0.5N K₂Cr₂O₇ for the complete oxidation. Calculate COD of the sample. Assuming that the effluent contains only oxalic acid. Calculate the amount of oxalic acid present in 1 dm³ (Eq.wt of oxalic acid = 45). (05 Marks)
- c. Write a note on Dendrimer. (05 Marks)

OR

- 10 a. Explain the Synthesis of nano materials by Chemical vapour condensation and precipitate methods. (06 Marks)
- b. Write a note on Carbon nanotubes. (05 Marks)
- c. Explain the desalination of water by electro – dialysis. (05 Marks)

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First/Second Semester B.E. Degree Examination, June/July 2019
Engineering Chemistry

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE questions, selecting ONE full question from each part.

PART – A

- 1 a. What are reference electrodes? Discuss the construction and working of Calomel electrode. (06 Marks)
- b. What are concentration cells? Derive an expression for the emf of a concentration cell. (04 Marks)
- c. Explain any two characteristics of a battery. (04 Marks)
- d. What are fuel cells? Discuss the construction and working of methanol – oxygen fuel cell with H₂SO₄ electrolyte. (06 Marks)
- 2 a. Derive Nernst equation for electrode potential. (05 Marks)
- b. A concentration cell is constructed by immersing 2 Fe electrodes in 0.01 M and 0.1 M FeSO₄ solution. Represent the cell and calculate the emf of the cell at 298 K. (05 Marks)
- c. Discuss the construction and working of nickel metal hydride battery and give its applications. (05 Marks)
- d. Discuss the construction and working of lithium ion cobalt oxide battery. (05 Marks)

PART – B

- 3 a. What is corrosion? Explain the electrochemical theory of corrosion taking iron as an example. (06 Marks)
- b. Explain the following factors which affects the rate of corrosion : (i) nature of the metal (ii) ratio of anodic to cathodic area. (04 Marks)
- c. Discuss the electroplating of hard chromium and mention its applications. (05 Marks)
- d. What is electroless plating? Mention the difference between electroplating and electroless plating. (05 Marks)
- 4 a. Discuss (i) galvanization and (ii) sacrificial method of cathodic protection. (06 Marks)
- b. Discuss (i) differential metal and (ii) stress corrosions. (04 Marks)
- c. Explain the electroplating of gold using acidic cyanide bath. (05 Marks)
- d. Discuss decomposition potential and overvoltage. (05 Marks)

PART – C

- 5 a. Explain the determination of calorific value of a solid fuel using bomb calorimeter. (05 Marks)
- b. Explain the process of knocking in diesel engines. (05 Marks)
- c. What is reforming of petrol? Give the reactions involved in it. (05 Marks)
- d. What are photovoltaic cells? Discuss the construction and working of PV cell. (05 Marks)

- 6 a. On burning 0.83 gm of a solid fuel in a bomb calorimeter, the temperature of 3500 gms of water increased from 25.5°C to 29.2°C. Water equivalent of calorimeter is 385 gms. Calculate the gross and net calorific values of the fuel if the percentage of hydrogen is 0.7%. (Given : Specific heat of water = 4.187 kJ/kg/K ; Latent heat of condensation of steam = 2458 kJ/kg). (05 Marks)
- b. Explain the mechanism of knocking in petrol engines. (05 Marks)
- c. Explain fluidized bed catalytic cracking of heavy oil. (05 Marks)
- d. Describe the method for production of solar grade silicon by union carbide method. (05 Marks)

PART – D

- 7 a. Explain the free radical mechanism of polymerization taking vinyl chloride as an example. (05 Marks)
- b. Explain any three structure – property relationship of a polymer. (05 Marks)
- c. What are conducting polymers? Explain the mechanism of conduction in polyaniline. (05 Marks)
- d. Write the synthesis and applications of Teflon and Plexi glass. (05 Marks)
- 8 a. A polymer sample contains 5 molecules having a molecular weight of 2000, 4 molecules having molecular weight of 3000 and 3 with molecular weight of 4000. Calculate number average and weight average molecular weight. (04 Marks)
- b. What is glass transition temperature? Explain any three factors influencing the glass transition temperatures. (06 Marks)
- c. What are elastomers? Explain the synthesis and uses of silicone rubber. (05 Marks)
- d. What are polymer composites? Explain the synthesis of Kevlar fibre. (05 Marks)

PART – E

- 9 a. What is boiler corrosion? Explain corrosion of boiler due to O₂, CO₂ and MgCl₂. (04 Marks)
- b. Define COD. Explain experimental determination of COD of sewage water. (06 Marks)
- c. How do you synthesize nanomaterial by hydrothermal and precipitation methods. (05 Marks)
- d. Write a note on dendrimers. (05 Marks)
- 10 a. What is desalination? Explain the reverse osmosis method of desalination. (05 Marks)
- b. Calculate COD of an effluent sample when 25 ml of the effluent required 8.3 ml of 0.001 M K₂Cr₂O₇ for oxidation. (05 Marks)
- c. Write a note on fullerene. (05 Marks)
- d. Explain the synthesis of nanomaterial by sol-gel process. (05 Marks)

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18CPS13/23

First/Second Semester B.E. Degree Examination, June/July 2019 C Programming for Problem Solving

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat block diagram of computer, explain its components. (10 Marks)
- b. Classify the following into input and output devices:
Monitors, visual display unit, Track balls, Bar code reader, Digital camera, Film recorder, Microfiche, OMR, Electronic Whiteboard, Plotters. (05 Marks)
- c. Define the terms: Network, LAN, WAN, MAN and network topology. (05 Marks)

OR

- 2 a. Write the basic structure of C program. Explain each section briefly with suitable example. (09 Marks)
- b. Define operator. Explain any 6 operators with suitable example. (07 Marks)
- c. State whether the following are valid identifiers or not: integer, float, I am, 123_AbC. (04 Marks)

Module-2

- 3 a. Define and write the classification of Input and Output statements in C. Write a C-program that prints the following output:

" I am
an" 'Engineering
Student'

Screen →

(06 Marks)

- b. Define branching statements. Explain them with syntax and suitable example. (10 Marks)

c. Evaluate:

```

i = 1
L : if (i > 2)
{
    printf ("Saturday");
    i = i + 1;
    goto L;
}
printf ("Sunday");
    
```

Explain your result briefly.

