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11506/21506

11506/21506

B. Tech. I - Sem. Main/Back & II–Sem. Back Exam., March – 2021
ESC
1FY3-06 /2FY3-06 Programming for Problem Solving

Time: 2 Hours   **Maximum Marks: 80**
                                                 Min. Passing Marks:

Instructions to Candidates:

Part – A: *Short answer questions (up to 25 words) 5 × 2 marks = 10 marks.*
All five questions are compulsory.

Part – B: *Analytical/Problem solving questions 4 × 10 marks = 40 marks.*
Candidates have to answer four questions out of six.

Part – C: *Descriptive/Analytical/Problem Solving questions 2 ×15 marks = 30 marks.*
Candidates have to answer two questions out of three.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

Instruction for question no. 1 and 2 of part – A :- A program is given below. Identify errors present in the program. If you find this program in order then what will be the output? Justify your answer in 25 words.

Q.1   int main ()   [2]
         {
                 int a = 12, b = 13;
                 if (a = b)
                         printf ("a and b are equal");
                 else
                         printf ("a and b are not equal");
         }

Q.2   int main ()   [2]
       {
            int a [ ] = { 10, 20, 30, 40, 50 };
            int j;
            for (j = 0; j < 5; j++)
            {
                 printf ("%d\n", *(a + j));
            }
       }

Q.3 Convert the following-   [2]

$$(255)_{16} = (?)_{10}$$

Q.4 Convert the following using direct conversion method-   [2]

$$(1234)_8 = (?)_2 = (?)_{16}$$

Q.5 **Suppose** a system have two variables. Draw a flowchart identifying the variable which contains highest number. (No explanation required)   [2]

PART – B

Q.1 (a) What is Stored Program Architecture of computer? Draw the architecture block diagram. Briefly describe each component and their interconnections.   [5]

   (b) Discuss following access methods using suitable example-   [5]

      (i)   Direct Access

      (ii)   Sequential Access

Q.2 Subtract using 2's complement method following steps as shown below (Step 1. Convert to binary → Step 2. Subtract using 2's complement → Step 3. Find magnitude in decimal)   [4+6=10]

   (a)   49 – 25

   (b)   101 - 115

Q.3 Draw a flowchart that read N numbers and also calculates the average of these N Numbers. Write an algorithm for the same. [5+5=10]

Q.4 What is 2 – D Array? Write a program to multiply two matrices A and B of size 3×3 each and store result in matrix C. [2+8=10]

Q.5 (a) Write a program to display the following patterns- [5]

A
A B
A B C
A B C D
A B C D E
:

(b) **What** is **pointer variable**? **Explain, why** pointer variable of a particular data type cannot refer to variable of another data type using suitable example. [5]

Q.6 During festive season a supermarket store offers discounts on total purchase cost under various offers which are as given below- https://www.btubikaner.com

Offer 1: if Purchase amount > = 3000 then Discount = 10%

Offer 2: if Purchase amount > = 6000 then Discount = 15%

Offer 3: if Purchase amount > = 10000 then Discount = 20%

Write a program which accept total purchase amount as input from user and display billing amount after applying discount. (e. g. if purchase cost = 12000/- then billing amount = 9600/- after discount @ 20%) [10]

PART – C

Q.1 (a) Explain features of Assembly level, Low level and High level languages in comparative manner. [8]

(b) What is Primary memory? Define and explain all types of primary memory used by computer systems. [7]

Q.2 Explain the difference between Structures and Unions in C. Write a C program to read the student's name, roll number and marks of three subjects and display the same using structures in C. [5+10=15]

Q.3 Explain following – (use suitable examples as needed) [5+5+5=15]

(a) Break statement

(b) Parameter passing in function

(c) File handling in C language

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11502/21502

11502/21502

B. Tech. I - Sem. Main/Back & II–Sem. Back Exam., March – 2021
BSC
1FY2-02/2FY2-02 Engineering Physics

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks:

Instructions to Candidates:

Part – A: *Short answer questions (up to 25 words) 10 ×3 marks = 30 marks. All ten questions are compulsory.*

Part – B: *Analytical/Problem solving questions 5 × 10 marks = 50 marks. Candidates have to answer five questions out of seven.*

Part – C: *Descriptive/Analytical/Problem Solving questions 4 ×20 marks = 80 marks. Candidates have to answer four questions out of five.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

Q.1 Mention the difference between Fresnel and Fraunhofer class of diffraction. [3]