(04 Marks)

OR

- 4 a. State the drawback of ladder if-else. Explain how do you resolve with suitable example. (08 Marks)

- b. Write a C program to get the triangle of numbers as a result:

```

1
1 2
1 2 3
1 2 3 4
    
```

(06 Marks)

- c. Write a C program to check whether given number is prime or not. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Define an array. Explain with suitable example how do you declare and initialize 1D array. (10 Marks)
b. Write a C program to search an element using linear and binary techniques. (10 Marks)

OR

- 6 a. Define a string. Explain any 4 string library functions with syntax and example. (10 Marks)
b. Write a C program to copy a string (combination of digits and alphabets) to another string (only alphabets). (10 Marks)

Module-4

- 7 a. Define a function. List and explain the categories of user defined functions. (10 Marks)
b. Write a C-program for evaluating the binomial coefficient using a function Factorial (n). (10 Marks)

OR

- 8 a. Define a recursion. Write a C recursive function for multiplying two integers where a function call is passed with two integers m and n. (10 Marks)
b. Differentiate: (i) User defined and built-in function (ii) Recursion and iteration (10 Marks)

Module-5

- 9 a. Define structures. Explain how do you declare, initialize and represent the memory for structure variable. (10 Marks)
b. Write a C program that accepts a structure variable as a parameters to a function from a function call. (10 Marks)

OR

- 10 a. Define pointers. Explain pass by value and pass by reference with C statements and an example. (10 Marks)
b. Define pre-processor directives. Write C program that finds the addition of two squared numbers, by defining macro for Square (x). (10 Marks)

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17PCD13/23

First/Second Semester B.E. Degree Examination, June/July 2019

Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Design a general structure of C program and explain with an example. (06 Marks)
- b. What are Identifiers? Define rules to declare an identifier. Identify the following words are valid / Invalid Identifier : i) asd123 ii) auto iii) 2K18 iv) @india. (06 Marks)
- c. Design a flow chart and develop a C – program to find area of a circle for the given radius. (08 Marks)

OR

- 2 a. Explain the formatted input and output statements in C with suitable examples. (06 Marks)
- b. With example, explain Implicit and Explicit type conversion and convert the following Mathematical Expression to C – equivalent Expression.
i) $\text{area} = \sqrt{S(s-a)(s-b)(s-c)}$ ii) $\frac{x}{a+b} + \frac{y}{a-b}$. (08 Marks)
- c. Write a C program to find largest of three numbers using ternary operator. (06 Marks)

Module-2

- 3 a. Explain the following selection statements with syntax and flow chart :
i) nested if ii) else – if ladder. (06 Marks)
- b. With example bring out the differences between while loop and do – while loop. (06 Marks)
- c. Design a C program to perform operations of a simple calculator using switch statement. Provide a provision to display an error message when an attempt is made to divide a number by zero. (08 Marks)

OR

- 4 a. Explain the working of for loop and write a C – program to find n – Fibonacci series, where n is specified by the user. (08 Marks)
- b. Explain the following unconditional statements with syntax and example :
i) goto ii) continue. (06 Marks)
- c. Design a C – program to read a Four – digit number from user and calculate the reverse of the number and check if the number is palindrome or not. (06 Marks)

Module-3

- 5 a. Define Array. Explain the methods of initializing one dimensional array with suitable examples. (06 Marks)
- b. What are Functions? Explain the following terms with example.
i) Function declaration ii) Function definition iii) Function call. (08 Marks)
- c. What is Recursion? Write a C program to find factorial of the given number using recursion. (06 Marks)

OR

- 6 a. Explain the String Manipulation Functions with syntax and code fragments.
i) strlen ii) strcmp. (06 Marks)
- b. With example explain different type of Functions based in parameters. (08 Marks)
- c. Write a C – Function to search an element in the given array using Linear search by passing array as an argument. (06 Marks)

Module-4

- 7 a. What is Structure? Explain the methods of declaration and initialization of structures with example. (06 Marks)
- b. Write a C – program to maintain record of n employee details using array of structures with three fields (id, name, salary) and print details of employee whose salary is greater than 5000. (08 Marks)
- c. What is a file? Explain fopen and fclose functions. (06 Marks)

OR

- 8 a. Explain the following file operations with example :
i) fprintf() ii) fseek() iii) fputc(). (06 Marks)
- b. Explain Structure within a structure with example. (08 Marks)
- c. Given a file “n.txt” which contains names. Write a C – program to create a new file “abc.txt” and copy the contents from “n.txt” to “abc.txt”. (06 Marks)

Module-5

- 9 a. What are Pointers? How pointer variables are declared and initialized. (06 Marks)
- b. Explain the concept of adding and deleting nodes in the linked list. (07 Marks)
- c. Develop a C program to swap two numbers using pointers. (07 Marks)

OR

- 10 a. Explain different dynamic memory allocation schemes in C with example. (08 Marks)
- b. Explain any three preprocessor directives with example. (06 Marks)
- c. What is a Stack? Explain the operations on stack. (06 Marks)

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15PCD13/23

First/Second Semester B.E. Degree Examination, June/July 2019 Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Write a general structure of C program. Explain with example. (06 Marks)
- b. List basic data types in C. Write the significance of each data type. (04 Marks)
- c. What is Variable? Explain the syntax of variable declaration and variable initialization. (06 Marks)

OR

- 2 a. With syntax and example, explain the formatted and unformatted input and output functions in C. (06 Marks)
- b. Write a C program to convert temperature from degree centigrade to Fahrenheit. (04 Marks)
- c. Explain various operators supported by C. (06 Marks)

Module-2

- 3 a. Explain the syntax of for loop and write a program using for loop to find sum of first n natural numbers. (08 Marks)
- b. Explain the syntax of if statement and write a program to find largest of 3 numbers using if statement. (08 Marks)

OR

- 4 a. With example, explain the syntax of switch statement. (06 Marks)
- b. Explain Break and Continue statements. (04 Marks)
- c. Differentiate between while and do – while loops. (06 Marks)

Module-3

- 5 a. Explain declaration and initialization of two dimensional array and write a program to multiply two matrices. (10 Marks)
- b. What is function? Explain the differences between call by value and call by reference. (06 Marks)

OR

- 6 a. Explain the various string manipulation functions. (06 Marks)
- b. Write a C program to find factorial of a number using recursion. (04 Marks)
- c. Explain with example syntax of puts and gets functions. (06 Marks)

Module-4

- 7 a. What is File? Explain any five file manipulation functions with example. (08 Marks)
- b. Write a C program to maintain record of n students with appropriate fields and print the marks of student if name is entered. (08 Marks)

OR

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 8 a. What is Structure? Explain the syntax of structure declaration. Explain structure within structure with an example. (08 Marks)
b. Write a C program to read text from file and display it on screen. (08 Marks)

Module-5

- 9 a. What is Stack? Explain various stack operations. (08 Marks)
b. What is Pointer? Write a C program to swap two numbers using pointers. (08 Marks)

OR

- 10 a. What is Dynamic Memory Allocation? Explain the four functions for memory management. (08 Marks)
b. Explain various Pre processor directives. (08 Marks)

First/Second Semester B.E. Degree Examination, June/July 2019
Programming in C and Data structures

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
at least ONE question from each part.**

Module – 1

- 1 a. Mention the types of input and output statements. Explain any two with example. (06 Marks)
- b. Mention types of operators based on the number of operands? Explain logical operators with example. (09 Marks)
- c. Evaluate the following expressions where $i = 3, j = 4, k = 2$:
 i) $i++-j--$
 ii) $++K%--j$ iii) $j+1/i-1$ iv) $j++/i--$ v) $++i/++j+1$ (05 Marks)
- 2 a. Mention the types of expressions. Explain with example. (06 Marks)
- b. Write a program in C to find the area of rectangle, triangle and circle. (06 Marks)
- c. Explain the steps of a C program. Explain each step. (08 Marks)

Module – 2

- 3 a. Mention the types of conditional branch statements. Explain else-if ladder with syntax and example. (08 Marks)
- b. Write a program in C to display color names depending on the code using switch statement. (08 Marks)
- c. Differentiate between while and do-while. (04 Marks)
- 4 a. Explain break, continue and exit statements with syntax and example. (08 Marks)
- b. Write a program in C to display multiplication table upto n number. (06 Marks)
- c. What is a loop? Why it is required? Explain. (06 Marks)

Module – 3

- 5 a. What is an array? Mention the types of array. Explain how it is declared, read and printed. (08 Marks)
- b. Explain any four string handling functions. (08 Marks)
- c. Write a program in C to find the factorial of a number using recursion. (04 Marks)
- 6 a. What is a string? Explain how it is declared, read and printed. (08 Marks)
- b. Write a program in C to find the transpose of a matrix. (06 Marks)
- c. What is a function? Mention types of functions. Explain any one with example. (06 Marks)

Module – 4

- 7 a. Explain array of structures with an example. (06 Marks)
- b. What is a file? Explain file mode operations. (06 Marks)
- c. Write a program in C to create a structure of employee with name, Ecode, dept and org as data members and using this structure read and write five employee information. (08 Marks)
- 8 a. Compare array with structure. What are the advantages of structure over array with an example? (08 Marks)
- b. Write the advantages of files. (04 Marks)
- c. Write a program to create a file to read and print 100 students information. (08 Marks)

Module – 5

- 9 a. Mention the types of data structure. Explain any two. (08 Marks)
- b. Explain the applications of stack and linked list. (08 Marks)
- c. What is a pointer? Write the advantages of pointers. (04 Marks)
- 10 a. Mention the types of preprocessors. Explain any two preprocessors. (06 Marks)
- b. What is dynamic memory allocation? Explain the functions of memory allocation. (06 Marks)
- c. Write a program in C to add n numbers using a pointer. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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First/Second Semester B.E Degree Examination, June/July 2019
Environmental Studies

(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the fifty questions, each question carries **ONE mark**.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

1. The Constituent assembly which had been elected for undivided India held its first meeting in
a) January 1948 b) December 1946 c) November 1945 d) July 1947
2. The following word has been added to the Preamble by 42nd Constitution Amendment Act.
a) Republic b) Fraternity c) Secular d) Sovereign
3. The minimum age to become eligible for the office of the Governor is
a) 50 years b) 45 years c) 35 years d) 60 years
4. The Election Commission of India does not conduct elections to the
a) Parliament b) Speaker of Lok Sabha
c) State Legislatures d) Office of the Vice-President
5. Traffic in human being means
a) Transporting human beings b) Traffic in places having dense population
c) Illegal sale of human organ d) Buying and selling men and women
6. The Constitution of India classifies the fundamental rights under
a) 6 heads b) 8 heads c) 7 heads d) 5 heads
7. The total number of members in the state Legislative Council should not be less than
a) 40 b) 50 c) 60 d) 100
8. To declare National Emergency a decision must be taken by the
a) Prime Minister b) Speaker of Lok Sabha
c) Chief Justice of India d) Union Cabinet

9. "Creamy Layer" in backward classes means,
 - a) Highly educated persons
 - b) Persons holding high posts
 - c) Highly cultured persons
 - d) Persons having higher incomes
10. Collective responsibility of the Union Cabinet means, all Ministers are collectively responsible to the
 - a) Prime minister
 - b) President
 - c) Lok sabha
 - d) Parliament
11. The Directive Principles of State Policy are
 - a) Social Rights
 - b) Political rights
 - c) Constitutional Rights
 - d) Legal Rights
12. This is not a Fundamental Duty
 - a) To develop scientific temper
 - b) Not to indulge in corrupt practices
 - c) To respect National Flag and the National Anthem
 - d) To abide by the constitution
13. High Court Judges are appointed by the
 - a) Prime Minister
 - b) President
 - c) Chief Justice of India
 - d) Union Law Minister
14. Writ of Mandamus can be issued on the ground of
 - a) Unlawful detention
 - b) Unlawful occupation of public office
 - c) Non-performance of public duties
 - d) All of these
15. Under which of the following Articles, the procedure for amending the Indian Constitution is detailed?
 - a) Article 360
 - b) Article 356
 - c) Article 365
 - d) Article 368
16. It is not the objective enshrined in the Preamble to
 - a) Secure shelter and livelihood to all
 - b) Equality of status
 - c) Liberty of thought and expression
 - d) social, economic and political justice
17. The Vice-President of India is elected by the
 - a) Members of Lok sabha
 - b) Members of Rajya sabha
 - c) Members of both Lok sabha and Rajya sabha
 - d) Members of Lok sabha and all state Legislative Assemblies
18. At present, the number of members in Election Commission of India including the Chairman is
 - a) 3
 - b) 4
 - c) 5
 - d) 6
19. What is the maximum percentage of jobs that can be reserved by a state for other backward classes (OBC) people (other than SC and ST) in the Government jobs?
 - a) 25%
 - b) 27%
 - c) 30%
 - d) 35%