Q.2 Explain Rayleigh criterion of Resolution. [3]

Q.3 Write important application of Hall Effect. [3]

Q.4 Explain the reason for high intensity of a laser. [3]

Q.5 What is the physical meaning of maximum angle of acceptance for an optical fiber? [3]

Q.6 Explain the advantage of using broad source of light in NR experiment instead of a point source of light. [3]

Q.7 Write the characteristics of wave function. [3]

Q.8   What are matter waves? How they are experimentally verified?   [3]

Q.9   What is the difference between Spontaneous and Stimulated emission?   [3]

Q.10 Give Poisson' and Laplace's equations.   [3]

PART – B

Q.1   Draw labelled diagram of a Michelson's Interferometer. How shall we use it to measure wavelength of a monochromatic source of light?   [10]

Q.2   What is meant by resolving power of a grating? Derive an expression for resolving power of grating & on what factor does it depend?   https://www.btubikaner.com   [10]

Q.3   Describe nature and origin of various forces existing between atoms of solid crystals. Explain the formation of covalent, ionic and metallic bonding in solids.   [10]

Q.4   Give the formulation of time-dependent Schrodinger's equation for a free particle. Discuss the probability density and normalization of the wave function.   [10]

Q.5   What is coherence? Explain temporal and spatial coherence.   [10]

Q.6   A laser beam having a wavelength of 8000 Å and aperture 0.5 cm is set to moon. If distance of moon from earth is 4×10^8 m, then calculate (a) Half angular spread of the beam and (b) Areal spread of the beam when it reaches the moon.   [10]

Q.7   If $\vec{A} = xz^3\hat{i} - 2x^2yz\hat{j} + 2yz^4\hat{k}$, find curl at point (1, - 1, 1).   [10]

PART – C

Q.1 (a) What is X-ray diffraction? Deduce Bragg's Law for the diffraction of X-ray in a crystal, how Bragg's spectrometer is used to determine the wavelength of monochromatic X-rays? [14]

(b) Assuming that there are 5×10^{28} atoms/m^3 in copper, find the Hall coefficient. [6]

Q.2 Write down the Schrödinger's time independent wave equation for a free particle confined in a one dimensional box of size 'a'. Obtain Eigen values and normalized wave function for this particle. [20]

Q.3 What is an optical fiber? What do you mean by numerical aperture of an optical fiber? Find an expression for the Numerical aperture of a step index optical fiber. Write the advantages of optical fiber also. [20]

Q.4 What is meant by population inversion? Give the essential requirements of any laser system. Explain how these requirements are achieved. Explain the working of semiconductor laser with necessary theory. Write down the applications of semiconductor laser. [20]

Q.5 What are Maxwell's Equations? Derive Maxwell's Equations in an Isotropic medium and in free space. [20]

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11501

11501

B. Tech. I - Sem. (Main / Back) Exam., March - 2021

1FY2-01 Engineering Mathematics - I

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks:

Instructions to Candidates:

Part – A: *Short answer questions (up to 25 words) 10 × 3 marks = 30 marks. All **ten** questions are compulsory.*

Part – B: *Analytical/Problem solving questions 5 × 10 marks = 50 marks. Candidates have to answer **five** questions out of **seven**.*

Part – C: *Descriptive/Analytical/Problem Solving questions 4 × 20 marks = 80 marks. Candidates have to answer **four** questions out of **five**.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL_____ 2. NIL_____

PART – A

Q.1 Evaluate - $\beta\left(\frac{5}{2}, \frac{3}{2}\right)$.

Q.2 Write the formula for volume of solid revolution when the revolution is about y – axis.

Q.3 State p – test for convergence of the series.

Q.4 Find whether the series $\sum \frac{\sqrt{n}}{n^2+1}$ is convergent or not.

Q.5 Find Fourier series coefficients a_0 and a_n for the function $f(x) = x^3$, $-\pi \leq x \leq \pi$

Q.6 State Parseval's theorem.

Q.7 If $u = x^y + y^x$, then find $\frac{\partial^2 u}{\partial x \partial y}$.

Q.8 Evaluate - $\int_1^2 \int_0^{3y} y\, dy\, dx$.

Q.9 Discuss curl of a Vector point function.

Q.10 State Gauss – divergence theorem.

PART – B

Q.1 Show that - $\int_0^1 \frac{dx}{\sqrt{(1-x^4)}} = \frac{\sqrt{2}}{8\sqrt{\pi}}\left(\sqrt{\frac{1}{4}}\right)^2$.