20. While proclamation of National Emergency is in operation, the President cannot suspend following Fundamental Rights.
 a) Article 14 and Article 15
 b) Article 14 and Article 16
 c) Article 20 and Article 21
 d) Article 32
21. The minimum age to contest the election of a State Legislative Assembly is
 a) 30 years
 b) 21 years
 c) 35 years
 d) 25 years
22. Oath of office and secrecy is administered to the President of India before entering upon his office by
 a) Speaker of Lok Sabha
 b) Prime Minister
 c) Chief Justice of India
 d) Vice-President
23. Chief Justice of India holds the office until he attains the age of
 a) 58 years
 b) 60 years
 c) 65 years
 d) 70 years
24. "Mandal Commission" appointed in 1978 deals with
 a) Laws relating to sexual harassment
 b) Reservation for backward classes people
 c) rights of the minorities
 d) Laws relating to child labour
25. An arrested person by the police personnel should be allowed to
 a) contact his relative
 b) consult his Lawyer
 c) contact higher police officer
 d) contact magistrate
26. Article 21A – Right to Education as a Fundamental Right has been added by
 a) 74th Constitution Amendment Act
 b) 76th Constitution Amendment Act
 c) 86th Constitution Amendment Act
 d) 91th Constitution Amendment Act
27. The Governor of a state may resign his office by writing to
 a) The chief Justice of India
 b) The Chief Minister of the State
 c) Prime Minister
 d) President
28. Under the Indian Constitution, the subjects of administration have been divided into
 a) Two lists
 b) Three lists
 c) Four lists
 d) Five lists
29. The Prime Minister is the link between
 a) The President and Union Council of Ministers
 b) The President and both houses of the Parliament
 c) The Legislature and the Executive
 d) India and Foreign States
30. Which of the following confers upon the citizens, the right to approach a Court of Law for the protection and restoration of fundamental rights?
 a) Right to equality
 b) Right to liberty
 c) Right to Constitutional remedy
 d) Right against exploitation
31. The Fundamental Duties incorporated in our Constitution under Part IV – A are based on the
 a) German Constitution
 b) Russian Constitution
 c) Constitution of Ireland
 d) U.S.A. Constitution

32. The Directive Principles of State Policy direct the state to improve
a) Standard of education
b) Standard of Public Health
c) Judicial system
d) Law and order conditions
33. When the State Emergency is declared, all or any of the functions of the State Government are assumed by the
a) President
b) Governor
c) Chief Minister
d) Union Cabinet
34. Elections to Lok sabha and State Legislative Assemblies in India are conducted on the basis of
a) Adult franchise
b) single transferable vote
c) Proportional representation
d) Limited suffrage
35. Article 24 of the Indian Constitution prohibits employment of children below the age of _____, years in any factors or mine or any other hazardous employment.
a) 12
b) 14
c) 16
d) 18
36. In the first stage, the Proclamation of Financial Emergency remains in operation for
a) one month
b) two months
c) three months
d) six months
37. The joint session of the two houses of the Parliament is presided over by the
a) President
b) Prime Minister
c) Vice-President
d) Speaker of Lok sabha
38. Chief Election Commissioner and other Election Commissioners are appointed by the
a) Chief Justice of India
b) Prime Minister
c) President
d) Union Home Minister
39. The Directive Principles of State Policy incorporated in the Indian Constitution are based on the constitution of
a) Russia
b) Ireland
c) Canada
d) Australia
40. National Commissions for scheduled castes and Scheduled Tribes have to submit their annual reports to the
a) Vice-President
b) Union Home Minister
c) Speaker of Lok sabha
d) President
41. Engineering Profession is considered to be like a building, its foundation is
a) Hard and sincere work
b) Sound common sense and expert knowledge
c) Expert engineering knowledge and skill
d) Honesty
42. Engineering ethics is a
a) Preventive ethics
b) Developing ethics
c) Natural ethics
d) Scientifically developed ethics
43. Conflict of interest exists for an engineer when he is subject to
a) Threats
b) Loyalties
c) Professional harassments
d) Professional impediments

44. Protection of the expression of ideas, but not the ideas themselves is called
a) Patent b) Forging c) Copy right d) Plagiarism
45. Fault tree is used
a) To assess the risk
b) In engineering testing
c) To assess the accuracy of the research work
d) To trace the fault in engineering work
46. Using the trade secrets of a former employer amounts to
a) Self deception b) Self dishonesty
c) Plagiarism d) Misusing the truth
47. This is not dishonesty in science and engineering
a) Forging b) Blending c) Trimming d) Cooking
48. As applied to responsibility, attitude of avoiding blame or being safe is the prime concern in
a) Reasonable care b) Minimalist approach
c) Good works views d) All of these
49. These are not trade secrets
a) Principles b) Formulas c) Devices d) Patterns
50. The owner of Patent right retains his patent right for _____ years from the date of filing.
a) 10 b) 15 c) 20 d) 50

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18ELN14/24

First/Second Semester B.E. Degree Examination, June/July 2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is semiconductor diode? Explain the different equivalent circuits of diode. (06 Marks)
- b. Explain the working of photodiode. (05 Marks)
- c. With a neat circuit diagram and waveforms, explain the working of full wave bridge rectifier. Also derive V_{dc} and V_{rms} values for full wave rectifier. (09 Marks)

OR

- 2 a. A full wave rectifier uses 2 diodes having internal resistance of 20Ω each. The transformer rms secondary voltage from centre to each end is 50V. Find I_m , I_{dc} , I_{rms} and V_{dc} if the load is 980Ω (06 Marks)
- b. Explain the functional block diagram of $78\times\times$ series voltage regulator. (06 Marks)
- c. Explain how Zener diode can be used as a voltage regulator. Give detail mathematical analysis. (08 Marks)

Module-2

- 3 a. With a neat circuit diagram explain the working of CMOS inverter. (06 Marks)
- b. For a N-channel JFET if $I_{DSS} = 8mA$ and $V_p = -5V$, calculate I_D at $V_{as} = -3V$ and V_{as} at $I_D = 3mA$. (05 Marks)
- c. Explain the construction, working and characteristics of N- channel JFET. (09 Marks)

OR

- 4 a. Explain the working of SCR using two transistor model. (06 Marks)
- b. What is commutation in SCR? Explain two types of commutation. (05 Marks)
- c. Explain the construction, working and characteristics of enhancement type MOSFET. (09 Marks)

Module-3

- 5 a. What is Op – AMP? List the characteristics of ideal Op – Amp. (06 Marks)
- b. Explain how Op – Amp can be used as i) Integrator ii) Voltage Follower. (08 Marks)
- c. Find the output of the Op – Amp circuit shown in Fig Q5(c) below

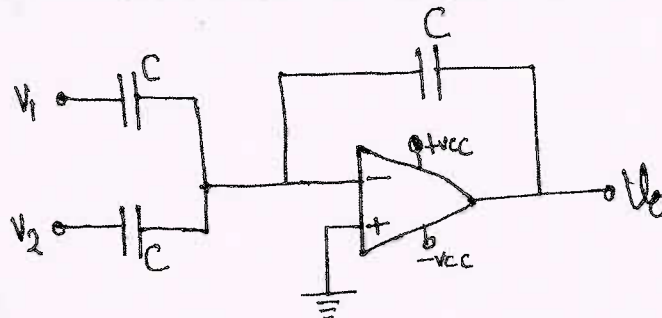


Fig Q5(c)

(06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revcaling of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the following terms with respect to Op – Amp
 i) CMRR ii) Slew Rate iii) Output offset voltage iv) Supply voltage Rejection Ratio. (08 Marks)
- b. Design on Op – Amp circuit to obtain output expression as $V_0 = - [V_1 + 3V_2 + 5V_3]$. (06 Marks)
- c. Explain how Op – Amp can be used as differentiator. (06 Marks)

Module-4

- 7 a. What is feedback amplifier? What are the properties of negative feedback amplifier? (06 Marks)
- b. Explain how transistor can be used as an amplifier. (06 Marks)
- c. With a neat circuit diagram and waveforms, explain the working of 555 timers as an oscillator. (08 Marks)

OR

- 8 a. Draw the block diagram of voltage series negative feedback amplifier and derive the expression for its voltage gain. (06 Marks)
- b. Design a RC phase shift oscillator for a frequency of 1KHz. Draw the circuit diagram with designed values. (06 Marks)
- c. With a neat circuit diagram, explain the working of Wein Bridge oscillator. (08 Marks)

Module-5

- 9 a. Perform the following :
 i) Convert $(925.75)_{10}$ to base – 2 and base - 16
 ii) Subtract from $(11011.11)_2$ from $(10101.11)_2$ using 2's compliment method. (06 Marks)
- b. With a block diagram explain the working of 3-bit asynchronous counter. (06 Marks)
- c. What is multiplexer? Implement 8:1 multiplexer using basic gates. (08 Marks)

OR

- 10 a. Simplify $S = A \oplus B \oplus C$ and realize using basic gates. (05 Marks)
- b. What is flip-flop? Explain the operation of master slave JK flip flop. (06 Marks)
- c. Implement full adder using two half adders. (04 Marks)
- d. With a block diagram, explain the working of basic communication system. (05 Marks)

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17ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is PN junction diode? With the help of circuit diagram, explain the VI characteristics of a diode. (07 Marks)
- b. What is rectifier circuit? Explain the classification of the rectifier. Derive the following expressions for Half-wave rectifier: (i) I_{dc} (ii) I_{rms} (iii) η (iv) γ (08 Marks)
- c. Design a Zener diode voltage regulator circuit to meet the following specifications: $I_L = 20$ mA, $V_o = 5$ V, $P_z = 500$ mW, $V_i = 12 \pm 2$ V and $I_{zmin} = 8$ mA. (05 Marks)

OR

- 2 a. What is a transistor? What are its applications? Explain the various current gains in a transistor and derive the relation between α and β . (07 Marks)
- b. With a neat circuit diagram, explain the input and output characteristics of the common emitter configuration. (08 Marks)
- c. Explain the operation of full wave rectifier with capacitor filter. (05 Marks)

Module-2

- 3 a. For the base bias circuit, $V_{CC} = 18$ V, $R_C = 2.2$ K Ω , $R_B = 470$ K Ω and $\beta = 100$. Find I_B , I_C and V_{CE} . Draw the DC load line and locate the operating point. (07 Marks)
- b. Draw the circuit diagram of the voltage divider biasing circuit. Derive the expressions of I_B and V_{CE} . (05 Marks)
- c. List out the various ideal op-amp characteristics. Explain the terms CMRR and Slew rate. (08 Marks)

OR

- 4 a. Derive the output equation of the inverting adder. Design an adder op-amp circuit to obtain an output voltage $V_o = -(0.1V_1 + 0.5V_2 + 20V_3)$. Select $R_f = 10$ K Ω . (07 Marks)
- b. What is an integrator? Derive its output equation. (05 Marks)
- c. Derive the output expressions for the following op-amp applications:
(i) Voltage follower (ii) Subtractor (08 Marks)

Module-3

- 5 a. What are Radix-2, Radix-8, Radix-10 and Radix-16 number system? Perform the following operations:
i) $(1234.56)_8 = (?)_{10}$ ii) $(BAD.DAD)_{16} = (?)_8$ iii) $(988.86)_{10} = (?)_{16}$ (08 Marks)
- b. Perform the following using 2's complement method:
i) $(15)_{10} - (28)_{10}$ ii) $(1011.10)_2 - (1000.01)_2$ (05 Marks)
- c. Write the symbol and truth table of the following gates:
i) AND ii) NOR iii) XOR iv) NAND (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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OR

- 6 a. Simplify and realize the following Boolean expressions using basic gates:
- $Y = \overline{A} \overline{B} \overline{C} + \overline{A} \overline{B} C + \overline{A} B \overline{C} + A \overline{B} \overline{C}$
 - $Y = ABC + A\overline{B}C + AB\overline{C} + \overline{A}BC$
 - $Y = \overline{(A+B)(A+C)(B+C)}$ (08 Marks)
- b. Implement XOR gate using only NOR gates. (05 Marks)
- c. Write truth table of half-adder and full-adders. Realize the full-adder using two half-adders. (07 Marks)

Module-4

- 7 a. What is flip-flop and latch? Explain the operation of SR latch using NAND gates. (07 Marks)
- b. Explain the working of clocked SR flip-flop with a suitable logic diagram and a truth table. (08 Marks)
- c. Explain the working of NAND gate latch and NOR gate latch. (05 Marks)