Q.2 Test the convergence of the following series -

$$\frac{x}{1.2} + \frac{x^2}{3.4} + \frac{x^3}{5.6} + \frac{x^4}{7.8} + \cdots \ldots \ldots, x > 0.$$

Q.3 Expand $f(x) = e^x$ in a cosine series over $(0, 1)$.

Q.4 Find the directional derivative of the function $f = x^2 - y^2 + 2z^2$ at the point $P(1, 2, 3)$ in the direction of the line PQ where Q is the point $(5, 0, 4)$.

Q.5 Discuss the maximum or minimum values of $u = x^3 y^2 (1 - x - y)$.

Q.6 Change the order of the integration in –

$I = \int_0^1 \int_{x^2}^{2-x} xy\, dx\, dy$ and hence evaluate the same.

Q.7 Using Green's theorem to evaluate $\int_C (x^2 y\, dx + x^2\, dy)$, where C is the boundary described counter clockwise of the triangle with vertices $(0, 0)$, $(1, 0)$ and $(1, 1)$.

PART – C

Q.1 (a) Find the surface of the solid generated by the revolution of the ellipse $x^2 + 4y^2 = 16$ about its x – axis.

(b) Find the volume of the solid generated by the revolution of $r = 2a \cos\theta$ about the initial line.

Q.2 Find the Fourier series for the function $f(x) = e^{-ax}$, $-\pi < x < \pi$. Hence, prove that –

$$\frac{\pi}{\sin h\pi} = 2\left[\frac{1}{2^2+1} + \frac{1}{3^2+1} + \frac{1}{4^2+1} + \cdots \cdots \cdots\right].$$

Q.3 (a) If $u = \sin^{-1}\left(\frac{x^2+y^2}{x+y}\right)$, then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.

(b) Evaluate – $\int_1^e \int_1^{\log y} \int_1^{e^x} \log z \, dz \, dx \, dy$.

Q.4 (a) Explain cos x in powers of $\left(x - \frac{\pi}{2}\right)$ by Taylor's series.

(b) Discuss the continuity of the function –

$$f(x,y) = \begin{cases} xy^3, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases} \text{ at } (0,0).$$

Q.5 Verify Stoke's theorem for $F = (x+y)\hat{\imath} + (2x-z)\hat{\jmath} + (y+z)\hat{h}$ for the surface of a triangular lamina with vertices (2, 0, 0), (0, 3, 0) and (0, 0, 6).

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B. Tech. I - Sem. Main/Back & II-Sem. Back Exam. March - 2021

BSC

1FY2-03 /2FY2-03 Engineering Chemistry

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks:

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 10 × 3 marks = 30 marks
All **ten** questions are compulsory.

Part – B: Analytical/Problem solving questions 5 × 10 marks = 50 marks
Candidates have to answer **five** questions out of **seven**.

Part – C: Descriptive/Analytical/Problem Solving questions 4 × 20 marks = 80 marks
Candidates have to answer **four** questions out of **five**.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL   2. **NIL**

PART – A

Q.1 What is carbonate hardness?

Q.2 Importance of ammonia buffer in EDTA titration.

Q.3 What is Cetane Number?

Q.4 What is calorific value?

Q.5 What are the basic constituents of cement?

Q.6 Pilling-Bedworth's rule

Q.7 Viscosity index of lubricating oil

Q.8 What is Steam Emulsion Number?

Q.9 Structure and uses of Paracetamol

PART – B

Q.1 Discuss the problem of scales in boilers.

Q.2 Significance of proximate analysis of coal

Q.3 Describe the mechanism of wet corrosion.

Q.4 Discuss the manufacturing of glass of a hard glass with diagram and reactions.

Q.5 What are Lubricants? Explain third layer mechanism of lubrication.

Q.6 Discuss free radical addition in alkanes.

Q.7 Explain various steps involved in municipal water supply.

PART – C

Q.1 What is softening of water? Describe lime – soda softening process with diagram and reactions.

Q.2 What is Coke? Describe the manufacturing of metallurgical coke with diagram and reactions.

Q.3 (a) Discuss pitting corrosion with suitable example.

(b) Explain the chemistry of setting and hardening of cement.

Q.4 (a) Describe the synthesis, properties and uses of Aspirin.

(b) Explain the determination viscosity with Redwood Viscometer No. 1.

Q.5 Write short notes on any four of the following –

(1) Caustic Embrittlement

(2) Regeneration zeolite

(3) Safety glass

(4) Flash and fire point

(5) Role of Gypsum

(6) Cathodic protection from corrosion

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11504/21504

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11504/21504
B. Tech. I - Sem. Main/Back & II–Sem. Back Exam., March – 2021
HMSC
1FY1-04 / 2FY1-04 Communication Skills

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks:

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 5 × 2 marks = 10 marks. All *five* questions are compulsory.

Part – B: Analytical/Problem solving questions 4 × 10 marks = 40 marks. Candidates have to answer *four* questions out of *six*.

Part – C: Descriptive/Analytical/Problem Solving questions 2 ×15 marks = 30 marks. Candidates have to answer *two* questions out of *four*.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART – A

Q.1 What do you understand by the term "Communication"? [2]

Q.2 What is a difference between CV and Resume? [2]

Q.3 What do you mean by Barriers of Communication? Name them. [2]

Q.4 Why did the author order coffee for himself too when he was already worried about the bill? [2]

Q.5 Write the central idea of the poem "Where the Mind is Without Fear" by Rabindranath Tagore. [2]

[11504/21504]

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[2180]

PART – B

Q.1 Distinguish between oral and written communication. [10]

Q.2 Write a paragraph on present "Education System". [10]

Q.3 (a) Change the following into Passive voice - [5]

    (i) I had purchased a car last year.

    (ii) Who broke this table?

    (iii) Please give me your pen.

    (iv) Does he read a book?

    (v) People speak English all over the world.

  (b) Fill in the blanks – [5]

    (i) If I .... (be) a bird I would fly.

    (ii) If they .... (have) enough money, they would buy a BMW car.

    (iii) They will talk to Ram if he .... (come).

    (iv) If they .... (to buy) the cat, their children would have been happy.

    (v) Ritu .... (become) a University lecturer if she studies hard.

Q.4 What are the points to be considered in writing a report? Describe the structure and layout of a report. https://www.btubikaner.com [10]

Q.5 Write the summary of the poem. "No Men Are Foreign" by James Kirkup. [10]

Q.6 What is the significance of the title "How Much Land Does a Man Need"? [10]

PART – C

Q.1 What do you mean by Verbal and Non-Verbal Communication? [15]

Q.2 (a) What qualities does the father want his son to follow in "If"? [7½]

  (b) What is the theme of the story "The Night Train at Deoli"? [7½]

Q.3 What do you mean by Qualities of Good Communication? [15]

Q.4 Wanted a software engineer for XYZ Pvt. Ltd. Co. Apply for this post with resume. [15]

Roll No. _____   Total No. of Pages: 3

11508/21508

B. Tech. I - Sem. Main/Back & II–Sem. Back Exam., March – 2021
1FY3-08 /2FY3-08 Basic Electrical Engineering

Time: 2 Hours   **Maximum Marks: 80**
                                           Min. Passing Marks:

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 5 × 2 marks = 10 marks. All *five* questions are compulsory.

Part – B: Analytical/Problem solving questions 4 × 10 marks = 40 marks. Candidates have to answer *four* questions out of *six*.

Part – C: Descriptive/Analytical/Problem Solving questions 2 ×15 marks = 30 marks. Candidates have to answer *two* questions out of *three*.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

Q.1   Define ideal voltage and current source.   [2]

Q.2   Define effective value of A.C. quantity.   [2]

Q.3   Write down the components of no load current of a transformer.   [2]

Q.4   What is synchronous motor? Classify it on the basis of rotor.   [2]

Q.5   What is power transistor?   [2]

PART – B

Q.1 Frame and solve the node equations of the network shown in figure1. Find out the current following in each branches. [10]
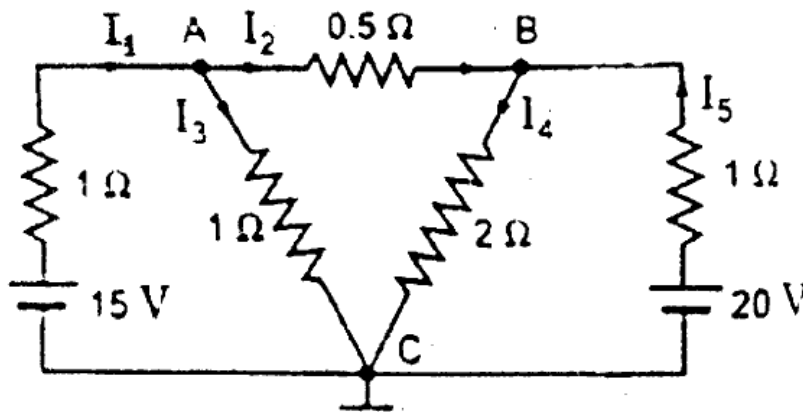