OR

- 8 a. What is microcontroller? List out the main features of 8051 microcontroller. (05 Marks)
- b. With a neat block diagram, explain the architecture of 8051 microcontroller. (09 Marks)
- c. What is stepper motor? Explain the working and interfacing of stepper motor to a 8051 microcontroller. (06 Marks)

Module-5

- 9 a. What is amplitude modulation and frequency modulation? With the help of neat waveform, derive the expression for AM wave. (07 Marks)
- b. A carrier signal with $A_c = 40$ V and $f_c = 1$ MHz is amplitude modulated with a modulating signal $A_m = 4$ V and $f_m = 2.5$ kHz. The depth of the modulation is 75%. Calculate the following: (i) P_c (ii) P_T (iii) P_{SB} (iv) BW (v) Sideband frequencies. Assume $R = 2\Omega$. (07 Marks)
- c. What is demodulation? Explain the working of AM detector circuit. (06 Marks)

OR

- 10 a. What is transducer? Explain the working of resistance transducer and resistance thermometer. (07 Marks)
- b. What is LVDT? Explain the construction, operation and applications of LVDT. (07 Marks)
- c. Explain the working of piezoelectric and photoelectric transducers. (06 Marks)

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15ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2019 Basic Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Draw forward and reverse V- I, characteristics of Si and Ge diodes and make any two comparison between Si and Ge diodes. (04 Marks)
- b. With a neat circuit diagram, input and output waveforms, explain the working of an Half wave diode rectifier. (06 Marks)
- c. A full-wave rectifier supplies a load of 1000Ω. The ac voltage applied to it is 200-0-200 V(rms). Calculate i) I_{Dc} ii) I_{rms} iii) efficiency (η), Assume $R_f = 0\Omega$. (06 Marks)

OR

- 2 a. Define 'α' and 'β' of a transistor amplifier and derive the relation between α and β. (04 Marks)
- b. With a neat circuit diagram, input and output waveforms, explain the operation of a Full wave two diode rectifier. (06 Marks)
- c. Draw an output characteristics of CE-transistor amplifier, mark different regions of working on it, explain each region of working. (06 Marks)

Module-2

- 3 a. With a neat sketch and equations, explain what is dc load line and bias point in a CE base bias amplifier. (04 Marks)
- b. Explain with neat circuit diagram and equations, voltage divider bias amplifier. (06 Marks)
- c. Design bias-bias transistor circuit, using 'Si' transistor having 'β' value of 100, V_{CC} is 10V, and dc bias conditions are to be $V_{ce} = 5v$ and $I_c = 5mA$. (06 Marks)

OR

- 4 a. Define CMRR and slew rate and write any four ideal characteristics for op-amp. (04 Marks)
- b. With a neat circuit diagram, derive an equation for op-amp application as

i) Inverting amplifier	ii) Non-inverting amplifier
iii) Inverting 2-input summer	iv) Subtractor
v) Integrator	vi) Differentiator.

(12 Marks)

Module-3

- 5 a. Convert $(1101010)_2 = ()_{10}$ and $(65)_{10} = ()_2$ (04 Marks)
- b. Convert $(ABCD)_{16} = ()_8$ and $(16000)_8 = ()_{16}$ (04 Marks)
- c. Write the truth table, design equations and circuit diagram of an Half adder using logic gates. (08 Marks)

OR

- 6 a. State and prove De Morgan's Theorem for 3-variables. (04 Marks)
- b. Realize AND, OR and EX-OR gates using NAND gates. (06 Marks)
- c. Perform the following subtraction using 1's and 2's complement, $(10111001)_2 - (1011)_2$. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Compare flip-flop and Latch. (02 Marks)
b. With circuit diagram and truth table explain the working of a NAND gate latch. (07 Marks)
c. Explain the operation of clocked RS-flip flop, with circuit diagram and truth table. (07 Marks)

OR

- 8 a. Explain with circuit diagram and truth table working of NOR gate latch. (06 Marks)
b. Draw the architecture of 8051 microcontroller, explain the function of each block used in it. (10 Marks)

Module-5

- 9 a. Draw the block diagram of communication system, explain the functions of each block used in it. (05 Marks)
b. Define amplitude modulation and derive equation of amplitude modulated double side band wave. (05 Marks)
c. A carrier of 2MHz has 1kW of its power amplitude modulated with a sinusoidal signal of 2KHz, the depth of modulation is 60% Calculate the side band frequencies, signal band width, power in side bands, and total power of modulated wave. (06 Marks)

OR

- 10 a. Distinguish between active and passive transducers. (02 Marks)
b. Bring out any four differences between amplitude modulation and frequency modulation. (04 Marks)
c. Explain with neat diagram working of LVDT. (10 Marks)

First Semester B.E. Degree Examination, June/July 2019
Basic Electronics

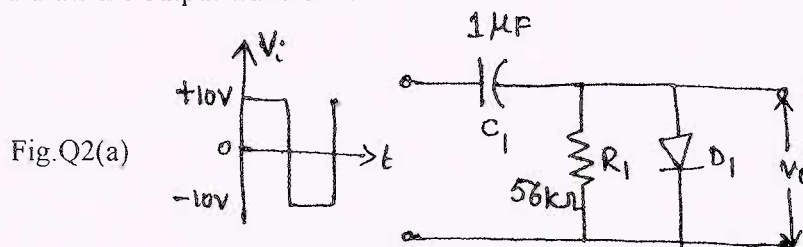
Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast ONE question from each part.