Figure 1

Q.2 Find the RMS value, average value and the form factor of the voltage waveform shown in figure2. [10]
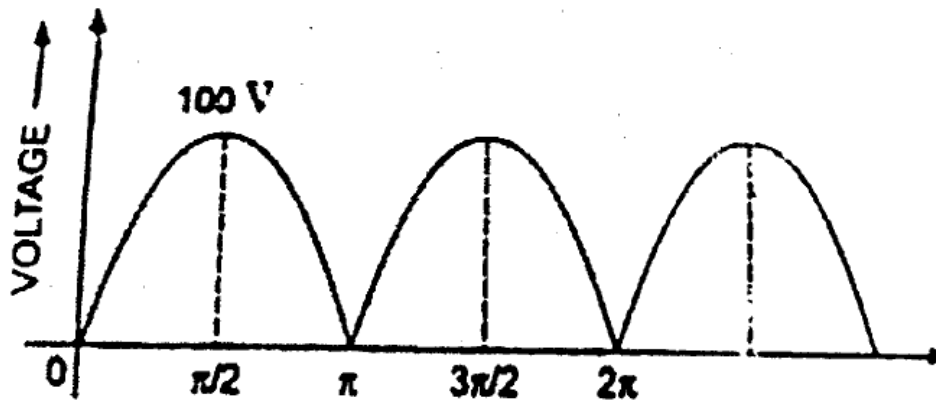

Figure 2

Q.3 Draw and explain simplified equivalent circuit diagram of transformer. [10]

Q.4 Explain Double Revolving Field theory. [10]

Q.5 What is chopper? Classify it and differentiate it with inverter. [10]

Q.6 How power is measured in electrical installation? Describe different methods in brief. [10]

PART – C

Q.1 (a) Find the current following through 2 Ω resistor across branch AB in the circuit, shown in figure 3 using Thevenin's theorem. [9]
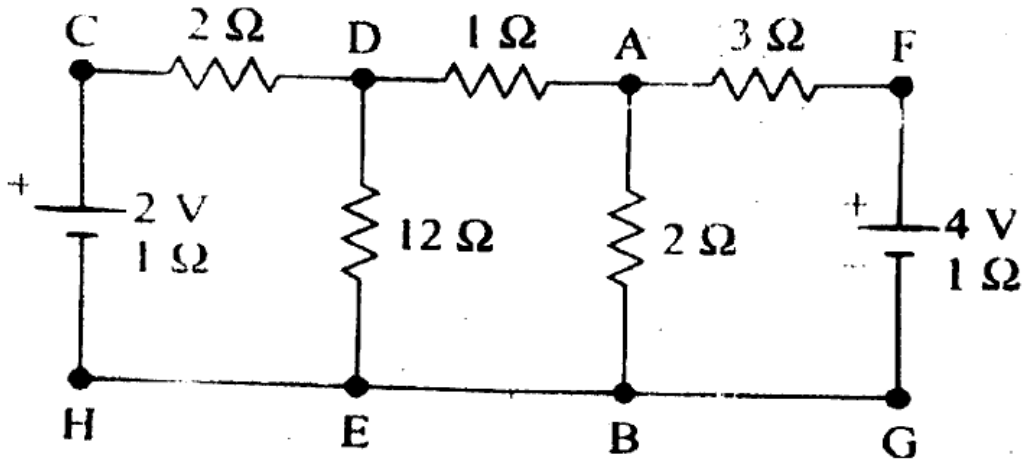

Figure 3

(b) Derive the expression for EMF equation of the transformer. [6]

Q.2 (a) Explain acceptor and rejector circuit and compare them. [9]

(b) What is IGBT? Draw and explain its VI characteristics. [6]

Q.3 (a) Explain speed control methods of separately excited DC motor. [5]

(b) A 50kW, 400V, three phase synchronous machine is operating at full load with an efficiency of 92%. If the field current is adjusted to make its power factor 0.8 leading, estimate the armature current. [5]

(c) Compare SFU, MCB and MCCB. [5]