PART - 1

1.
 - a. Sketch and discuss the forward and reverse characteristics of a silicon diode. (05 Marks)
 - b. Define rms and dc or average value of voltage, peak inverse voltage, ripple factor and conversion efficiency with respect to Half wave rectifier. (10 Marks)
 - c. A full wave rectifier circuit provides peak secondary voltage of 35V, the load resistance $R_L = 1\text{ k}\Omega$, $R_T = 13\Omega$, $R_s = 12\Omega$. Find the dc and rms value of output voltage. Also find the regulation. (05 Marks)
2.
 - a. The diode clamping circuit in fig. Q2(a) has $\pm 10\text{V}$, 1 kHz square wave input. Calculate the tilt, and draw the output waveform. (06 Marks)



- b. Sketch and explain Zener diode voltage regulator. Discuss the effects of load current. (06 Marks)
 - c. Explain BJT common emitter configuration with a suitable circuit, to draw the input and output characteristics. (08 Marks)

PART - 2

3.
 - a. Explain the operation of Base bias circuit and write the equations for I_B , I_C and V_{CE} . (04 Marks)
 - b. A voltage divider bias circuit has $V_{CC} = 10\text{V}$, $R_C = 2.2\text{ k}\Omega$, $R_1 = 82\text{ k}\Omega$, $R_2 = 18\text{ k}\Omega$, $R_E = 0.5\text{ k}\Omega$. Find the 'Q' point and terminal voltages (V_B , V_C , V_E). Draw the load line and locate the operating point. (08 Marks)
 - c. Mention the ideal characteristics of an Op - amp and explain the concept of virtual ground. (08 Marks)
4.
 - a. Derive an expression for output voltage of a Non - Inverting summing circuit. Draw the circuit. (10 Marks)
 - b. The two input voltages of an op-amp are 2V and 3V. The common output voltage is 2mV and the difference mode output voltage is 9V. Find CMRR. (05 Marks)
 - c. For a base bias circuit configuration $R_B = 470\text{ k}\Omega$, $R_C = 2.2\text{ k}\Omega$ and $V_{CC} = 18\text{V}$ and $\beta = 100$. Find I_B , I_C , V_{CE} . (05 Marks)

PART - 3

- 5 a. Convert : i) $(47.8125)_{10} = (?)_2$ ii) $(1011101.1011)_2 = (?)_{16}$ iii) $(BCDE)_{16} = (?)_8 = (?)_{10}$. (06 Marks)
- b. Subtract i) 101000_2 from 0101111 using one's complement
ii) $(15)_{10} - (18)_{10}$ using 2's complement. (05 Marks)
- c. State and prove De - Morgan's theorem for two input variables by induction method. (05 Marks)
- d. Realize 'AND' gate using 'NOR' gate and 'OR' gate by 'NAND' gates only. (04 Marks)
- 6 a. Simplify the following Boolean expressions and implement the same using NOR gates only.
i) $F = \bar{X} \bar{Y} \bar{Z} + \bar{X} \bar{Y} \bar{Z} + \bar{X} \bar{Y} + X \bar{Y}$ ii) $F = (X + Y) (\bar{X} + Z) (\bar{Y} + Z)$. (07 Marks)
- b. For the given Boolean expression, draw the logic diagram using basic gates.
i) $Y = \overline{AB(C+D)}$ ii) $Z = \overline{X+AB}$. (05 Marks)
- c. Design Full adder using Half address. Write the expressions for SUM and CARRY. Also write the Truth Table. (08 Marks)

PART - 4

- 7 a. Draw NOR gate latch and its truth table. Explain the working of a NOR gate latch. (04 Marks)
- b. With a block diagram, explain the working of 8085 μ p. (06 Marks)
- c. Explain the working of clocked RS flip - flop. (05 Marks)
- d. What is Transducer? Compare active and passive transducers. (05 Marks)
- 8 a. Explain the working of LVDT. (06 Marks)
- b. Define Seebeck effect, Peltier and Thompson effect. (06 Marks)
- c. What is a microcontroller? List specific features of 8051 architecture. (06 Marks)
- d. Bring out the differences between piezoelectric and photo electric transducers. (02 Marks)

PART - 5

- 9 a. Derive an expression for AM wave. Write the spectrum. (06 Marks)
- b. Show that the total power in the modulated wave is 1.5 times the power in carrier. (06 Marks)
- c. Derive an expression for frequency modulated wave. (08 Marks)
- 10 a. Compare AM and FM. (05 Marks)
- b. Explain the operation of mobile communication with a block diagram. (05 Marks)
- c. Write a note on ISDN. (05 Marks)
- d. What are the advantages and disadvantages of an optical fiber communication? (05 Marks)

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First/Second Semester B.E. Degree Examination, June/July 2019
Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions, choosing one full question from each module.
2. Use of Steam table is permitted.

Module-1

- 1 a. List and explain any one source of energy. (06 Marks)
 b. Explain briefly : (i) Global Warming (ii) Ozone depletion (06 Marks)
 c. Find the enthalpy of 1 kg of steam at 12 bar when,
 (i) Steam is dry saturated.
 (ii) Steam is 22% wet and
 (iii) Super heated to 250°C
 Assume the specific heat of the super heated steam as 2.25 KJ/kgK. (08 Marks)

OR

- 2 a. Explain briefly any two of the following:
 (i) Zeroth law of thermodynamics.
 (ii) First law of thermodynamics.
 (iii) Second law of thermodynamics. (06 Marks)
 b. Explain formation of steam with the help of Temperature-Enthalpy (T-h) diagram. (08 Marks)
 c. Find the specific volume and enthalpy of 1 kg of steam at 0.8 MPa.
 (i) When the dryness fraction is 0.9.
 (ii) When the steam is super heated to a temperature of 300°C.
 The specific heat of the super heated steam is 2.25 KJ/kgK. (06 Marks)

Module-2

- 3 a. With a neat labeled diagram, explain working of Babcock and Wilcox boiler. (08 Marks)
 b. Define prime movers and explain working of Pelton wheel turbine with a neat sketch. (12 Marks)

OR

- 4 a. Define (i) Boiler Mountings. (ii) Boiler Accessories.
 Explain functions of any five mountings or accessories. (12 Marks)
 b. What are hydraulic pumps? Explain centrifugal pump with a neat sketch. (08 Marks)

Module-3

- 5 a. Explain 4-s petrol engines with P-V diagram. (10 Marks)
 b. Give comparisons between petrol and diesel engines. (05 Marks)
 c. A four stroke IC engine running at 450 rpm has a bore diameter of 100 mm and stroke length 120 mm. The indicated diagram details are,
 (i) Area of the diagram 4 cm²
 (ii) Length of the indicated diagram 6.5 cm
 (iii) Spring value of the spring used 10 bar/cm.
 Calculate the indicated power of the engine. (05 Marks)

OR

- 6 a. Explain with a neat sketch working of vapour compression Refrigerator. (08 Marks)
 b. Define : (i) Ton of Refrigerator (ii) COP (iii) Ice making capacity (06 Marks)
 c. List commonly used refrigerants and mention the applications of air conditioners. (06 Marks)

Module-4

- 7 a. Classify ferrous and non ferrous metals. (05 Marks)
 b. Define composites, explain any two of the following : (i) Piezoelectric materials.
 (ii) Shape memory alloys (iii) Optical fibre glass. (05 Marks)
 c. Classify metal joining processes, explain TIG (Tungsten Inert Gas) Welding with a neat sketch. (10 Marks)

OR

- 8 a. Derive an expression for length of the belt in open belt drive. (10 Marks)
 b. Mention advantages and disadvantages of V-Belt drive. (05 Marks)
 c. List different types of gears and explain any one with its advantages. (05 Marks)

Module-5

- 9 a. Explain briefly the following:
 (i) Turning
 (ii) Facing
 (iii) Thread cutting (06 Marks)
 b. Explain the working of horizontal milling machine with a simple line diagram. (08 Marks)
 c. Explain briefly:
 (i) Angular milling.
 (ii) Gang milling.
 (iii) Plane milling. (06 Marks)

OR

- 10 a. Explain briefly the components of a CNC machine with a neat block diagram. (08 Marks)
 b. Define Robots and mention its general applications. (07 Marks)
 c. Write short note on:
 CNC Machining Center or Turning Center. (05 Marks)

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17EME14/24

Second Semester B.E. Degree Examination, June/July 2019 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Distinguish between non-renewable and renewable sources of energy. (06 Marks)
 b. With neat sketch describe working hydroelectric power plant. (08 marks)
 c. What are bio fuels? Compare them with petroleum based fuels. (06 Marks)

OR

- 2 a. What is a boiler? Classify them. (06 marks)
 b. Briefly describe steam formation with the help of T-H diagram. (04 marks)
 c. Explain working of Babcock and Wilox boiler with a neat sketch. (10 marks)

Module-2

- 3 a. Distinguish between impulse and reaction steam turbines. (06 Marks)
 b. Explain working of Kaplan water turbine. (08 Marks)
 c. Compare petrol engine with diesel engine. (06 Marks)

OR

- 4 a. A four stroke single cylinder internal combustion engine has a volume of 6 litres and runs at 300 rpm. At full load, tight side and slack side tensions of belt dynamometer are 700N and 300N respectively. The diameter of pulley dynamometer is 1m. The mass of fuel is 4 kg/hr with a calorific value of 42000kJ/kg. If the indicated mean effective pressure is 6 bar, determine the brake power, indicated power, mechanical efficiency, indicated thermal efficiency and brake specific fuel consumption. (10 Marks)
 b. With neat sketches explain working of four stroke petrol engine. (10 Marks)

Module-3

- 5 a. What is machine tool? Explain thread cutting and taper turning operations with neat sketches. (08 Marks)
 b. Differentiate between reaming and boring. (06 marks)
 c. Sketch and explain slot milling and end milling. (06 Marks)

OR

- 6 a. Compare NC machine tool with CNC machine. (04 Marks)
 b. What is automation? Enlist advantages and limitation of robot physical configuration with neat sketches. (16 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. State the composition, properties of any four ferrous metals. (08 marks)
b. How are composite materials classified? Enlist their application in biomedical and military. (08 Marks)
c. Sketch and explain electric arc welding. (04 Marks)

OR

- 8 a. State the composition and applications of any four non ferrous metals. (08 Marks)
b. Compare welding with brazing. (06 marks)
c. Sketch and explain gas welding. (06 Marks)

Module-5

- 9 a. What is refrigeration? What are desirable properties of a good refrigerant? (06 marks)
b. Compare refrigeration system with air conditioning. (04 Marks)
c. Explain the principle and working of vapour absorption refrigeration with neat sketch. (10 Marks)

OR

- 10 a. Name commonly used refrigerants for different applications. (05 marks)
b. What is principle of refrigeration? Name essential parts of refrigerator and briefly explain their functions. (05 marks)
c. Explain the principle and working of room air conditioner with neat sketch. (10 Marks)

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14EME14/24

First/Second Semester B.E. Degree Examination, June/July 2019 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Classify renewable and non-renewable energy sources and explain. (10 Marks)
b. Name some of the bio-fuels used in engineering application. (05 Marks)
c. Explain the principle of solar photovoltaic cell. (05 Marks)

OR

- 2 a. Classify the fuels and explain,
i) Calorific value (08 Marks)
ii) Combustion. (08 Marks)
b. Explain the properties of steam and with a neat sketch explain the formation of steam. (08 Marks)
c. List the boiler mountings and accessories. (04 Marks)

Module-2

- 3 a. Explain with a neat sketch and working principle of Parson's turbine. (08 Marks)
b. Classify turbines in detail. (04 Marks)
c. With P-V diagram, explain four stroke diesel engine. (08 Marks)

OR

- 4 a. With a neat sketch, explain two stroke petrol engine. (08 Marks)
b. Explain principle and working of pelton wheel. (06 Marks)
c. In a 4 stroke diesel engine has a piston diameter 250 mm, stroke 400 mm, mep = 4 bar and speed is 500 rpm. Diameter of the brake drum is 1000 mm. Effective brake load is 400 N. Calculate I.P, B.P and F. P. (06 Marks)

Module-3

- 5 a. Classify the robots based on configuration. (06 Marks)
b. What are the advantages and disadvantages of automation? (06 Marks)
c. Explain any four kinds of operations performed on lathe machine. (08 Marks)

OR

- 6 a. Explain any four drilling operations performed on drilling machine. (08 Marks)
b. What are the advantages and disadvantages of robots? (06 Marks)
c. Explain fixed and flexible automation process. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Classify the engineering materials. (06 Marks)
b. Classify the composite materials and its application in aircraft and automobile application. (08 Marks)
c. With a neat sketch, explain oxy – acetylene welding. (06 Marks)

OR

- 8 a. With a neat sketch, explain Arc – welding. (06 Marks)
b. What are the differences between soldering, welding and brazing? (06 Marks)
c. List the application of Ferrous alloys. (04 Marks)
d. Write a note on composites materials and mention its applications. (04 Marks)

Module-5

- 9 a. What are the properties of good refrigerant? (06 Marks)
b. Explain the principle of working of vapour absorption refrigeration, with a neat diagram. (10 Marks)
c. Define the term :
i) COP
ii) Unit of refrigeration. (04 Marks)

OR

- 10 a. Explain the working principle of room air conditioning with a neat sketch. (10 Marks)
b. List commonly used refrigerant and its properties. (06 Marks)
c. Define the term :
i) Ton of refrigeration
ii) Refrigerating effect. (04 Marks)

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